FUNCTIONAL SERVICING & PRELIMINARY STORMWATER MANAGEMENT REPORT

11 MAIN STREET
ESTATE RESIDENTIAL DEVELOPMENT

TOWNSHIP OF PUSLINCH
COUNTY OF WELLINGTON

PREPARED FOR:

WDD MAIN STREET

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
55 WYNDHAM STREET NORTH SUITE 215
GUELPH, ON N1H 7T8

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by WDD Main Street (Owner) to prepare a Functional Servicing and Preliminary Stormwater Management Report in support of Draft Plan Approval for the estate residential development located at 11 Main Street in the Township of Puslinch (Site). The purpose of this report is to demonstrate the proposed development is feasible from a functional servicing and stormwater management perspective and conforms with the requirements of the Township of Puslinch (Town), County of Wellington (County), and Conservation Halton (Conservation Authority).

This report has been completed in accordance with the appropriate design guidelines and Township of Puslinch Pre-consultation Comment Summary dated October 21, 2022. The relevant background studies and reports used in preparation of this report include:

- Conservation Halton Guidelines for Stormwater Management Engineering Submissions (November 2021)
- Fluvial Geomorphological and Meander Belt Width Assessment (February 13, 2023)
- Geotechnical Investigation (Terraprobe Inc., October 3, 2023)
- Hydrogeological Assessment (Englobe, August 28, 2024)
- Ministry of the Environment Design Guidelines for Drinking-Water Systems (2008)
- Ministry of Environment Stormwater Management Planning and Design Manual (March 2003)
- The Ontario Geologic Survey (OGS) database, accessed February 2023
- The Ontario Building Code (OBC) (2012)
- The Township of Puslinch Municipal Development Standards (September 2019)
- Well Record Database, Ministry of the Environment, Conservation and Parks, accessed February 2023

This report has been prepared to address the third submission comments received from the reviewing agencies (September 27, 2024) and to support the fourth submission of the Zoning By-Law Amendment Application for the proposed development.

2.0 Site Description

The site encompasses an area of approximately 23.60 ha and currently consists of vacant agricultural fields and forested areas. Most of the site is designated as woodlot and wetlands which leaves approximately 5.98 ha of developable area. The site, located in a residential and agricultural area, is bounded by residential dwellings to the north and west, agricultural lands to the east, and forested and agricultural lands to the south.

According to the Development Concept prepared by Weston Consulting dated May 14, 2024, the proposed estate residential development will consist of the following elements:

- Twenty-one (21) estate residential lots with lot sizes ranging from 0.19 ha to 0.38 ha.
- A 20.0 m wide urban municipal right-of-way with road access to Ochs Street.
- Associated forest, landscaped, stormwater management and amenity areas.

The development limits for the proposed development were established based on the following environmental constraints:

- South-western channel 38 m meander belt per the Meander Belt Assessment prepared by Geo Morphix Ltd.
- 10 m offset from the woodlot, staked, and surveyed by Colville Consulting Inc. (September 20, 2022)
- 15 m offset from Regional Floodplain Limits per Conservation Halton HEC-RAS Modelling (BronteReach5, May 14, 2012)

3.0 Soil and Groundwater Conditions

Englobe (formerly Terraprobe) was retained by the Owner to complete a hydrogeological assessment for the proposed residential development. Five (5) boreholes were advanced across the site in August 2022. The boreholes were drilled to depths between 6.1 m and 8.1 m below ground surface (mbgs).

As reported by Terraprobe, the soils encountered consisted of earth fill materials, comprised of sand, with some gravel and trace amounts of rootlets to a depth of 0.8 mbgs.

Underlying the earth fill, silty sand to sand and silt deposits, with trace amounts of clay and gravel was encountered and extended to depths ranging from 0.8 mbgs to the full depth of the borehole. In BH1, a clayey silt deposit with trace amounts of sand was encountered beneath the silty sand to sand and silt layer between 6.1 and 6.6 mbgs. Refer to the Geotechnical Investigation (Terraprobe Inc., October 3, 2023) for the borehole logs and locations.

Referring to Supplementary Standard SB-6 of the 2012 Ontario Building Code (OBC) and the results of the grain size distribution analysis for the soil samples obtained from BH41, BH3, and BH5, the predominant soil is classified as SM-ML soil as described by the Unified Soil Classification System. An SM-ML soil is a silty sand, or sand silt mix with a percolation rate ranging from 8 min/cm to 50 min/cm. Based on the percentage of silt and clay in the soil samples, Crozier assigned a percolation rate of 30 min/cm for this sewage system design.

Monitoring wells were installed in four (4) of the five (5) borehole locations (BH1, BH2, BH3 and BH5) to allow for the measurement of the groundwater levels. Groundwater levels were measured between August 24, 2022 and September 19, 2022. The stabilized groundwater levels ranged from approximately 5.21 m to 6.76 mbgs (311.82 m to 311.42 m above sea level). Refer to the Hydrogeological Assessment (Englobe, August 28, 2024) for additional details.

4.0 Water Servicing

4.1 Water Supply

As the property is in a rural area, there is no municipal water infrastructure available to service the proposed development. The water servicing needs for the proposed development will be provided via private drilled drinking water wells. The depth, size, and locations of the wells will be determined during the detailed design of each individual lot. It should be noted that the groundwater in the area is mostly used by privately drilled groundwater wells.

As part of the response to the Township's comments, Englobe completed a pumping test to determine well capacities within the property. The pumping test was completed in October 2024, the results of which are provided under separate cover.

4.2 Fire Flow Calculations

Preliminary calculations were completed to estimate the required fire storage volume for the proposed development, as there is no municipal water supply for firefighting purposes. The fire storage volume was calculated using the Ontario Fire Marshalls Fire Protection Water Supply Guideline (1999), as is required in Part 3 of the Ontario Building Code.

The fire storage volume was calculated assuming a maximum house footprint of 360 m^2, appropriate separation distances, and assuming a Group C (residential) occupancy. The largest calculated fire storage volume will be provided on-site. **Table 1** below summarizes the preliminary fire storage volumes calculated for the proposed development.

Table 1: Fire Storage Volume Requirements

Lot	Total Area[1] (m^2)	Height (m)	Volume (m^3)	K[1]	S_{side}[2]	Required Fire Storage Volume, Q (L)
Lot 19	360	6.0	2,160	23	1.8	89,400

1. K values for the proposed residential dwellings are assumed based on past similar residential projects.
2. S_{side} values determined from distance to other structures using Figure 1 in Section 6.3 of the Ontario Fire Marshalls Guidelines.

As can be seen from **Table 1**, a storage volume of 89,400 L is the required minimum fire storage volume, and it must be supplied at a rate of 45 L/s for a duration of 0.5 hours. Refer to **Appendix A** for preliminary fire storage volume calculations.

Two fire cisterns have been shown at this preliminary stage to meet the required fire storage volumes and necessary spacing and distribution for the proposed development. The location and size of the fire cisterns can be refined throughout the design process through consultation with the Fire Chief and the Township. Refer to **Figure 1** for the location of the fire cistern.

5.0 Sanitary Servicing

The site is located in a rural area that does not currently have municipal sanitary services available and the Township of Puslinch does not anticipate municipal sanitary servicing for this area in the near future. Therefore, the proposed development will be serviced by individual onsite sewage systems.

5.1 Sanitary Design Calculations

It is understood the proposed development will consist of twenty-one (21) residential lots with private servicing and that the proposed residential dwellings will have three (3) to four (4) bedrooms. For the purpose of this assessment, preliminary sewage system design flows were calculated for a typical four (4) bedroom dwelling with 360 m^2 of finished floor area, three (3) bathroom groups and additional fixtures for a total of 45 fixture units.

The preliminary sewage system design flows were calculated in accordance with the Ontario Building Code, Part 8 and are presented below in **Table 2**. Detailed sanitary servicing calculations are found in **Appendix B**.

Table 2: Preliminary Sewage System Design Flows

Unit Type	Number of Bedrooms	Floor Area (m^2)	Number of Fixture Units	Base Flow (L/day)	Additional Flow – Floor Area (L/day)	Additional Flow – Fixture Units (L/day)	Total Flow Per Unit (L/day)
360 m^2 Residential Dwelling	4	360	45	2,000	1,600	1,250	3,600

As shown, the preliminary sewage system design flow for a typical unit will be approximately 3,600 L/day. These flows were calculated based on the information available at the time of this report. If details of the proposed dwellings change (e.g., number of bedrooms, fixtures, and floor area) during detailed design, the sewage system design flows might change, which may affect the size of the onsite sewage systems.

The detailed design of the onsite sewage systems will be confirmed during the building permit stage and building permits will be required for each sewage system prior to construction. Properties with a total daily design sanitary sewage flow exceeding 10,000 L/day are subject to Section 53 of the Ontario Water Resources Act and require an Environmental Compliance Approval (ECA) issued by the Ministry of Environment, Conservation and Parks. Given the preliminary sewage system design flow is less than 10,000 L/day per individual lot, an ECA is not required.

5.2 Proposed Individual Sanitary Servicing Strategy

Sanitary servicing for the proposed development will be provided through individual Class 4 onsite sewage systems. The onsite sewage system will consist of an advanced treatment unit discharging to a leaching bed constructed as a Type A dispersal bed. Due to space limitations, ,Lot 1 of the development is proposed to be serviced through a shallow buried trench as shown on FIG 2.

5.3 Proposed Sewage System

Nitrate loading calculations were prepared by Terraprobe to determine the effluent concentration of nitrate-nitrogen each sewage system must achieve for the proposed development to meet MECP Guideline D-5-4. Terraprobe has indicated that at least a 62.5% reduction of nitrate-nitrogen (effluent concentration of 15 mg/L) is required. A typical conventional onsite sewage system produces an effluent concentration of nitrate-nitrogen of approximately 40 mg/L. This is insufficient to meet D-5-4 requirements, therefore, advanced treatment with denitrification will be required.

The proposed sewage system will consist of a Level IV treatment unit meeting the CAN/BNQ 3680-600 standard with 62.5% nitrate-nitrogen reduction, discharging treated effluent to a Type A dispersal bed. A Waterloo Biofilter system (or equivalent) with recirculation is proposed. Sewage will flow from the dwelling to a Waterloo Biofilter anaerobic digester tank. Effluent from the digester tank is pumped to the Waterloo Biofilter basket tank, which is equipped with a patented foam media that effectively treats wastewater prior to discharge to the leaching bed. A portion of the treated effluent is recirculated to the anaerobic digester, providing a 62.5% nitrate-nitrogen reduction. Refer to **Appendix C** for additional information and testing results for this technology.

Treated effluent from the Waterloo Biofilter will be discharged to a Type A dispersal bed sized in accordance with Section 8.7.7. of the OBC (with the exception of Lot 1). The Type A dispersal bed consists of a stone layer equipped with perforated distribution pipe, underlain by a sand layer. **Table 3** summarizes the preliminary sizing of the Type A Dispersal Bed.

Table 3: Preliminary Type A Dispersal Bed Sizing

Unit Type	Total Flow Per Unit (L/day)	Minimum Stone Area (m^2)	Provided Stone Area (m^2)	Minimum Sand Area (m^2)	Provided Sand Area (m^2)
360 m^2 Residential Dwelling	3,600	72	72	270	270 - 368

The Preliminary Site Servicing Plans (**Figure 1** and **Figure 2**) illustrate the proposed onsite sewage servicing for the proposed development. The conceptual figure illustrates a Waterloo Biofilter configuration; however, it is noted that any treatment unit meeting CAN/BNQ certification requirements with 62.5% nitrate-nitrogen removal may be considered. The details, size, and location of the onsite sewage systems will be determined once individual home designs and building permit applications are prepared.

6.0 Drainage Conditions

The drainage conditions for the site in both pre-development and post-development conditions are outlined in the following sections.

6.1 Existing Drainage Conditions

According to the topographic survey (J.D. Barnes Limited, September 16, 2022) and site reconnaissance, the site currently consists of vacant agricultural fields and forested areas. The site has a drainage split which divides the site into an eastern and western catchment based on this topographic survey.

The western catchment (Catchment 101A) consists primarily of vacant agricultural lands and generally slopes northeast to southwest. Runoff from Catchment 101A is directed via sheet flow to a tributary of Bronte Creek located along the western development limits of the site.

The central catchment (Catchment 101B) consists primarily of vacant agricultural lands and generally slopes northwest to southeast. Runoff from Catchment 101B is directed via sheet flow to a tributary of Bronte Creek located along the western development limits of the site.

The eastern catchment (Catchment 102) consists primarily of vacant agricultural lands and generally slopes northwest to southeast. Runoff from Catchment 101A and 101B is directed via sheet flow to the eastern drainage feature. Correspondence with Geo Morphix (November 23, 2022) indicated the eastern drainage feature does not exhibit a defined channel and outlets to the Bronte Creek tributary located along the southern portion of the site.

There are two (2) external catchments that drain towards the site via overland flow from the north (Catchment EX1 and EX2). Catchment EX1 and EX2 consist of existing residential properties, roadways, landscaped areas, and Old Morriston Baseball Diamond (Catchment EX1 exclusively). Based on existing LiDAR contour mapping and a site visit complete on January 11, 2023, runoff from Catchment EX1 flows from north to south and is directed to a low-lying depression area located in the eastern corner of the Old Morriston Baseball Diamond. An earthen berm along the south and east property limits of the baseball diamond retains stormwater within the park limits. Please refer to Appendix H for site photos illustrating the berm. If the storage limits are reached, stormwater will drain southwest towards the Bronte Creek tributary via sheet flow. Runoff from Catchment EX2 runs from north to south and is directed to the eastern drainage feature via sheet flow through Catchment 102, ultimately outletting to the Bronte Creek tributary. It is recommended that at detailed design, permission from the owner of the Baseball Diamond be obtained to complete a topographic survey to confirm the elevation of the berm.

Table 4 summarizes the pre-development catchment areas and **Figure 6** illustrates the Pre-Development Drainage Plan.

Table 4: Pre-Development Catchment Areas and Percent Impervious

Catchment ID	Land-Use Description	Impervious Area[1] (ha)	Pervious Area (ha)	Total Area (ha)	Percent Impervious (%)	Outlet
101A	Vacant agricultural land and forested area	-	1.26	1.26	0	Bronte Creek Tributary
101B		-	0.76	0.76	0	
102		-	3.96	3.96	0	
Site Total		**-**	**5.98**	**5.98**	**0**	
EX1	Residential properties, roadways, landscaped areas, and a baseball diamond	1.55	3.62	5.17	30.0	Bronte Creek Tributary
EX2	Residential properties, roadways, and landscaped areas	0.52	0.89	1.41	37.2	
External Total		**2.07**	**4.51**	**6.58**	**31.5**	

Note: 1. Impervious area measurements based on Google Earth aerial imaging and is approximate only.

6.2 Proposed Drainage Conditions

Based on the Development Concept prepared by Weston Consulting (October 3, 2023), the proposed development will consist of twenty-one (21) estate residential lots, associated paved internal roadway, and landscaped areas. Access to the proposed development will be provided from the proposed entrance on Ochs Street.

The proposed site grading divides the site into two (2) internal and four (4) external post-development drainage catchment areas as shown on the Post-Development Drainage Plan (**Figure 7**). Details of each drainage catchment are provided in the following section.

- Catchment 201 (A = 3.50 ha) consists of drainage from the proposed building footprints, front yards fronting Street A, landscaped areas and the internal roadways (Street A). Storm events up to and including the 5-year event (minor storm events) will be collected and conveyed by the internal storm sewer system to the proposed stormwater management facility. Storm events greater than the 5-year event (major storm events) will be conveyed overland within the internal roadways (Street A) to the proposed stormwater management facility. The proposed stormwater management facility will provide quantity, quality, and erosion controls for the stormwater runoff from Catchment 201 prior to outletting to the Bronte Creek Tributary, consistent with existing conditions.

- Catchment 202 (A = 2.48 ha) consists of uncontrolled drainage from the proposed building footprints and rear yards along the east side of Street A. All storm events from this catchment are proposed to be conveyed uncontrolled via overland flow towards the Bronte Creek tributary south of the site, consistent with existing conditions.

- Catchment EXT1 (A = 5.22 ha) consists of uncontrolled external drainage from the existing residential properties, roadways, landscaped areas, and a baseball diamond north of the site. Drainage from this catchment is directed to the southwest corner of the park. An earth berm along the south and east property limits of the park, will prevent drainage from this catchment to enter the proposed lots and will be conveyed to the southwest through the drainage easement and proposed swale between Lot 1 and Lot 2 towards the Bronte Creek tributary, consistent with existing conditions. Site photos have been provided in **Appendix H** to show existing earth berm and drainage conditions.

- Catchment EXT2 (A = 0.26 ha) consists of uncontrolled external drainage from the existing residential properties, roadways, and landscaped areas north of the site. All storm events from these catchments are conveyed by the proposed storm sewer infrastructure and internal roadway within the development towards the proposed stormwater management facility, ultimately outletting to the Bronte Creek tributary.

- Catchment EXT3 (A = 0.26 ha) consists of uncontrolled external drainage from the existing residential properties, roadways, and landscaped areas north of the site. All storm events from these catchments are conveyed by the proposed storm sewer infrastructure and internal roadway within the development towards the proposed stormwater management facility, ultimately outletting to the Bronte Creek tributary.

- Catchment EXT4 (A = 0.46 ha) consists of uncontrolled external drainage from the existing residential properties, Ochs Street expansion, and landscaped areas north of the site. All storm events from this catchment are conveyed towards the existing Badenoch Street storm sewer via sheetflow along Ochs Street.

Under the proposed drainage conditions, all storm events up to the 100-year storm from Catchments 201, EXT2, and EXT3 will be conveyed to the proposed stormwater management facility. Following quantity and quality control, stormwater is to be conveyed to the Bronte Creek Tributary.

Table 5 provides details of the catchment areas and percent imperviousness for the post-development conditions.

Table 5: Post-Development Catchment Areas and Percent Impervious

Catchment ID	Catchment Area (ha)	Land Use(s)	Percent Impervious	Outlet
201	3.50	Building footprints, front yards, and internal roadway	58.0	Bronte Creek Tributary
202	2.48	Building footprints and rear yards	36.7	
EXT1	5.22	Residential properties, roadways, landscaped areas, and a baseball diamond	30.0	
EXT2	0.26	Residential properties, roadways, and landscaped areas	42.0	
EXT3	0.26		30.8	
EXT4	0.46		30.4	Badenoch Street Right-of-Way

Refer to the Post-Development Drainage Plan (**Figure 7**) for proposed drainage conditions and the Preliminary Site Servicing and Preliminary Site Grading Plans (**Figures 1-4**) that illustrate the proposed preliminary site servicing and drainage designs.

7.0 Stormwater Management

Stormwater management and site drainage for the proposed development must adhere to the policies and standards of the Township of Puslinch, Conservation Halton, and Ministry of Environment, Conservation, and Parks (MECP).

The stormwater management criteria for the development have been summarized below:

Water Quantity Control

According to the Township of Puslinch Municipal Development Standards (September 2019), water quantity controls are required for the site. The water quantity requirements include controlling the post-development peak runoff rates to the pre-development peak runoff rates for storms up to and including the 100-year event (i.e., 2, 5, 10, 50, 100-year return periods).

Water Quality Control

At least 80% removal of Total Suspended Solids will be provided with "Enhanced Protection" as outlined in the Stormwater Management Planning and Design Manual (MOE, 2003).

Water Balance

Infiltration facilities shall be designed to ensure that, under post-development conditions, infiltration volumes match the pre-development condition.

Erosion Control

According to Conservation Halton Guidelines for Stormwater Management Engineering Submissions (November 2021), erosion control is recommended such that the 25 mm design storm is retained over at least a 24-hour period.

7.1 Stormwater Modelling Parameters

The Township of Puslinch stormwater management guidelines were referenced to determine the hydrologic parameters for the various catchment areas within the site. The topographic survey prepared by J.D. Barnes Limited (September 16, 2022) and the Hydrogeological Assessment prepared by Englobe (August 28, 2024) were referenced to confirm the land cover, drainage pattern, and on-site soil conditions.

Based on these sources, the hydrologic parameters for pre-development and post-development conditions were determined and are summarized in **Table 6** and **Table 7** below. The detailed hydrologic parameter sheets for each catchment area are included in **Appendix D**.

Table 6: Pre-Development Hydrologic Parameters

Catchment Description	101A[N]	101B[N]	102[N]	EX1[S]	EX2[S]
Drainage Area (ha)	1.26	0.76	3.96	5.22	1.41
Total Imperviousness (%)	-	-	-	30.0	37.2
Directly Connected Imperviousness (%)	-	-	-	20.7	29.1
Curve Number (CN)[1]	67.6	66.9	67.9	80.0	80.0
Time to Peak (hours)	0.14	0.05	0.08	-	-

1. Curve number presented as utilized in VO modeling. CN reflects composite curve number for rural catchments modeled using NASHYD routine and curve number for pervious areas only for urban catchments using STANDHYD routine.
2. Superscript N represents the catchment was modelled using a NASHYD and a superscript S, represents the catchment was modelled using a STANHYD.

Table 7: Post-Development Hydrologic Parameters

Catchment Description	201[S]	202[S]	EXT1[S]	EXT2[S]	EXT3[S]	EXT4[S]
Drainage Area (ha)	3.50	2.48	5.22	0.26	0.26	0.46
Total Imperviousness (%)	58.0	36.7	30.0	42.0	30.8	30.4
Directly Connected Imperviousness (%)	19.9	5.0	20.7	30.5	15.4	21.7
Curve Number (CN)[1]	80.0	80.0	80.0	80.0	80.0	80.0
Time to Peak (hours)	-	-	-	-	-	-

1. Curve number presented as utilized in VO modeling. CN reflects composite curve number for rural catchments modeled using NASHYD routine and curve number for pervious areas only for urban catchments using STANDHYD routine.
2. Superscript N represents the catchment was modelled using a NASHYD and a superscript S, represents the catchment was modelled using a STANDHYD.

7.2 Stormwater Quantity Control

As discussed in Section 7.0, stormwater quantity control requirements for the site include controlling the post-development peak runoff to the pre-development peak runoff for storm events up to and including the 100-year event. According to the Township of Puslinch Municipal Development Standards, the City of Guelph's intensity-duration-frequency data for a 2-year to 100-year Chicago Storm event must be used as the hydraulic parameters for stormwater management modelling with a duration of 3 hours.

Visual OTTHYMO (VO) was used to create pre-development, post-development, and post-development with mitigation scenarios to quantify the site's peak stormwater flows. The associated hydrologic parameters are outlined in **Table 6** and **Table 7**. The pre-development and post-development stormwater flows directed to the Bronte Creek Tributary and the storage requirements are summarized below in **Table 8**. The VO model schematics, modelling results, and output files are included in **Appendix E**.

Table 8: Peak Flows and Target Flows Summary (Discharge towards Bronte Creek Tributary)

Storm (Year)	**Pre-Dev. Peak Flow Rate[1]** (m^3/s)	**Post-Dev. Uncontrolled Peak Flow Rate[2]** (m^3/s)	**Post-Dev. Controlled Peak Flow Rate[2]** (m^3/s)	**Storage Volume Required** (m^3)	**Storage Volume Provided[3]** (m^3)
2	0.239	0.478	0.144	554	1,143
5	0.411	0.754	0.249	642	
10	0.561	0.967	0.329	726	
25	0.767	1.283	0.488	823	
50	0.924	1.511	0.632	896	
100	1.087	1.740	0.833	973	
Regional	0.769	0.922	0.915	1,149	

Notes: 1. Includes runoff from Catchment 101A, 101B, 102, and EX2.
2. Includes runoff from Catchment 201, 202, EXT2, and EXT3.
3. 1,143 m^3 of storage is available in the SWM facility.

A *RouteReservoir* component was used in Visual OTTHYMO to model the proposed stormwater management facility and determine the active storage volumes required to control the peak flows for the 2-year to 100-year storm events. The 3-hour Chicago design storm was modelled using the City of Guelph's IDF parameters. To meet quantity control criteria, 973 m^3 of active storage volume is required to control the 100-year 3-hour Chicago design storm. Required active storage volumes for each storm event are summarized above in **Table 8**. The total active storage provided in the stormwater management pond is 1,143 m^3, providing an additional 0.3 m of freeboard to the top of berm (not included in active storage). An emergency overflow weir has been proposed to outlet to the Bronte Creek tributary to convey the expected peak flow from the Regional event. The Visual OTTHYMO input and output files and model schematics have been provided in **Appendix E** and the details of the weir are illustrated on **Figure 1**.

A storm sewer design sheet has been prepared to determine storm pipe sizes throughout the development and has been provided in **Appendix D**.

The proposed stormwater management facility will be a stormwater management dry pond located near the southeast corner of the proposed development and will control post-development peak flows to their pre-development levels or lower ('Post-to-Pre control'). The ultimate receiver of the stormwater from the proposed development is the Bronte Creek Tributary which is located east of the proposed development.

Catchment 202 will consist of rooftop and rear-yard drainage from the lots located along the southern and eastern property limits. Drainage from Catchment 201 will be overcontrolled to allow for Catchment 202 to drain uncontrolled to the Bronte Creek Tributary; however, the proposed dry pond will overcontrol the remainder of the site so the total peak flow rate from the site to the Bronte Creek Tributary will remain less than existing conditions.

7.3 Stormwater Quality Control

Stormwater quality controls for the proposed development must incorporate measures to provide "enhanced protection" as outlined by the Township of Puslinch Municipal Development Standards. Enhanced water quality protection involves the removal of at least 80% of the total suspended solids (TSS) from 90% of the annual runoff volume.

Water quality control for Catchment 201 will be provided using an oil-grit separator (Stormceptor EFO8 or approved equivalent) and dry pond in series. The oil-grit-separator is located upstream of the proposed stormwater management dry pond to provide quality control for runoff before discharging into the pond. It is understood the Township recognizes that an OGS unit provides 50% TSS removal. The proposed dry pond will provide 60% TSS removal per MECP standards. Together, the oil-grit separator and dry pond in series will provide 80% TSS removal (50% + 60%x50% = 80%). The water treatment train calculations and OGS sizing report can be found in **Appendix F**.

Catchment 202 will produce only clean runoff (i.e., landscaped and rooftop runoff). Therefore, quality controls are not proposed.

7.4 Stormwater Management Erosion Control

As outlined above, the proposed development is required to provide erosion control in the form of extended detention. The extended detention includes a minimum of 24-hour detention for the 25 mm storm event, per the Conservation Halton Stormwater Management Guidelines.

Erosion control for the proposed stormwater management facility is proposed to be provided by the active storage component of the proposed dry pond. A 25 mm 3-Hour Chicago storm event was executed in the proposed conditions VO model. The computed runoff depth and required extended detention volume for the SWM dry pond is summarized in **Table 9**.

Table 9: Required Extended Detention Volume

Stormwater Management Facility	Total Contributing Drainage Area (ha)	Criteria	Required Volume (m^3)	Provided Volume (m^3)
Dry Pond	4.02	MECP Extended Detention (150 m^3/ha)	603	603
		Erosion Control (25mm Runoff Volume)	465	

Note: 1. Required storage volumes from Table 3.2 of MECP SWM Planning and Design Manual (2003) based on 150 m^3/ha for extended detention.
2. 25 mm runoff volume obtained from VO model

As presented in **Table 9**, the MECP Extended Detention volume requirements exceed the Erosion Control volume requirements requested by Conservation Halton. Therefore, the MECP standards govern the required volume for extended detention in the proposed stormwater management dry pond. The governing volume of 603 m^3 must be detained over a period of 24-hour to 48-hours. Drawdown calculations have been provided in **Appendix D**.

7.5 Stormwater Management Facility Design Requirements

The proposed stormwater management dry pond will provide stormwater quantity, quality, and erosion controls to meet the relevant stormwater criteria outlined in Section 7.0 for the proposed development. The dry pond will provide an active storage component equipped with an outlet structure sized to meet stormwater quantity control and erosion control criteria.

The pond design was prepared to achieve the following Ministry of Environment, Conservation, and Parks design requirements as outline in Table 4.8 of the MECP Stormwater Management Manual:

- The proposed pond will have 4:1 side slopes.
- Mean depth between 1 m – 3 m.
- The dry pond will be designed with an emergency overflow weir to direct flows towards the Bronte Creek tributary.

7.6 Stormwater Management Facility Operating Characteristics

A preliminary stormwater management dry pond design has been completed, demonstrating that the stormwater management block is adequately sized to meet the requirements set by the various regulatory bodies. A summary of the preliminary stormwater management pond's characteristics is shown below in **Table 10**.

Table 10: Stormwater Management Pond Operating Characteristics

Component	Elevation (m)	Storage Required (m^3)	Storage Provided (m^3)
Bottom of Pond	312.35	-	-
Extended Detention	313.52	603	603
Regional High Water Level	314.05	1,127	1,143
Top of Berm	314.35	-	1,536

As shown above in **Table 10**, the stormwater management facility presented within this report is sufficiently sized to meet all design criteria. Refer to **Appendix D** for detailed stormwater management facility calculations.

7.7 Water Balance

The water balance parameters were established based on the climate data from various Kitchener-Waterloo Weather Stations near the Region of Waterloo International between 1990 – 2020, as well as site topography, soil type, and land cover infiltration factors. The results of the water balance indicate that there is an infiltration deficit of approximately 3,148 m^3/year (3.2 mm storm event) due to an increase in impervious surfaces.

Based on communications with the Hydrogeological Consultant (Englobe, formerly Terraprobe), when applying a safety factor of 2.5, the existing soils at the location of the end-of-pipe LID can facilitate a preliminary infiltration rate of 30 mm/hr. The infiltration rate is to be confirmed with site testing (i.e., test pits and Guelph permeameter or double-ring infiltrometer testing) at the detailed design stage.

An end-of-pipe LID feature is proposed to meet pre-development infiltration volumes. This end-of-pipe LID will be a 367 m^2 underground gravel infiltration trench with a depth of 1 m. This LID is designed to infiltrate 5,292 m^3/year (5 mm storm event), which is designed to infiltrate 34% of the average cumulative precipitation between the months of April and October. It has been assumed that the months of October to March are not conducive for infiltration due to frozen conditions. Refer to **Table 11** which outlines the storage volume requirements for each lot to meet the water balance requirements on the site should LIDs be required.

Table 11: Water Balance Volume Requirements

Storage Requirements	Gravel Diaphragm Area (m^2)	Void Ratio	Required Storage (m^3)	Provided Storage (m^3)
Water Balance	367	0.4	147	147

As outlined above in **Table 11**, if the Conservation Authority would like the water balance objectives to be met under post-development conditions, this will require an infiltration trench to store and infiltrate a volume of at least 147 m^3, which will be provided through a proposed infiltration trench. The detailed water balance calculations are presented in **Appendix D**.

7.8 Floodplain Assessment

The Conservation Halton HEC-RAS floodplain modelling for the Bronte Creek Tributary (March 14, 2012) was obtained and reviewed by Crozier. Review of the modeling and the staked wetland and woodlot environmental constraints on the property ultimately determined the wetland and woodlot setbacks that govern the overall development limits for the site.

The Regional floodplain from the Conservation Halton HEC-RAS floodplain model has been delineated on the civil engineering drawings and a 15 m floodplain setback was established based on the Conservation Halton Policies and Guidelines for the Administration of Ontario Regulation 162/06 and Land Use Planning Policy Document April 27, 2006 (last amended, November 6, 2020). The wetland and woodlot were determined to be the governing development setbacks for the proposed development and, therefore, a detailed floodplain assessment has not been completed at this time. Furthermore, a meeting was held with Conservation Halton staff on July 4th to discuss if the Conservation Halton HEC-RAS floodplain model delineation was sufficient for the floodplain delineation for the proposed development. Following the meeting, it was noted the Conservation Halton HEC-RAS floodplain model delineation was sufficient for the proposed development. Email excerpts with Conservation Halton staff have been included in **Appendix F**.

8.0 Erosion and Sediment Controls During Construction

The design of the erosion and sediment controls will be completed during the detailed design of the proposed development. The erosion and sediment controls will be required to be installed prior to the beginning of any construction activities. They will be maintained until the site is stabilized or as directed by the Site Engineer and/or Township of Puslinch. Controls will be inspected after each significant rainfall event and maintained in proper working condition.

Further details on the erosion and control measures that may be implemented have been summarized below:

Sediment Control Silt Fence

Sediment Control Silt Fence will be installed on the perimeter of the site to intercept sheet flow. Additional Sediment Control Silt Fence may be added based on field decisions by the Site Engineer and Owner prior to, during, and following construction.

Rock Mud Mat

A rock mud mat will be installed at the entrance to the construction zone to prevent mud tracking from the site onto surrounding lands and the perimeter roadway network. All construction traffic will be restricted to this access only.

Rock Check Dams

Rock check dams installed according to OPSD 219.210 should be installed in the proposed swale to protect from erosion conveyance during construction.

The Removals, Erosion and Sediment Control Plan will be refined throughout the planning application process with consultation with the Township and Conservation Authority to ensure potential environmental hazards during construction are minimized.

9.0 Conclusions & Recommendations

This report was prepared in support of the Zoning By-Law Amendment Application for the property located at 11 Main Street in the Township of Puslinch. The proposed development can be serviced for sanitary, water, and stormwater management in accordance with the Township of Puslinch, County of Wellington, and Conservation Halton requirements and standards. Our conclusions and recommendations include:

Proposed Water and Sanitary Servicing

1. Municipal servicing infrastructure is not available for the Site, therefore, the proposed development will be serviced by individual onsite sewage systems and drilled wells.

2. On-site soils are primarily classified as silty sand to sand and silt deposits. The anticipated T-time for the soils is 30 min/cm. This T-time is an assumed average for the entire site based on the findings outlined in the Hydrogeological Assessment (Englobe, August 28, 2024). At detailed design, it is recommended that detailed groundwater studies are conducted to provide location specific T-Time estimates to support the detailed design of the sewage systems throughout the development. Groundwater was observed to be 5.21 mbgs to 6.76 mbgs. Additional groundwater information is provided in the Hydrogeological Assessment (Englobe, August 28, 2024).

3. The preliminary sewage system design flows are expected to be approximately 3,600 L/d for each lot. Given the preliminary sewage system design flow is less than 10,000 L/day per individual lot, an ECA issued by the MECP will not be required. Each onsite sewage system will consist of an advanced treatment unit discharging to a leaching bed constructed as a Type A dispersal bed with a footprint of approximately at least 270 m^2. The advanced treatment system will consist of a Level IV treatment unit meeting the CAN/BNQ 3680-600 standard and must achieve the denitrification requirement of at least 62.5% nitrate-nitrogen reduction to meet MECP Guideline D-5-4.

4. Individual lots will be serviced with private drilled wells in accordance with O. Reg. 903 for potable water supply.

Stormwater Management

1. The site's stormwater runoff from the developable area (Catchment 201) will be collected and conveyed towards the proposed stormwater management facility by the proposed storm sewer network and internal road network. The proposed dry pond will control the post-development peak flows to the pre-development peak flows prior to outletting towards the Bronte Creek Tributary. Stormwater runoff the Catchment 202 will flow uncontrolled towards to the Bronte Creek Tributary.

2. Stormwater runoff from Catchment EXT1 will continue to be directed around the proposed development towards the Bronte Creek Tributary and stormwater runoff from Catchment EXT2 and EXT3 will be conveyed through the proposed development by the proposed storm sewer system and internal road network to the dry pond.

3. Stormwater quality controls for Catchment 201 will be provided by an oil-grit separator in series with the proposed dry pond to achieve 80% TSS removal.

4. The stormwater management facility will be designed to meet the erosion control requirements and provide a minimum of 24-hour detention for the 25 mm storm event.

5. The preliminary infiltration rate for soils onsite is 30 mm/yr. Therefore, an underground gravel infiltration trench has been proposed with a storage of 147 m^3 per storm event, which meets the infiltration target of 5,292 m^3/year.

Erosion and Sediment Controls

1. Erosion and sediment controls will be implemented prior to construction and maintained to the satisfaction of the Township and Site Engineer until the site is stabilized.

Based on the above conclusions, we recommend the approval of the Zoning By-Law Amendment Application from the perspective of functional servicing and preliminary stormwater management.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Cole Martin
Engineering Intern, Land Development

C.F. CROZIER & ASSOCIATES INC.

Trevor Fraser, P.Eng.
Project Manager, Land Development

TF/tc:rl

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APPENDIX A

Fire Flow Calculations

CROZIER CONSULTING ENGINEERS

Project: 11 Main Street
Project NO.: 2366-6537
Date: 2023-01-09
Designed By: BP
Checked By: BW

Adequate Water Supply Calculations (OFM Version)
Part 3 Fire Protection, Occupant Safety and Accessibility of the Ontario Building Code

Building:	Type C (Residential)	360 m²	6 m

References

1. Part 3 of the Ontario Building Code (2012)
2. Fire Protection Water Supply Guideline For Part 3 Of The Ontario Building Code, TG-03-1999 (October 1999)
3. Draft Plan of Subdivision, Weston Consulting (February 6, 2023)

Equation

$$Q = KVS_{Total}$$

Q	Minimum supply of water in litres.
K	Water supply coefficient based upon building occupancy.
V	Total building volume in cubic metres.
S_{TOT}	Total of spatial coefficient values from property line exposures on all sides

Minimum Supply of Water

K =	23.0	C Classification	(reference 1.)
V =	2160 m³		
S_{TOT} =	1.8		

Exposure	Distance (m)	S_{side}
North	40.0	0.0
East	6.0	0.4
South	6.0	0.4
West	30.0	0.0

Q = 89,424 L

Minimum Water Flow Supply Flow Rate

Required minimum water supply flow rate (L/min) (reference 2.)

Floor area ≤ 600 m²:		Yes	
		2700 L/min	Required flow rate
		0.5 hr	Required duration
Q =	**81,000 L**		

Conclusion

Therefore, the minimum water supply for proposed Building Type C (Residential) is **89,424 L**

CROZIER CONSULTING ENGINEERS

Project: 11 Main Street, Puslinch
Project No.: 2366-6537
Created By: AL
Checked By: BW
Date: 2023.02.07
Updated: 2024-07-31

Domestic Water Demand - Ontario Building Code

Peak Sewage Flow	3,600	L/day	
Avg. Daily Demand =	450	L/day	
	0.31	**L/min**	
Peaking Factors			
Max Day =	8.0		
Peak Hour =	12.1		
Average Day =	**0.31**	L/min	
Max Day =	**2.50**	L/min	
Peak Hour =	**3.77**	L/min	

Notes & References

Ontario Building Code - Table 8.2.1.3.B

24-hr day

Based on MECP suggested factor from Table 3-3 MOE Design Guidelines for Drinking Water Systems fewer than 500 people (2008)

Max Day = (Average Day Demand) * (Max Day Factor)

Peak Hour = (Average Day Demand) * (Peak Hour Factor)

Criteria	Average Daily Water Demand (L/min)	Max Day Demand (L/min)	Peak Hourly Demand (L/min)
OBC and MECP Design Guidelines	0.31	2.50	3.77

CROZIER CONSULTING ENGINEERS

Project: 11 Main Street, Puslinch
Project No.: 2124-6029
Prepared By: BP
Checked By: BW
Date: 2022.05.11
Updated: 2024.07.31

WATER DEMAND CALCULATIONS

11 Main Street, Township of Puslinch

Note: Based on Development Concept prepared by Weston Consulting dated February 6, 2023

			References
Population Density	4	persons/unit	Per jobs of similar scope.
Number of Units	23		
Total Population	92	persons	
Average Daily Demand	450	L/cap/day	MOE Design Guidelines for Drinking Water Systems (2008), Section 3.4.2.
	41,400	L/day	
	0.48	**L/s**	
Maximum Daily Demand Peaking Factor	3.6		MOE Design Guidelines for Drinking Water Systems (2008), Section 3.4.5.1, Table 3-3.
Maximum Hourly Demand Peaking Factor	5.4		
Maximum Daily Flow	149,040	L/day	
	1.73	**L/s**	
Peak Hour Flow	223,560	L/day	
	2.59	**L/s**	
Maximum Daily per Unit	6,480	L/day	
	0.08	**L/s**	
Peak Hour Flow per Unit	9,720	L/day	
	0.11	**L/s**	

APPENDIX B

Sanitary Servicing Calculations

CROZIER CONSULTING ENGINEERS

ONSITE SEWAGE SYSTEM RESIDENTIAL CALCULATION SHEET

Project Name: 11 Main Street
Project Number: 2366-6537

######## 2024-11-07
Designed By: AL
Checked By: KR

input required

Fixtures	Number of Fixtures	Fixture Units per Fixture	Total Fixture Units
Bathroom Group (flush tank)	3	6	18.0
2 Piece Bathroom	2	5.5	11.0
Basement Rough-in	0	6	0.0
Sinks (Domestic Lavatory w. 1/2" trap, kitchen sink, single compartment laundry tray)	5	1.5	7.5
Clothes Washer	1	1.5	1.5
Dishwasher (if not connected to kitchen sink)	1	1	1.0
Shower (from 1 head)	1	1.5	2
Floor drain	1	3	3
Laundry Tub	1	1.5	2
		Total Fixture Units	**45.0**

Assumed fixture units based on similar house sizes

ONSITE SEWAGE SYSTEM RESIDENTIAL CALCULATION SHEET

CROZIER CONSULTING ENGINEERS

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2024-11-07
Designed By: AL
Checked By: KR

input required

House Details: 4 bedroom
360.00 m2

References

Description		Number of Units	Additional Flow per Unit (L)	Total Flow (L/day)
Base Flow				2000
Additional Flow				
i) Each bedroom over 5		0	500	0
ii) Area over $200m^2$,				
A) Each $10m^2$ over $200m^2$ to $400m^2$		16	100	1600
B) Each $10m^2$ over $400m^2$ to $600m^2$		0	75	0
C) Each $10m^2$ over $600m^2$		0	50	0
	Total Additional Sewage Flow from Area			1600
iii) Fixture Units over 20		25	50	1250
			Addition flow (greatest of i,ii,iii)	**1600**
			Total Daily Design Sanitary Sewage Flow (L/day):	**3600**

Pre-Treatment Options

Treatment: **WBP Model AD40**, 4000 L/d
Treatment: **ADIPC-11250**
Basket Biofilter Tank: **BT-11250**
Orangeville Precast Concrete Ltd.

Required septic tank size = 7200 L minimum

Propose Level IV Treatment (Y/N): Y

Native Percolation time, T = 30 min/cm — T-time estimated by Crozier

Imported Sand Percolation time = 30 min/cm

Option #1 - Type A Dispersal Bed

	Required		Provided	
Stone area =	72 m^2	(Q/50)	72 m^2	12m x 6m
Sand area =	270 m^2	(QT/400)	368 m^2	16m x 23m

APPENDIX C

Waterloo Biofilter Third-party Verification Studies

WaterNOx-LS Third Party Testing Summary

In the fall of 2016, Waterloo Biofilter Systems Inc. installed their WaterNOx-LS™ denitrification unit at the Bureau de Normalisation du Quebec (BNQ) test site located in Quebec City. The system underwent BNQ 3680-600 test protocol which includes two parts - Period A and Period B. Period A is based on the methodology of NSF/ANSI Standards 40 and 245, containing the same flow patterns and stress tests. Period B provides for a further 6 months of seasonal reliability testing to ensure that the test includes cold weather results.

The WaterNOx-LS is a passive autotrophic denitrification process using sulphur-limestone minerals in a submerged, up-flow configuration. The WaterNOx-LS, which was sized for 1,600 L/day (350 gpd) followed a Waterloo Biofilter nitrifying treatment unit.

Period A Test Results

During Period A wastewater is dosed according to the hydraulic loading specified in NSF-40. Period A includes the wash-day, working-parent, power failure, and vacation period stress tests. All sample results taken during stress tests are included in the analysis. Influent wastewater temperature values ranged from 10.0 °C (50 °F) to 16.5 °C (62 °F) with an average value of 13.3 °C (56 °F). Influent pH averaged 7.9 and effluent pH averaged 7.2.

Table 1 – Period A Results for the WaterNOx-LS

Parameters	Influent	Effluent	Removal
(c)BOD_5	260	6	97.6%
TSS	312	3	99.2%
Fecal Coliforms	2,403,000	4,900	99.8%
$NO_{2,3}$	-	0.20	-
TKN	57.1	4.6	92.0%
TN ($NO_{2,3}$ + TKN)	57.1	4.8	91.6%

n = 123; n = 357 for fecals
All parameters in mg/L except Fecal Coliforms in cfu/100mL
All values arithmetic averages except Fecal Coliforms in geometric average

Weekly influent total nitrogen concentrations ranged from 43.0 mg/L to 68.8 mg/L with a six-month average concentration of 57.1 mg/L.

Weekly effluent $NO_{2,3}$ concentrations ranged from < 0.02 mg/L to 3.33 mg/L with a six-month average of 0.20 mg/L. Weekly effluent TKN concentrations ranged from 1.5 mg/L to 16.9 mg/L with a six-month average of 4.6 mg/L. Weekly effluent total nitrogen concentrations ranged from 1.7 mg/L to 17.1 mg/L with a six-month average of 4.8 mg/L. The total nitrogen reduction over the six-month period was 91.6%.

65 Massey Road, Suite C, Guelph ON N1H 7M6 T: 519 856-0757 1-866-366-4329 F: 519 856-0759 www.waterloo-biofilter.com

Period B Test Results

Weekday hydraulic loading is modified during Period B to a strenuous 'working parent' schedule where 40% of the flow is delivered over three hours in the morning, and 60% is delivered over three hours in the evening. All samples taken during Period B are included in the analysis. Influent wastewater temperature values ranged from 10.1 °C (50 °F) to 15.8 °C (60 °F) with an average value of 12.3 °C (54 °F). Influent pH averaged 8.0 and effluent pH averaged 7.1.

Table 2 – Period B Results for the WaterNOx-LS

Parameters	Influent	Effluent	Removal
(c)BOD_5	248	4	98.2%
TSS	304	3	99.1%
Fecal Coliforms	2,142,000	2,800	99.9%
$NO_{2,3}$	-	3.38	-
TKN	60.3	8.5	85.9%
TN ($NO_{2,3}$ + TKN)	60.4	11.9	80.3%

n = 59; n = 118 for fecals
All parameters in mg/L except Fecal Coliforms in cfu/100mL
All values arithmetic averages except Fecal Coliforms in geometric average

Weekly influent total nitrogen concentrations ranged from 21.2 mg/L to 85.6 mg/L with a six-month average concentration of 60.4 mg/L.

Weekly effluent $NO_{2,3}$ concentrations ranged from < 0.04 mg/L to 15.2 mg/L with a six-month average of 3.38 mg/L. Weekly effluent TKN concentrations ranged from 1.2 mg/L to 21.2 mg/L with a weekly average of 8.5 mg/L. Weekly effluent total nitrogen concentrations ranged from 3.7 mg/L to 22.2 mg/L with a six-month average of 11.9 mg/L. The total nitrogen reduction over the six-month period was 80.3%.

Conclusion

In summary, the WaterNOx-LS system can successfully remove very high levels of total nitrogen passively, while buffering pH to neutral and keeping $cBOD_5$ and TSS levels below 10 mg/L.

APPENDIX D

Hydrologic Parameter Sheets & SWM Design

CROZIER
CONSULTING ENGINEERS

Project: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Checked By:
Date: 2024.06.19

Water Budget Summary
Project Name: 11 Main Street
Water Balance/Water Budget Assessment

Characteristic	Site				
	Pre-Development	Post-Development	Post-Development *with Mitigation*	Change (Pre to Post)	Change (Pre to Post) *with Mitigation*
Inputs (Volumes)					
Precipitation (m^3/yr)	50872	50872	50872	0%	0%
Run-On (m^3/yr)	0	0	0	0%	0%
Other inputs (m^3/yr)	0	0	0	0%	0%
Total Inputs (m^3/yr)	**50872**	**50872**	**50872**	**0**	**0**
Outputs (Volumes)					
Runoff (m^3/yr)*	9603	24891	19599	15288	9996
Evapotranspiration (m^3/yr)	34867	22726	22726	-12140	-12140
Infiltration (m^3/yr)	6402	3254	3254	-3148	-3148
Soakaway Infiltration (m^3/yr)	0	0	**5292**	**0**	**5292**
Total Infiltration (m^3/yr)	**6402**	**3254**	**8547**	-3148	2145
Runoff Pervious Areas (m^3/yr)	9603	4882	4882	-4722	-4722
Runoff Impervious Areas (m^3/yr)	0	20010	14717	20010	14717
Total Runoff (m^3/yr)	9603	24891	19599	15288	9996
Total Outputs (m^3/yr)	**50872**	**50872**	**50872**	0%	0%

CROZIER
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Project Name: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Checked By:
Date: 2024.06.19

Climatic Water Budget - Thornthwaite Method
Project Name: 11 Main Street
*WATERLOO WELLINGTON A - Climate Normals 1971-2000 Station Data

	Degrees	Minutes	Seconds	
Insert Latitude:	43	27	0	*Only Applicable Between Latitudes 40° - 50°

Month	Mean Temperature (◦C)	Heat index	" a "	PET - Potential Evapotranspiration (mm)	Daily Correction Value	Adjusted PET - Potential Evapotranspiration (mm)	Total Precipitation (mm)	Surplus (mm)	Deficit (mm)
January	-6.3	0.0	0.49	0.0	0.77	0.0	66.3	66.3	0.0
February	-5.9	0.0	0.49	0.0	0.87	0.0	46.1	46.1	0.0
March	-0.8	0.0	0.49	0.0	0.99	0.0	57.0	57.0	0.0
April	5.9	1.3	0.52	27.0	1.11	30.1	81.2	51.1	0.0
May	12.6	4.1	0.56	60.9	1.23	74.8	80.2	5.4	0.0
June	17.8	6.8	0.61	88.3	1.29	113.7	80.5	0.0	33.2
July	20.2	8.3	0.64	101.1	1.26	127.8	96.2	0.0	31.6
August	19.1	7.6	0.62	95.2	1.17	111.4	67.2	0.0	44.2
September	15.2	5.4	0.59	74.5	1.05	78.0	75.2	0.0	2.8
October	8.8	2.4	0.53	41.5	0.92	38.2	71.0	32.8	0.0
November	2.6	0.4	0.50	11.2	0.81	9.1	74.9	65.8	0.0
December	-2.8	0.0	0.49	0.0	0.75	0.0	54.9	54.9	0.0
Totals		**36.2**	**1.07**			**583.1**	**850.7**	**379.5**	**111.8**

TOTAL WATER DEFICIT = **111.8 mm**
TOTAL WATER SURPLUS (SURPLUS - DEFICIT) = **267.6 mm**
Precipitation Adjustment Factor : **none**

NOTES:
1. Water budget adjusted for latitude and daylight.
2. (◦C) - Represents calculated mean of daily temperatures for the month.
3. Precipitation and Temperature data from the *WATERLOO WELLINGTON A (Station No.6149387) Environment Canada Station Data
4. Total Water Surplus (Thornthwaite, 1948) is calculated as total precipitation minus adjusted potential evapostranspiration.

Project: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Date: 2024.06.19

Design Storm Determination
Project Name: 11 Main Street
Water Balance/Water Budget Assessment

Days with Precipitation (From Climate Data)

	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
>= 0.2 mm	13.0	12.3	12.0	11.8	11.0	11.5	14.1	86
>= 5 mm	5.0	4.8	5.1	4.5	4.0	4.8	4.5	33
>= 10 mm	2.4	2.8	2.6	3.0	2.4	2.7	2.6	19
>= 25 mm	0.3	0.4	0.3	1.0	0.5	0.6	0.3	3.45

Available Precipitation

Storm Event (mm)	Total Days Per Year	Incremental Precipitation (mm/yr)	Cumulative Precipitation (mm/yr)
0.2	86	17.1	17.1
5	33	163.2	180.4
10	19	186.1	366.5
25	3.45	86.3	452.8
Total	**140**	**452.8**	

Infiltration Target:	5292	m^3/year	
Contributing Area:	29402	m^2	Impervious Area
Infiltration Target:	107	mm/year	
Runoff Coefficient:	0.90		Impervious runoff coefficient
Design Precipitation:	119	mm/year	(Design Infiltration / Contributing RC)
Therefore Min. Design Storm:	3.2	mm	
Chosen Design Storm:	5	mm	
Required Storage:	147	m^3	Volume per Storm Event

CROZIER CONSULTING ENGINEERS

Project Name: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Checked By:
Date: 2024.06.19

Water Budget - Post-Development *with Mitigation*
Project Name: 11 Main Street
Water Balance/Water Budget Assessment

Post-development pervious area.
Post-development impervious area.

Catchment Designation	Site - Post-Development		
	Pervious Area	Impervious Area	Totals
Area (m^2)	30398	29402	59800
Pervious Area (m^2)	30398	0	30398
Impervious Area (m^2)	0	29402	29402
Infiltration Factors			
Topography Infiltration Factor	0.10	0	
Soil Infiltration Factor	0.20	0	
Land Cover Infiltration Factor	0.10	0	
MOE Infiltration Factor	0.40	0.00	
Actual Infiltration Factor	0.40	0.00	
Run-off Coefficient	0.25	0.90	
Runoff from Impervious Surfaces *	0.00	1.00	
Inputs (per Unit Area)			
Precipitation (mm/yr)	851	851	851
Run-On (mm/yr)	0	0	0
Other Inputs (mm/yr)	0	0	0
Total Inputs (mm/yr)	**851**	**851**	**851**
Outputs (per Unit Area)			
Precipitation Surplus (mm/yr)	268	851	554
Net Surplus (mm/yr)	268	851	554
Evapotranspiration (mm/yr) *	583	170	380
Infiltration (mm/yr)	107	0	54
Soakaway Infiltration (mm/yr)	0	180	88
Total Infiltration (mm/yr)	107	180	143
Runoff Pervious Areas (mm/yr)	161	0	82
Runoff Impervious Areas (mm/yr)	0	501	246
Total Runoff (mm/yr)	161	501	328
Total Outputs (mm/yr)	**851**	**851**	**851**
Difference (Inputs- Outputs)	**0**	**0**	**0**
Inputs (Volumes)			
Precipitation (m^3/yr)	25860	25012	50872
Run-On (m^3/yr)	0	0	0
Other Inputs (m^3/yr)	0	0	0
Total Inputs (m^3/yr)	**25860**	**25012**	**50872**
Outputs (Volumes)			
Precipitation Surplus (m^3/yr)	8136	25012	33148
Net Surplus (m^3/yr)	8136	25012	33148
Evapotranspiration (m^3/yr) *	17724	5002	22726
Infiltration (m^3/yr)	3254	0	3254
Underground Storage Infiltration (m^3/yr)	0	5292	5292
Total Infiltration (m^3/yr)	3254	5292	8547
Runoff Pervious Areas (m^3/yr)	4882	0	4882
Runoff Impervious Areas (m^3/yr)	0	14717	14717
Total Runoff (m^3/yr)	4882	14717	19599
Total Outputs (m^3/yr)	**25860**	**25012**	**50872**
Difference (Inputs- Outputs)	**0**	**0**	**0**

5292 Proposed Infiltration via Mitigation

Pre-Development Total Infiltration:
107 mm/yr

Note:
0 mm
Precipitation available between Apr-Oct (non-winter months). Therefore available for infiltration into non-frozen soil

Pre-Development Total Infiltration:
6402 m3/yr

NOTES:
* Evaporation from impervious areas was assumed to be 20% of precipitation.

Project Name: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Checked By:
Date: 2024.07.02

Water Budget - Post-Development *without Mitigation*
Project Name: 11 Main Street
Water Balance/Water Budget Assessment

Post-development pervious area.
Post-development impervious area.

Note: Site land use areas consistent with Post-Development SWM hydrologic modeling & calculations

Catchment Designation	Site - Post-Development		
	Pervious Area	Impervious Area	Totals
Area (m^2)	30398	29402	59800
Pervious Area (m^2)	30398	0	30398
Impervious Area (m^2)	0	29402	29402
Infiltration Factors			
Topography Infiltration Factor	0.10	0	
Soil Infiltration Factor	0.20	0	
Land Cover Infiltration Factor	0.10	0	
MOE Infiltration Factor	0.40	0.00	
Actual Infiltration Factor	0.40	0.00	
Run-off Coefficient	0.25	0.90	
Runoff from Impervious Surfaces *	0.00	1.00	
Inputs (per Unit Area)			
Precipitation (mm/yr)	851	851	851
Run-On (mm/yr)	0	0	0
Other Inputs (mm/yr)	0	0	0
Total Inputs (mm/yr)	**851**	**851**	**851**
Outputs (per Unit Area)			
Precipitation Surplus (mm/yr)	268	851	554
Net Surplus (mm/yr)	268	851	554
Evapotranspiration (mm/yr) *	583	170	380
Infiltration (mm/yr)	107	0	54
Soakaway Infiltration (mm/yr)	0	0	0
Total Infiltration (mm/yr)	107	0	54
Runoff Pervious Areas (mm/yr)	161	0	82
Runoff Impervious Areas (mm/yr)	0	681	335
Total Runoff (mm/yr)	161	681	416
Total Outputs (mm/yr)	**851**	**851**	**851**
Difference (Inputs- Outputs)	**0**	**0**	**0**
Inputs (Volumes)			
Precipitation (m^3/yr)	25860	25012	50872
Run-On (m^3/yr)	0	0	0
Other Inputs (m^3/yr)	0	0	0
Total Inputs (m^3/yr)	**25860**	**25012**	**50872**
Outputs (Volumes)			
Precipitation Surplus (m^3/yr)	8136	25012	33148
Net Surplus (m^3/yr)	8136	25012	33148
Evapotranspiration (m^3/yr) *	17724	5002	22726
Infiltration (m^3/yr)	3254	0	3254
Soakaway Infiltration (m^3/yr)	0	0	0
Total Infiltration (m^3/yr)	3254	0	3254
Runoff Pervious Areas (m^3/yr)	4882	0	4882
Runoff Impervious Areas (m^3/yr)	0	20010	20010
Total Runoff (m^3/yr)	4882	20010	24891
Total Outputs (m^3/yr)	**25860**	**25012**	**50872**
Difference (Inputs- Outputs)	**0**	**0**	**0**

Pre-Development Total Infiltration:
6402 m3/yr

NOTES:
* Evaporation from impervious areas was assumed to be 0% to be conservative, as there will be some evaporation.

CROZIER CONSULTING ENGINEERS

Project Name: 11 Main Street
Project No: 2366-6357
Modelled By: DK
Checked By:
Date: 2024.07.02

Water Budget - Pre-Development
Project Name: 11 Main Street
Water Balance/Water Budget Assessment

Pre-development pervious area.
Pre-development impervious area.

Note: Site land use areas consistent with Pre-Development SWM hydrologic modeling & calculations

Catchment Designation	Site - Pre-Development		
	Pervious Area	Impervious	Totals
Area (m^2)	59800	0	59800
Pervious Area (m^2)	59800	0	59800
Impervious Area (m^2)	0	0	0
Infiltration Factors			
Topography Infiltration Factor	0.10	0	
Soil Infiltration Factor	0.20	0	
Land Cover Infiltration Factor	0.10	0	
MOE Infiltration Factor	0.40		
Actual Infiltration Factor	0.40	0	
Run-off Coefficient	0.25	0.90	
Runoff from Impervious Surfaces *	0	0.90	
Inputs (per Unit Area)			
Precipitation (mm/yr)	851	851	851
Run-On (mm/yr)	0	0	0
Other Inputs (mm/yr)	0	0	0
Total Inputs (mm/yr)	**851**	**851**	**851**
Outputs (per Unit Area)			
Precipitation Surplus (mm/yr)	268	766	268
Net Surplus (mm/yr)	268	766	268
Evapotranspiration (mm/yr) *	583	170	583
Infiltration (mm/yr)	107	0	107
Soakaway Infiltration (mm/yr)	0	0	0
Total Infiltration (mm/yr)	107	0	107
Runoff Pervious Areas (mm/yr)	161	0	161
Runoff Impervious Areas (mm/yr)	0	681	0
Total Runoff (mm/yr)	161	681	161
Total Outputs (mm/yr)	**851**	**851**	**851**
Difference (Inputs- Outputs)	**0**	**0**	**0**
Inputs (Volumes)			
Precipitation (m^3/yr)	50872	0	50872
Run-On (m^3/yr)	0	0	0
Other Inputs (m^3/yr)	0	0	0
Total Inputs (m^3/yr)	**50872**	**0**	**50872**
Outputs (Volumes)			
Precipitation Surplus (m^3/yr)	16005	0	16005
Net Surplus (m^3/yr)	16005	0	16005
Evapotranspiration (m^3/yr) *	34867	0	34867
Infiltration (m^3/yr)	6402	0	6402
Soakaway Infiltration (m^3/yr)	0	0	0
Total Infiltration (m^3/yr)	6402	0	6402
Runoff Pervious Areas (m^3/yr)	9603	0	9603
Runoff Impervious Areas (m^3/yr)	0	0	0
Total Runoff (m^3/yr)	9603	0	9603
Total Outputs (m^3/yr)	**50872**	**0**	**50872**
Difference (Inputs- Outputs)	**0**	**0**	**0**

CROZIER CONSULTING ENGINEERS

Project: 11 Main Street
Project No.: 2366-6537
Created By: CM
Checked By: TF
Date: 2024.11.08

Erosion Control Volume Calculations (MECP)

Area Name	**Drainage Area**			
Area to Pond =	4.02	ha	Percent Impervious	55.2%
Extended detention (MECP) =	603	m^3	Percent Pervious	44.8%

Extended Detention Volume:

Greater of :	Dry Pond Detention:	V =	150 m^3 / ha	(MECP requirement)
		V =	603 m^3	
	Detention of 25mm Runoff:	Depth =	11.56	(from VO model)
	(Runoff volume based on 25mm VO Model)	V =	465 m^3	

Required Extended Detention Volume = 603 m^3

CROZIER CONSULTING ENGINEERS

Project No:	2366-6537
Project:	11 Main Street
File:	Extended Detention
Design by:	CM
Checked by:	TF
Date:	2024.11.08

Extended Detention Specifications

(Per MECP)

Extended Detention Volume (Area x runoff from 25mm event)		603
t (drawdown time - seconds, *hours in italics*)	*24.0*	86400
Ao (cross section area of orifice - sqm)		0.0044
h (maximum water elevation above orifice for extended detention- m)		1.17
C (discharge coefficient)		0.64
Ap (average surface area for extended detention - sqm)		857

t = 2*Ap*(h^0.5)/(C*Ao*(g*2)^0.5)

Ao = 0.008 sqm d = 98 mm

Extended Detention Orifice Diameter (as designed) d = **75** mm

ACTUAL DRAWDOWN TIME

* Neglecting tailwater conditions*

Extended Detention Volume Used	603
d (orifice diameter, mm)	75
h (maximum head acting on orifice for extended detention, m)	1.17
Ao (cross section area of orifice, m^2)	0.0044
C (discharge coefficient)	0.64
Ap (average surface area for extended detention, m^2)	850

t = 2*Ap*(h^0.5)/(C*Ao*(g*2)^0.5)

t (hours) 41

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME 101A
D.A. AREA (ha) 2.02

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 101A

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic Group	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	2.02
				0
				0
				0
Total Area				2.02

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*On-site soils silty sand with poor hydraulic conductivity per Terraprobe Hydrogeological Assessment (February 2023)

Impervious Landuses Present:												
	Gravel		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0		0		0		0		0		0	0
Subtotal	0		0		0		0		0			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.16	36	0.00	30	0		0		1.86	70	2.02	136.01
Subtotal	0.16		0.00		0		0		1.86			

Composite Area Calculations		
	Total Pervious Area	2.02
	Total Impervious Area	0.00
	% Impervious	0.00%
	Composite Curve Number	67.3
	Total Area Check	2.02

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Dumfries Sandy Loam*								
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.16	1.59	0.30	0.16		0		0		0	0.05
Meadow	8	0	0		0.00		0		0		0	0
Wetland	16	0	0		0.00		0		0		0	0
Lawn	5	0	0		0.00		0		0		0	0
Cultivated	7	1.86	13.03	0.45	1.86		0		0		0	0.84
Impervious	2	0	0		0.00		0		0		0	0
Composite		2.02	7.24	Composite Runoff Coefficient								0.44

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Sheet Flow	111	6.70	6.04%	2.7	0.66	0.05	0.03	0.03	0.07	0.05	0.21	0.14

Appropriate calculated time to peak:	0.14	Appropriate Method:	Airport

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2024.04.30
By: DK/TF

D.A. NAME **101B**
D.A. AREA (ha) **0.76**

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 101B

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic Group	% Area	Area
Dumfries Sandy Loam*	DUF	AB	100	0.76
				0
				0
				0
Total Area				0.76

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*On-site soils silty sand with poor hydraulic conductivity per Terraprobe Hydrogeological Assessment (February 2023)

Impervious Landuses Present:												
	Gravel		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0		0		0		0		0		0	0
Subtotal	0		0		0		0		0			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.07	36	0		0		0		0.69	70	0.76	50.82
Subtotal	0.07		0		0		0		0.69			

Composite Area Calculations		
	Total Pervious Area	0.76
	Total Impervious Area	0.00
	% Impervious	0.00%
	Composite Curve Number	66.9
	Total Area Check	0.76

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Dumfries Sandy Loam*								
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.07	0.70	0.30	0.07		0		0		0	0.02
Meadow	8	0	0		0.00		0		0		0	0
Wetland	16	0	0		0.00		0		0		0	0
Lawn	5	0	0		0.00		0		0		0	0
Cultivated	7	0.69	4.83	0.45	0.69		0		0		0	0.31
Impervious	2	0	0		0.00		0		0		0	0
Composite		0.76	7.28	Composite Runoff Coefficient								0.44

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Sheet Flow	103	4.40	4.27%	2.7	0.56	0.05	0.03	0.03	0.08	0.05	0.23	0.15

Appropriate calculated time to peak:	0.05	Appropriate Method:	Bransby Williams

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **102**
D.A. AREA (ha) **3.96**

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 102

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic Group	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	3.96
				0
				0
				0
Total Area				3.96

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*On-site soils silty sand with poor hydraulic conductivity per Terraprobe Hydrogeological Assessment (February 2023)

Impervious Landuses Present:												
	Gravel		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0		0		0		0		0		0	0
Subtotal	0.00		0		0		0.00		0			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.25	36	0		0		0		3.71	70	3.96	268.79
Subtotal	0.25		0		0		0		3.71			

Composite Area Calculations		
	Total Pervious Area	3.96
	Total Impervious Area	0.00
	% Impervious	0.00%
	Composite Curve Number	67.9
	Total Area Check	3.96

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Dumfries Sandy Loam*								
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.25	2.48	0.30	0.25		0		0		0	0.07
Meadow	8	0	0		0.00		0		0		0	0.00
Wetland	16	0	0		0		0		0		0	0.00
Lawn	5	0	0		0		0		0		0	0.00
Cultivated	7	3.71	25.99	0.45	3.71		0		0		0	1.67
Impervious	1.5	0	0		0		0		0		0	0.00
Composite		3.96	7.19	Composite Runoff Coefficient								0.44

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Sheet Flow	165	13.00	7.88%	2.7	0.76	0.06	0.04	0.04	0.09	0.06	0.23	0.16

Appropriate calculated time to peak:	0.06	Appropriate Method:	Bransby Williams

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **EX1**
D.A. AREA (ha) **5.22**

Hydrologic Parameters: CALIB STANDHYD Command
External Drainage Area: Catchment EX1

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	5.22
				0
				0
				0
Total Area Check				5.22

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*External soils assumed to be silty sand with poor hydraulic conductivity.

Impervious Landuses Present:												
	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.21	98	0.35	91	0.52	98	0.49	98	0.00	98	1.57	150.9
Subtotal Area	0.21		0.35		0.52		0.49		0.00		1.57	

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		3.66	50	0.00		3.66	182.8
Subtotal Area	0.00		0.00		0.00		3.66		0.00			

Pervious Area Calculations	Total Pervious Area	3.66
	Composite Pervious Curve Number	50
Impervious Area Calculations	Total Directly Connected Area	1.08
	Total Indirectly Connected Area	0.49
	Total Impervious Area	1.57
	% X imp	20.7
	% T imp	30.0
	Total Area Check	5.22

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	3.66	18.28
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	10.00%	30	0.25
Impervious	1.5	10.00%	187	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **EX2 (Pre-Dev)**
D.A. AREA (ha) **1.41**

Hydrologic Parameters: CALIB STANDHYD Command
External Drainage Area: Catchment EX2 (Pre-Dev)

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	1.41
				0
				0
				0
Total Area Check				1.41

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*External soils assumed to be silty sand with poor hydraulic conductivity.
**Roadway includes driveways.

Impervious Landuses Present:												
	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.41	98	0.00	91	0.00	98	0.11	98	0.00	98	0.52	51.0
Subtotal Area	0.41		0.00		0.00		0.11		0.00		0.52	

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		0.89	50	0.00		0.89	44.5
Subtotal Area	0.00		0.00		0.00		0.89		0.00			

	Pervious Area Calculations	Total Pervious Area	0.89
		Composite Pervious Curve Number	50
	Impervious Area Calculations	Total Directly Connected Area	0.41
		Total Indirectly Connected Area	0.11
		Total Impervious Area	0.52
		% X imp	29.1
		% T imp	36.9
		Total Area Check	1.41

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.89	4.45
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	6.00%	20	0.25
Impervious	1.5	6.00%	42	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2023-11-28
By: DK

D.A. NAME **201**
D.A. AREA (ha) **3.50**

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment 201

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	3.50
				0
				0
				0
Total Area Check				3.50

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*On-site soils silty sand with poor hydraulic conductivity per Terraprobe Hydrogeological Assessment (February 2023)

Impervious Landuses Present:												
	Roadway		Driveway		Sidewalk		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.48	98	0.25	98	0.07	98	0.83	98	0.15	50	1.78	167.2
Subtotal Area	0.48		0.25		0.07		0.83		0.15			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		1.72	50	0.00		1.72	86.1
Subtotal Area	0.00		0.00		0.00		1.72		0.00			

Pervious Area Calculations	Total Pervious Area	1.72
	Composite Pervious Curve Number	50
Impervious Area Calculations	Total Directly Connected Area	0.70
	Total Indirectly Connected Area	1.08
	Total Impervious Area	1.78
	% X imp	19.9
	% T imp	50.8
	Total Area Check	3.50

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	1.72	8.61
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	4.00%	20	0.25
Impervious	1.5	4.00%	153	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2024.05.07
By: DK

D.A. NAME **202**
D.A. AREA (ha) **2.48**

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment 202

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic Group	% Area	Area
Dumfries Sandy Loam*	DUF	A	86%	2.12
Parkhill Loam	PLL	C	14%	0.36
				0
				0
Total Area Check				2.48

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*On-site soils silty sand with poor hydraulic conductivity per Terraprobe Hydrogeological Assessment (February 2023)

Impervious Landuses Present:												
	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00	98	0.00	98	0.00	98	0.83	98		39	0.83	81.2
PLL							0.08	98			0.08	7.9
Subtotal Area	0.00		0.00		0.00		0.91		0.00		0.91	

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		1.29	50	0.00		1.29	64.6
PLL	0.00		0.00		0.00		0.28	74	0.00		0.28	20.5
Subtotal Area	0.00		0.00		0.00		1.57		0.00			

Pervious Area Calculations	Total Pervious Area	1.57
	Composite Pervious Curve Number	54.2
Impervious Area Calculations	Total Directly Connected Area	0.00
	Total Indirectly Connected Area	0.91
	Total Impervious Area	0.91
	% X imp	0.0
	% T imp	36.7
	Total Area Check	2.48

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	1.57	7.85
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	4.00%	30	0.25
Impervious	1.0	2.00%	129	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

CROZIER CONSULTING ENGINEERS

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **EX2**
D.A. AREA (ha) **0.26**

Hydrologic Parameters: CALIB STANDHYD Command
External Drainage Area: Catchment EX2

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	0.26
				0
				0
				0
Total Area Check				0.26

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*External soils assumed to be silty sand with poor hydraulic conductivity.
**Roadway includes driveways.

Impervious Landuses Present:												
	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.08	98	0.00	91	0.00	98	0.03	98	0.00	98	0.11	10.7
Subtotal Area	0.08		0.00		0.00		0.03		0.00		0.11	

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		0.15	50	0.00		0.15	7.5
Subtotal Area	0.00		0.00		0.00		0.15		0.00			

	Pervious Area Calculations	Total Pervious Area	0.15
		Composite Pervious Curve Number	50
	Impervious Area Calculations	Total Directly Connected Area	0.08
		Total Indirectly Connected Area	0.03
		Total Impervious Area	0.11
		% X imp	30.5
		% T imp	42.0
		Total Area Check	0.26

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.15	0.75
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	6.00%	20	0.25
Impervious	1.5	6.00%	42	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **EX3**
D.A. AREA (ha) **0.26**

Hydrologic Parameters: CALIB STANDHYD Command
External Drainage Area: Catchment EX3

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	0.26
				0
				0
				0
Total Area Check				0.26

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*External soils assumed to be silty sand with poor hydraulic conductivity.
**Roadway includes driveways.

Impervious Landuses Present:												
	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.04	98	0.00	91	0.00	98	0.04	98	0.00	98	0.08	7.8
Subtotal Area	0.04		0.00		0.00		0.04		0.00		0.08	

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		0.18	50	0.00		0.18	9.0
Subtotal Area	0.00		0.00		0.00		0.18		0.00			

Pervious Area Calculations	Total Pervious Area	0.18
	Composite Pervious Curve Number	50
Impervious Area Calculations	Total Directly Connected Area	0.04
	Total Indirectly Connected Area	0.04
	Total Impervious Area	0.08
	% X imp	15.4
	% T imp	30.8
	Total Area Check	0.26

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.18	0.90
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	10.00%	30	0.25
Impervious	1.5	4.00%	42	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

CROZIER CONSULTING ENGINEERS

Project Name: 11 Main Street
Project Number: 2366-6537
Date: 2022-10-12
By: BP/PR

D.A. NAME **EX4**
D.A. AREA (ha) **0.46**

Hydrologic Parameters: CALIB STANDHYD Command
External Drainage Area: Catchment EX4

Curve Number Calculation

Soil Types Present per Wellington County Soils Map (1962):				
Type	ID	Hydrologic	% Area	Area
Dumfries Sandy Loam*	DUF	A	100	0.46
				0
				0
				0
Total Area Check				0.46

Note: RC and CN values obtained from the MTO Drainage Management Manual Part 4 (1995)
*External soils assumed to be silty sand with poor hydraulic conductivity.
**Roadway includes driveways.

Impervious Landuses Present:												
	Roadway		Gravel		Driveway		Building		SWM Pond		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.10	98	0.00	91	0.00	98	0.04	98	0.00	98	0.14	13.7
Subtotal Area	0.10		0.00		0.00		0.04		0.00		0.14	

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
DUF	0.00		0.00		0.00		0.32	50	0.00		0.32	16.0
Subtotal Area	0.00		0.00		0.00		0.32		0.00			

	Pervious Area Calculations	Total Pervious Area	0.32
		Composite Pervious Curve Number	50
	Impervious Area Calculations	Total Directly Connected Area	0.10
		Total Indirectly Connected Area	0.04
		Total Impervious Area	0.14
		% X imp	21.7
		% T imp	30.4
		Total Area Check	0.46

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0	0
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.32	1.60
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	4.00%	20	0.25
Impervious	1.5	2.00%	55	0.013

$$A = 1.5LGI^2$$

Note: LGI formula retrieved from Visual OTTHYMO Reference Manual (pg. 7)

where LGI represents impervious length (m)

Project No:	11 Main Street
Project:	2366-6537
File:	Stage-Storage-Discharge
Design by:	CM
Checked by:	TF
Date:	2024.11.08

Storage - Outflow Calculations

Outlet Structure			**Main Cell Spillway**		
E.D. Orifice Diameter:	0.075	m	Emergency Spill Elev.	313.90	m
E.D. Orifice Invert Elevation:	312.35	m	Emerg Spill Bot. Width	5	m
V-notch angle	N/A	degrees	Trap. Side Slopes	10	:1
V-notch constant	N/A	const			
V-notch invert	N/A	m			
Rect weir length	0.900	m			
Rect weir invert	313.50	m			
Extended Detention Depth:	1.17	m			

Pond Dimensions				Total	Outlet Structure			Cell Spillway			
Elev.	Depth Above PP	Area	Storage Volume	Storage Volume	ED Orifice Discharge	V-notch Discharge	Rect. Weir Discharge	Emerg. Weir Ave. Width	Emerg. Weir Discharge	Total Discharge	Storage
(m)	(m)	(sqm)	(cu.m)	(cu.m)	(cu.m/s)	(cu.m/s)	(cu.m/s)	(m)	(cu.m/s)	(cu.m/s)	(ha-m)
312.35	0.00	243	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
312.45	0.10	256	16	16	0.003	0.000	0.000	0.000	0.000	0.003	0.002
312.55	0.20	306	44	44	0.005	0.000	0.000	0.000	0.000	0.005	0.004
312.65	0.30	357	77	77	0.006	0.000	0.000	0.000	0.000	0.006	0.008
312.75	0.40	410	116	116	0.008	0.000	0.000	0.000	0.000	0.008	0.012
312.85	0.50	463	159	159	0.009	0.000	0.000	0.000	0.000	0.009	0.016
312.95	0.60	518	208	208	0.009	0.000	0.000	0.000	0.000	0.009	0.021
313.05	0.70	575	263	263	0.010	0.000	0.000	0.000	0.000	0.010	0.026
313.15	0.80	633	323	323	0.011	0.000	0.000	0.000	0.000	0.011	0.032
313.25	0.90	692	390	390	0.012	0.000	0.000	0.000	0.000	0.012	0.039
313.35	1.00	752	462	462	0.012	0.000	0.000	0.000	0.000	0.012	0.046
313.45	1.10	814	540	540	0.013	0.000	0.000	0.000	0.000	0.013	0.054
313.52	1.17	857	603	603	0.013	0.000	0.006	1.000	0.000	0.020	0.060
313.55	1.20	876	625	625	0.014	0.000	0.019	0.000	0.000	0.032	0.062
313.65	1.30	939	715	715	0.014	0.000	0.096	0.000	0.000	0.110	0.072
313.75	1.40	1002	812	812	0.015	0.000	0.207	0.000	0.000	0.222	0.081
313.85	1.50	1067	916	916	0.015	0.000	0.343	0.000	0.000	0.358	0.092
313.90	1.55	1100	973	973	0.015	0.000	0.419	5.000	0.000	0.434	0.097
313.95	1.60	1134	1026	1026	0.016	0.000	0.500	5.500	0.190	0.706	0.103
314.05	1.70	1202	1143	1143	0.016	0.000	0.675	6.500	1.300	1.992	0.114
314.15	1.80	1271	1266	1266	0.017	0.000	0.868	9.000	2.070	2.954	0.127
314.25	1.90	1341	1397	1397	0.017	0.000	1.076	12.500	4.762	5.855	0.140
314.35	2.00	1478	1536	1536	0.018	0.000	1.298	17.000	9.442	10.758	0.154

11 Main Street

2366-6537

STORM SEWER DESIGN SHEET

CROZIER CONSULTING ENGINEERS

FREQUENCY - 5 YEAR - CITY OF GUELPH DEVELOPMENT ENGINEERING MANUAL (OCTOBER 2023)			
Coef. A=	632.75	Coef. B=	-0.741
FREQUENCY - 100 YEAR - CITY OF GUELPH DEVELOPMENT ENGINEERING MANUAL (OCTOBER 2023)			
Coef. A=	953.29	Coef. B=	-0.711

MATERIAL	MANNINGS "n"
PVC	0.009
CONCRETE	0.013

DESIGNED BY:	H.W
CHECKED BY:	T.F
DATE:	2024.11.15
REVISION NO.:	1
REVISED BY:	T.F
DATE:	2024.11.15

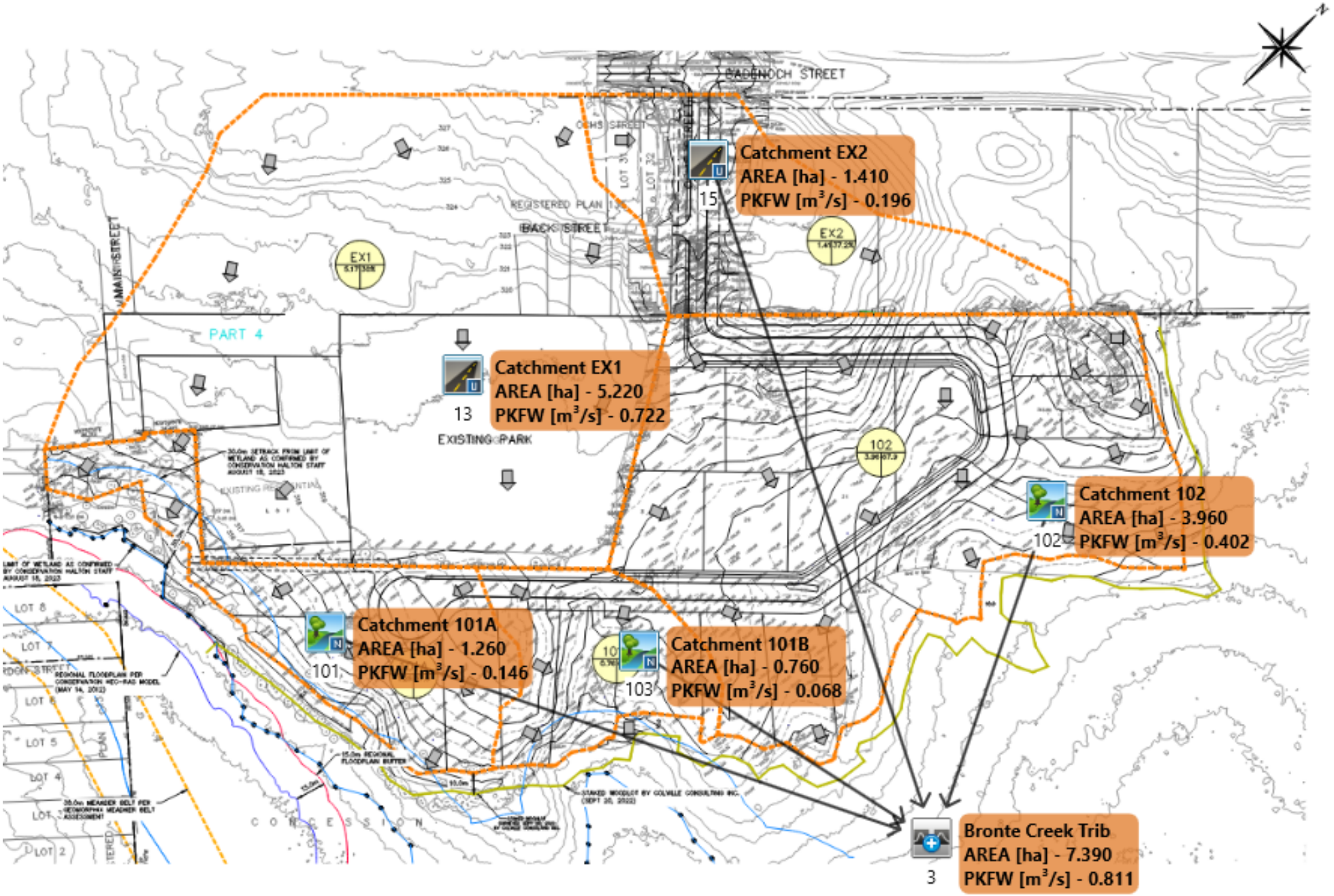
INITIAL TIME OF CONCENTRATION (minutes) = 10.00

CATCHMENT I.D.	STREET	TO MH	FROM MH	AREA (A) (Ha)	5 YEAR RUN-OFF COEFF (C_5)	100 YEAR RUN-OFF COEFF (C_{100})	DESIGN STORM	A x C	5 YEAR CUMUL. A x C	100 YEAR CUMUL. A x C	TIME OF CONC. (min.)	5 YEAR I (mm/hr)	100 YEAR I (mm/hr)	Q (RUNOFF) (l/sec)	DESIGN FLOW (l/sec)	SLOPE (%)	PIPE DIA. (mm)	MANNING'S "n"	VEL. (m/sec)	LENGTH	TIME OF FLOW (min)	PIPE CAPACITY (l/sec)	CAPACITY (%)
1	STREET A	STM DCB 15	STM MH 14	0.28	0.72	0.90	5 year	0.20	0.20	0.00	10.00	114.88	185.45	**63.26**	**63.26**	1.00%	300	0.009	2.0	37.3	0.31	**139.68**	**45%**
2	STREET A	STM MH 14	STM CBMH 13	0.04	0.67	0.83	5 year	0.03	0.22	0.00	10.31	112.27	181.41	**69.67**	**69.67**	1.00%	300	0.009	2.0	73.9	0.62	**139.68**	**50%**
3		STM CB 20	STM CBMH 19	0.07	0.74	0.93	5 year	0.05	0.05	0.00	10.00	114.88	185.45	**16.13**	**16.13**	1.00%	300	0.009	2.0	4.2	0.04	**139.68**	**12%**
4		STM CBMH 19	STM CBMH 13	0.04	0.90	1.00	5 year	0.04	0.09	0.00	10.04	114.58	184.98	**28.44**	**28.44**	2.00%	300	0.009	2.8	7.4	0.04	**197.54**	**14%**
5	STREET A	STM CBMH 13	STM CBMH 12	0.18	0.68	0.84	5 year	0.12	0.43	0.00	10.94	107.49	174.00	**128.76**	**128.76**	1.80%	450	0.009	3.5	90.7	0.44	**552.51**	**23%**
6		STM CB 18	STM CBMH 12	0.77	0.59	0.74	5 year	0.46	0.46	0.00	10.00	114.88	185.45	**145.34**	**145.34**	3.00%	300	0.009	3.4	9.2	0.04	**241.93**	**60%**
7	STREET A	STM CBMH 12	STM CBMH 11	0.25	0.68	0.85	5 year	0.17	1.05	0.00	11.37	104.43	169.24	**305.52**	**305.52**	1.70%	525	0.013	2.6	42.0	0.27	**560.73**	**54%**
8	STREET A	STM CBMH 11	STM DCBMH 2	0.43	0.62	0.78	5 year	0.27	1.32	0.00	11.64	102.63	166.44	**376.47**	**376.47**	0.40%	675	0.013	1.5	39.6	0.44	**531.63**	**71%**
9		STM DCB 17	STM DCBMH 2	0.22	0.61	0.77	5 year	0.13	0.13	0.00	10.00	114.88	185.45	**42.90**	**42.90**	0.50%	300	0.009	1.4	7.3	0.09	**98.77**	**43%**
10		STM CB 26	STM DCBMH 10	0.03	0.55	0.69	5 year	0.02	0.02	0.00	10.00	114.88	185.45	**5.88**	**5.88**	3.40%	300	0.009	3.6	3.7	0.02	**257.56**	**2%**
11		STM DCB 25	STM DCBMH 10	0.10	0.63	0.79	5 year	0.06	0.06	0.00	10.00	114.88	185.45	**20.16**	**20.16**	2.00%	300	0.009	2.8	7.4	0.04	**197.54**	**10%**
12		STM DCBMH 10	STM MH 9	0.05	0.67	0.84	5 year	0.03	0.11	0.00	10.04	114.50	184.87	**36.04**	**36.04**	2.10%	300	0.009	2.9	17.4	0.10	**202.41**	**18%**
13		STM MH 9	STM CBMH 8	0.02	0.83	1.00	5 year	0.01	0.13	0.00	10.15	113.65	183.56	**40.40**	**40.40**	2.80%	300	0.009	3.3	11.1	0.06	**233.73**	**17%**
14		STM CB 24	STM CBMH 8	0.01	0.90	1.00	5 year	0.01	0.01	0.00	10.00	114.88	185.45	**3.33**	**3.33**	2.00%	300	0.009	2.8	7.4	0.04	**197.54**	**2%**
15		STM CBMH 8	STM CBMH 7	0.02	0.79	0.99	5 year	0.01	0.15	0.00	10.04	114.50	184.87	**48.47**	**48.47**	3.00%	300	0.009	3.4	56.0	0.27	**241.93**	**20%**
16		STM CB 23	STM CBMH 7	0.05	0.84	1.00	5 year	0.05	0.05	0.00	10.00	114.88	185.45	**14.65**	**14.65**	2.00%	300	0.009	2.8	7.4	0.04	**197.54**	**7%**
17		STM CBMH 7	STM CBMH 6	0.09	0.78	0.97	5 year	0.07	0.26	0.00	10.32	112.25	181.38	**82.47**	**82.47**	2.00%	300	0.009	2.8	55.9	0.33	**197.54**	**42%**
18		STM CBMH 27	STM CBMH 22	0.06	0.71	0.89	5 year	0.05	0.05	0.00	10.00	114.88	185.45	**14.69**	**14.69**	0.50%	300	0.009	1.4	14.6	0.17	**98.77**	**15%**
19		STM CBMH 22	STM CBMH 6	0.03	0.90	1.00	5 year	0.02	0.07	0.00	10.17	113.42	183.19	**21.89**	**21.89**	2.00%	375	0.009	3.2	7.4	0.04	**358.16**	**6%**
20		STM CBMH 6	STM MH 5	0.10	0.75	0.94	5 year	0.08	0.41	0.00	10.65	109.64	177.33	**124.83**	**124.83**	3.00%	450	0.009	4.5	9.9	0.04	**713.29**	**18%**
21		STM MH 5	STM MH 4	0.04	0.70	0.88	5 year	0.03	0.44	0.00	10.69	109.36	176.89	**134.13**	**134.13**	3.00%	450	0.009	4.5	39.3	0.15	**713.29**	**19%**
22		STM CB 21	STM MH 4	0.16	0.61	0.76	5 year	0.10	0.10	0.00	10.00	114.88	185.45	**31.85**	**31.85**	2.00%	300	0.009	2.8	7.5	0.04	**197.54**	**16%**
23		STM CB 4	STM MH 3	0.05	0.90	1.00	5 year	0.05	0.59	0.00	10.83	108.26	175.19	**177.06**	**177.06**	3.00%	525	0.013	3.4	14.2	0.07	**744.89**	**24%**
24		STM MH 3	STM DCBMH 2	0.09	0.61	0.77	5 year	0.05	0.05	0.00	10.90	107.76	174.41	**15.75**	**15.75**	0.60%	600	0.013	1.7	34.6	0.34	**475.61**	**3%**
25		STM DCBMH 2	STM OGS	0.09	0.84	1.00	5 year	0.08	1.58	0.00	12.09	99.82	162.06	**439.70**	**439.70**	0.50%	750	0.013	1.8	5.6	0.05	**787.21**	**56%**
26		STM OGS	STM HW 1	0.00	0.00	0.00	5 year	0.00	1.58	0.00	12.14	99.50	161.57	**438.29**	**438.29**	0.60%	750	0.013	2.0	4.7	0.04	**862.34**	**51%**

APPENDIX E

VO Modelling

Pre-Development Visual-Otthymo Schematic



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 V  V    I      SS   U   U  AAAAA  L
 V  V    I       SS  U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

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

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DATE: 11-08-2024 TIME: 08:45:48

USER:

COMMENTS: _____

** SIMULATION : 2yr 4hr 10min Chicago **

| CHICAGO STORM | Ptotal= 33.31 mm |

IDF curve parameters: A= 475.610
B= 0.000
C= 0.738
used in: INTENSITY = A / (t + B)^C

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.45	1.00	12.69	2.00	5.04	3.00	2.85
0.17	2.76	1.17	86.95	2.17	4.42	3.17	2.67
0.33	3.17	1.33	15.73	2.33	3.95	3.33	2.52
0.50	3.77	1.50	9.66	2.50	3.59	3.50	2.39
0.67	4.72	1.67	7.25	2.67	3.30	3.67	2.27
0.83	6.58	1.83	5.91	2.83	3.05	3.83	2.17

| CALIB | NASHYD (0101) | ID= 1 DT= 5.0 min | Area (ha)= 1.26 | Ia (mm)= 7.21 | U.H. Tp(hrs)= 0.14 | Curve Number (CN)= 67.6 | # of Linear Res.(N)= 3.00 |

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.45	1.083	12.69	2.083	5.04	3.08	2.85
0.167	2.45	1.167	12.69	2.167	5.04	3.17	2.85
0.250	2.76	1.250	86.95	2.250	4.42	3.25	2.67
0.333	2.76	1.333	86.95	2.333	4.42	3.33	2.67
0.417	3.17	1.417	15.73	2.417	3.95	3.42	2.52
0.500	3.17	1.500	15.73	2.500	3.95	3.50	2.52
0.583	3.77	1.583	9.66	2.583	3.59	3.58	2.39
0.667	3.77	1.667	9.66	2.667	3.59	3.67	2.39
0.750	4.72	1.750	7.25	2.750	3.30	3.75	2.27
0.833	4.72	1.833	7.25	2.833	3.30	3.83	2.27
0.917	6.58	1.917	5.91	2.917	3.05	3.92	2.17
1.000	6.58	2.000	5.91	3.000	3.05	4.00	2.17

Unit Hyd Qpeak (cms)= 0.344

PEAK FLOW (cms)= 0.019 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 4.573
TOTAL RAINFALL (mm)= 33.310
RUNOFF COEFFICIENT = 0.137

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

| CALIB | NASHYD (0102) | ID= 1 DT= 5.0 min | Area (ha)= 3.96 | Ia (mm)= 7.19 | U.H. Tp(hrs)= 0.06 | Curve Number (CN)= 67.9 | # of Linear Res.(N)= 3.00 |

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.45	1.083	12.69	2.083	5.04	3.08	2.85
0.167	2.45	1.167	12.69	2.167	5.04	3.17	2.85
0.250	2.76	1.250	86.95	2.250	4.42	3.25	2.67
0.333	2.76	1.333	86.95	2.333	4.42	3.33	2.67
0.417	3.17	1.417	15.73	2.417	3.95	3.42	2.52
0.500	3.17	1.500	15.73	2.500	3.95	3.50	2.52
0.583	3.77	1.583	9.66	2.583	3.59	3.58	2.39
0.667	3.77	1.667	9.66	2.667	3.59	3.67	2.39
0.750	4.72	1.750	7.25	2.750	3.30	3.75	2.27
0.833	4.72	1.833	7.25	2.833	3.30	3.83	2.27
0.917	6.58	1.917	5.91	2.917	3.05	3.92	2.17
1.000	6.58	2.000	5.91	3.000	3.05	4.00	2.17

Unit Hyd Qpeak (cms)= 2.521

PEAK FLOW (cms)= 0.098 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 4.004
TOTAL RAINFALL (mm)= 33.310
RUNOFF COEFFICIENT = 0.120

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

| CALIB | NASHYD (0103) | ID= 1 DT= 5.0 min | Area (ha)= 0.76 | Ia (mm)= 7.28 | U.H. Tp(hrs)= 0.05 | Curve Number (CN)= 66.9 | # of Linear Res.(N)= 3.00 |

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.45	1.083	12.69	2.083	5.04	3.08	2.85
0.167	2.45	1.167	12.69	2.167	5.04	3.17	2.85
0.250	2.76	1.250	86.95	2.250	4.42	3.25	2.67
0.333	2.76	1.333	86.95	2.333	4.42	3.33	2.67
0.417	3.17	1.417	15.73	2.417	3.95	3.42	2.52
0.500	3.17	1.500	15.73	2.500	3.95	3.50	2.52
0.583	3.77	1.583	9.66	2.583	3.59	3.58	2.39
0.667	3.77	1.667	9.66	2.667	3.59	3.67	2.39
0.750	4.72	1.750	7.25	2.750	3.30	3.75	2.27
0.833	4.72	1.833	7.25	2.833	3.30	3.83	2.27
0.917	6.58	1.917	5.91	2.917	3.05	3.92	2.17
1.000	6.58	2.000	5.91	3.000	3.05	4.00	2.17

Unit Hyd Qpeak (cms)= 0.581

PEAK FLOW (cms)= 0.017 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 3.408
TOTAL RAINFALL (mm)= 33.310
RUNOFF COEFFICIENT = 0.102

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

| CALIB | STANDHYD (0015) | ID= 1 DT= 5.0 min | Area (ha)= 1.41 | Total Imp(%)= 36.90 | Dir. Conn.(%)= 29.10 |

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.52	0.89
Dep. Storage (mm)=	1.50	5.00
Average Slope (%)=	6.00	6.00
Length (m)=	42.00	20.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.45	1.083	12.69	2.083	5.04	3.08	2.85
0.167	2.45	1.167	12.69	2.167	5.04	3.17	2.85
0.250	2.76	1.250	86.95	2.250	4.42	3.25	2.67
0.333	2.76	1.333	86.95	2.333	4.42	3.33	2.67
0.417	3.17	1.417	15.73	2.417	3.95	3.42	2.52
0.500	3.17	1.500	15.73	2.500	3.95	3.50	2.52
0.583	3.77	1.583	9.66	2.583	3.59	3.58	2.39
0.667	3.77	1.667	9.66	2.667	3.59	3.67	2.39
0.750	4.72	1.750	7.25	2.750	3.30	3.75	2.27
0.833	4.72	1.833	7.25	2.833	3.30	3.83	2.27
0.917	6.58	1.917	5.91	2.917	3.05	3.92	2.17
1.000	6.58	2.000	5.91	3.000	3.05	4.00	2.17

Max.Eff.Inten.(mm/hr)=	86.95	23.68	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.94 (ii)	5.76 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.15	
			TOTALS
PEAK FLOW (cms)=	0.10	0.05	0.134 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	31.81	9.76	16.17
TOTAL RAINFALL (mm)=	33.31	33.31	33.31
RUNOFF COEFFICIENT =	0.95	0.29	0.49

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0003)	1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
		ID1= 1 (0101):	1.26	0.019	1.42	4.57
		+ ID2= 2 (0102):	3.96	0.098	1.33	4.00
		ID = 3 (0003):	5.22	0.112	1.33	4.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)	3 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
		ID1= 3 (0003):	5.22	0.112	1.33	4.14
		+ ID2= 2 (0103):	0.76	0.017	1.33	3.41
		ID = 1 (0003):	5.98	0.130	1.33	4.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)	1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
		ID1= 1 (0003):	5.98	0.130	1.33	4.05
		+ ID2= 2 (0015):	1.41	0.134	1.33	16.17
		ID = 3 (0003):	7.39	0.264	1.33	6.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB | STANDHYD (0013) | ID= 1 DT= 5.0 min | Area (ha)= 5.22 | Total Imp(%)= 30.00 | Dir. Conn.(%)= 20.70 |

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.57	3.65
Dep. Storage (mm)=	1.50	5.00
Average Slope (%)=	10.00	10.00
Length (m)=	186.55	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.45	1.083	12.69	2.083	5.04	3.08	2.85
0.167	2.45	1.167	12.69	2.167	5.04	3.17	2.85
0.250	2.76	1.250	86.95	2.250	4.42	3.25	2.67
0.333	2.76	1.333	86.95	2.333	4.42	3.33	2.67
0.417	3.17	1.417	15.73	2.417	3.95	3.42	2.52
0.500	3.17	1.500	15.73	2.500	3.95	3.50	2.52
0.583	3.77	1.583	9.66	2.583	3.59	3.58	2.39
0.667	3.77	1.667	9.66	2.667	3.59	3.67	2.39
0.750	4.72	1.750	7.25	2.750	3.30	3.75	2.27
0.833	4.72	1.833	7.25	2.833	3.30	3.83	2.27
0.917	6.58	1.917	5.91	2.917	3.05	3.92	2.17
1.000	6.58	2.000	5.91	3.000	3.05	4.00	2.17

Max.Eff.Inten.(mm/hr)=	86.95	24.11	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.97 (ii)	8.44 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.31	0.12	
			TOTALS
PEAK FLOW (cms)=	0.26	0.17	0.380 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	31.81	9.83	14.38
TOTAL RAINFALL (mm)=	33.31	33.31	33.31
RUNOFF COEFFICIENT =	0.95	0.30	0.43

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
 V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
 V    V   I    SS     U   U   A A   L
  V  V    I      SS   U   U  AAAAA  L
  V  V    I       SS  U   U  A   A  L
   VV     I    SSSSS  UUUUU  A   A  LLLLL

   OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
  O   O    T      T    H   H   Y Y   MM MM  O   O
  O   O    T      T    H   H    Y    M   M  O   O
   OOO     T      T    H   H    Y    M   M   OOO
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DATE: 11-08-2024                          TIME: 08:45:48

USER:


COMMENTS: _____________________________________________________________
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```
  ************************************************
  ** SIMULATION : 5yr 4hr 10min Chicago         **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 632.750
| Ptotal= 43.59 mm |                          B=   0.000
--------------------                          C=   0.741
                       used in:   INTENSITY =  A / (t + B)^C

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

          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.00    3.17 |  1.00   16.54 |  2.00    6.54 |  3.00    3.69
          0.17    3.57 |  1.17  114.88 |  2.17    5.73 |  3.17    3.46
          0.33    4.11 |  1.33   20.52 |  2.33    5.13 |  3.33    3.26
          0.50    4.88 |  1.50   12.57 |  2.50    4.65 |  3.50    3.09
          0.67    6.13 |  1.67    9.43 |  2.67    4.27 |  3.67    2.94
          0.83    8.55 |  1.83    7.68 |  2.83    3.95 |  3.83    2.80


--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=   1.26   Curve Number   (CN)= 67.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.21   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.14

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

                          ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    3.17 | 1.083   16.54 | 2.083    6.54 |  3.08    3.69
         0.167    3.17 | 1.167   16.54 | 2.167    6.54 |  3.17    3.69
         0.250    3.57 | 1.250  114.88 | 2.250    5.73 |  3.25    3.46
         0.333    3.57 | 1.333  114.88 | 2.333    5.73 |  3.33    3.46
         0.417    4.11 | 1.417   20.52 | 2.417    5.13 |  3.42    3.26
         0.500    4.11 | 1.500   20.52 | 2.500    5.13 |  3.50    3.26
         0.583    4.88 | 1.583   12.57 | 2.583    4.65 |  3.58    3.09
         0.667    4.88 | 1.667   12.57 | 2.667    4.65 |  3.67    3.09
         0.750    6.13 | 1.750    9.43 | 2.750    4.27 |  3.75    2.94
         0.833    6.13 | 1.833    9.43 | 2.833    4.27 |  3.83    2.94
         0.917    8.55 | 1.917    7.68 | 2.917    3.95 |  3.92    2.80
         1.000    8.55 | 2.000    7.68 | 3.000    3.95 |  4.00    2.80

--------------------
| CALIB            |
| STANDHYD (  0015)|   Area    (ha)=   1.41
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.90   Dir. Conn.(%)=  29.10
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.52         0.89
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      6.00         6.00
     Length            (m)=     42.00        20.00
     Mannings n            =     0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    3.17 | 1.083   16.54 | 2.083    6.54 |  3.08    3.69
         0.167    3.17 | 1.167   16.54 | 2.167    6.54 |  3.17    3.69
         0.250    3.57 | 1.250  114.88 | 2.250    5.73 |  3.25    3.46
         0.333    3.57 | 1.333  114.88 | 2.333    5.73 |  3.33    3.46
         0.417    4.11 | 1.417   20.52 | 2.417    5.13 |  3.42    3.26
         0.500    4.11 | 1.500   20.52 | 2.500    5.13 |  3.50    3.26
         0.583    4.88 | 1.583   12.57 | 2.583    4.65 |  3.58    3.09
         0.667    4.88 | 1.667   12.57 | 2.667    4.65 |  3.67    3.09
         0.750    6.13 | 1.750    9.43 | 2.750    4.27 |  3.75    2.94
         0.833    6.13 | 1.833    9.43 | 2.833    4.27 |  3.83    2.94
         0.917    8.55 | 1.917    7.68 | 2.917    3.95 |  3.92    2.80
         1.000    8.55 | 2.000    7.68 | 3.000    3.95 |  4.00    2.80

     Max.Eff.Inten.(mm/hr)=    114.88        41.98
               over (min)          5.00        10.00
     Storage Coeff.  (min)=      0.84 (ii)    5.16 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.34         0.16
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.13         0.08          0.199 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=     42.09        16.02         23.60
     TOTAL RAINFALL   (mm)=     43.59        43.59         43.59
     RUNOFF COEFFICIENT   =      0.97         0.37          0.54

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  80.0     Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0101):     1.26   0.038     1.42     8.31
     + ID2= 2 (  0102):     3.96   0.193     1.33     7.27
       ==========================================================
       ID = 3 (  0003):     5.22   0.225     1.33     7.52

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     5.22   0.225     1.33     7.52
     + ID2= 2 (  0103):     0.76   0.034     1.33     6.21
       ==========================================================
       ID = 1 (  0003):     5.98   0.259     1.33     7.35

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     5.98   0.259     1.33     7.35
     + ID2= 2 (  0015):     1.41   0.199     1.33    23.60
       ==========================================================
```

```
    Unit Hyd Qpeak  (cms)=   0.344

    PEAK FLOW       (cms)=   0.038 (i)
    TIME TO PEAK    (hrs)=   1.417
    RUNOFF VOLUME    (mm)=   8.308
    TOTAL RAINFALL   (mm)=  43.592
    RUNOFF COEFFICIENT   =   0.191

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

--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   3.96   Curve Number   (CN)= 67.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.19   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.06

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

                          ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    3.17 | 1.083   16.54 | 2.083    6.54 |  3.08    3.69
         0.167    3.17 | 1.167   16.54 | 2.167    6.54 |  3.17    3.69
         0.250    3.57 | 1.250  114.88 | 2.250    5.73 |  3.25    3.46
         0.333    3.57 | 1.333  114.88 | 2.333    5.73 |  3.33    3.46
         0.417    4.11 | 1.417   20.52 | 2.417    5.13 |  3.42    3.26
         0.500    4.11 | 1.500   20.52 | 2.500    5.13 |  3.50    3.26
         0.583    4.88 | 1.583   12.57 | 2.583    4.65 |  3.58    3.09
         0.667    4.88 | 1.667   12.57 | 2.667    4.65 |  3.67    3.09
         0.750    6.13 | 1.750    9.43 | 2.750    4.27 |  3.75    2.94
         0.833    6.13 | 1.833    9.43 | 2.833    4.27 |  3.83    2.94
         0.917    8.55 | 1.917    7.68 | 2.917    3.95 |  3.92    2.80
         1.000    8.55 | 2.000    7.68 | 3.000    3.95 |  4.00    2.80

    Unit Hyd Qpeak  (cms)=   2.521

    PEAK FLOW       (cms)=   0.193 (i)
    TIME TO PEAK    (hrs)=   1.333
    RUNOFF VOLUME    (mm)=   7.266
    TOTAL RAINFALL   (mm)=  43.592
    RUNOFF COEFFICIENT   =   0.167

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

--------------------
| CALIB            |
| NASHYD   (  0103)|   Area    (ha)=   0.76   Curve Number   (CN)= 66.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.28   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.05

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

                          ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    3.17 | 1.083   16.54 | 2.083    6.54 |  3.08    3.69
         0.167    3.17 | 1.167   16.54 | 2.167    6.54 |  3.17    3.69
         0.250    3.57 | 1.250  114.88 | 2.250    5.73 |  3.25    3.46
         0.333    3.57 | 1.333  114.88 | 2.333    5.73 |  3.33    3.46
         0.417    4.11 | 1.417   20.52 | 2.417    5.13 |  3.42    3.26
         0.500    4.11 | 1.500   20.52 | 2.500    5.13 |  3.50    3.26
         0.583    4.88 | 1.583   12.57 | 2.583    4.65 |  3.58    3.09
         0.667    4.88 | 1.667   12.57 | 2.667    4.65 |  3.67    3.09
         0.750    6.13 | 1.750    9.43 | 2.750    4.27 |  3.75    2.94
         0.833    6.13 | 1.833    9.43 | 2.833    4.27 |  3.83    2.94
         0.917    8.55 | 1.917    7.68 | 2.917    3.95 |  3.92    2.80
         1.000    8.55 | 2.000    7.68 | 3.000    3.95 |  4.00    2.80

    Unit Hyd Qpeak  (cms)=   0.581

    PEAK FLOW       (cms)=   0.034 (i)
    TIME TO PEAK    (hrs)=   1.333
    RUNOFF VOLUME    (mm)=   6.211
    TOTAL RAINFALL   (mm)=  43.592
    RUNOFF COEFFICIENT   =   0.142

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

--------------------
| CALIB            |
| STANDHYD (  0013)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      1.57         3.65
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=     10.00        10.00
     Length            (m)=    186.55        30.00
     Mannings n            =     0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    3.17 | 1.083   16.54 | 2.083    6.54 |  3.08    3.69
         0.167    3.17 | 1.167   16.54 | 2.167    6.54 |  3.17    3.69
         0.250    3.57 | 1.250  114.88 | 2.250    5.73 |  3.25    3.46
         0.333    3.57 | 1.333  114.88 | 2.333    5.73 |  3.33    3.46
         0.417    4.11 | 1.417   20.52 | 2.417    5.13 |  3.42    3.26
         0.500    4.11 | 1.500   20.52 | 2.500    5.13 |  3.50    3.26
         0.583    4.88 | 1.583   12.57 | 2.583    4.65 |  3.58    3.09
         0.667    4.88 | 1.667   12.57 | 2.667    4.65 |  3.67    3.09
         0.750    6.13 | 1.750    9.43 | 2.750    4.27 |  3.75    2.94
         0.833    6.13 | 1.833    9.43 | 2.833    4.27 |  3.83    2.94
         0.917    8.55 | 1.917    7.68 | 2.917    3.92 |  3.92    2.80
         1.000    8.55 | 2.000    7.68 | 3.000    3.95 |  4.00    2.80

     Max.Eff.Inten.(mm/hr)=    114.88        42.67
               over (min)          5.00        10.00
     Storage Coeff.  (min)=      1.76 (ii)    6.91 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.32         0.14
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.34         0.32          0.589 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=     42.09        16.12         21.49
     TOTAL RAINFALL   (mm)=     43.59        43.59         43.59
     RUNOFF COEFFICIENT   =      0.97         0.37          0.49

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  80.0     Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

       ID = 3 (  0003):     7.39   0.457     1.33    10.45

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

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
        V  V    I       SS  U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\68824a09-fc
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\68824a09-fc


DATE: 11-08-2024                          TIME: 08:45:48

USER:


COMMENTS: _____________________________________________________
```

****
** SIMULATION : 10yr 4hr 10min Chicago **
****

CHICAGO STORM	Ptotal= 51.12 mm

IDF curve parameters: A= 721.920
B= 0.000
C= 0.736
used in: INTENSITY = A / (t + B)^C

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.79	1.00	19.52	2.00	7.77	3.00	4.40
0.17	4.26	1.17	132.58	2.17	6.82	3.17	4.13
0.33	4.90	1.33	24.19	2.33	6.10	3.33	3.90
0.50	5.82	1.50	14.88	2.50	5.54	3.50	3.69
0.67	7.29	1.67	11.18	2.67	5.09	3.67	3.51
0.83	10.14	1.83	9.12	2.83	4.72	3.83	3.35

CALIB	NASHYD (0101)	ID= 1 DT= 5.0 min

Area (ha)= 1.26 Curve Number (CN)= 67.6
Ia (mm)= 7.21 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.14

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.79	1.083	19.52	2.083	7.77	3.08	4.40
0.167	3.79	1.167	19.52	2.167	7.77	3.17	4.40
0.250	4.26	1.250	132.58	2.250	6.82	3.25	4.13
0.333	4.26	1.333	132.58	2.333	6.82	3.33	4.13
0.417	4.90	1.417	24.19	2.417	6.10	3.42	3.90
0.500	4.90	1.500	24.19	2.500	6.10	3.50	3.90
0.583	5.82	1.583	14.88	2.583	5.54	3.58	3.69
0.667	5.82	1.667	14.88	2.667	5.54	3.67	3.69
0.750	7.29	1.750	11.18	2.750	5.09	3.75	3.51
0.833	7.29	1.833	11.18	2.833	5.09	3.83	3.51
0.917	10.14	1.917	9.12	2.917	4.72	3.92	3.35
1.000	10.14	2.000	9.12	3.000	4.72	4.00	3.35

CALIB	NASHYD (0102)	ID= 1 DT= 5.0 min

Area (ha)= 3.96 Curve Number (CN)= 67.9
Ia (mm)= 7.19 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.06

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.79	1.083	19.52	2.083	7.77	3.08	4.40
0.167	3.79	1.167	19.52	2.167	7.77	3.17	4.40
0.250	4.26	1.250	132.58	2.250	6.82	3.25	4.13
0.333	4.26	1.333	132.58	2.333	6.82	3.33	4.13
0.417	4.90	1.417	24.19	2.417	6.10	3.42	3.90
0.500	4.90	1.500	24.19	2.500	6.10	3.50	3.90
0.583	5.82	1.583	14.88	2.583	5.54	3.58	3.69
0.667	5.82	1.667	14.88	2.667	5.54	3.67	3.69
0.750	7.29	1.750	11.18	2.750	5.09	3.75	3.51
0.833	7.29	1.833	11.18	2.833	5.09	3.83	3.51
0.917	10.14	1.917	9.12	2.917	4.72	3.92	3.35
1.000	10.14	2.000	9.12	3.000	4.72	4.00	3.35

CALIB	STANDHYD (0015)	ID= 1 DT= 5.0 min

Area (ha)= 1.41
Total Imp(%)= 36.90 Dir. Conn.(%)= 29.10

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.52	0.89
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	6.00	6.00
Length	(m)=	42.00	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.79	1.083	19.52	2.083	7.77	3.08	4.40
0.167	3.79	1.167	19.52	2.167	7.77	3.17	4.40
0.250	4.26	1.250	132.58	2.250	6.82	3.25	4.13
0.333	4.26	1.333	132.58	2.333	6.82	3.33	4.13
0.417	4.90	1.417	24.19	2.417	6.10	3.42	3.90
0.500	4.90	1.500	24.19	2.500	6.10	3.50	3.90
0.583	5.82	1.583	14.88	2.583	5.54	3.58	3.69
0.667	5.82	1.667	14.88	2.667	5.54	3.67	3.69
0.750	7.29	1.750	11.18	2.750	5.09	3.75	3.51
0.833	7.29	1.833	11.18	2.833	5.09	3.83	3.51
0.917	10.14	1.917	9.12	2.917	4.72	3.92	3.35
1.000	10.14	2.000	9.12	3.000	4.72	4.00	3.35

				TOTALS
Max.Eff.Inten.(mm/hr)=		132.58	56.04	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.79 (ii)	4.87 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.22	
PEAK FLOW	(cms)=	0.15	0.14	0.287 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	49.62	21.11	29.40
TOTAL RAINFALL	(mm)=	51.12	51.12	51.12
RUNOFF COEFFICIENT	=	0.97	0.41	0.58

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0003)	1 + 2 = 3

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):		1.26	0.054	1.42	11.55
+ ID2= 2 (0102):		3.96	0.270	1.33	10.10
ID = 3 (0003):		5.22	0.316	1.33	10.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)	3 + 2 = 1

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0003):		5.22	0.316	1.33	10.45
+ ID2= 2 (0103):		0.76	0.047	1.33	8.65
ID = 1 (0003):		5.98	0.364	1.33	10.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)	1 + 2 = 3

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0003):		5.98	0.364	1.33	10.22
+ ID2= 2 (0015):		1.41	0.287	1.33	29.40
ID = 3 (0003):		7.39	0.651	1.33	13.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Unit Hyd Qpeak (cms)= 0.344

PEAK FLOW (cms)= 0.054 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 11.551
TOTAL RAINFALL (mm)= 51.117
RUNOFF COEFFICIENT = 0.226

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

CALIB	NASHYD (0102)	ID= 1 DT= 5.0 min

Area (ha)= 3.96 Curve Number (CN)= 67.9
Ia (mm)= 7.19 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.06

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.79	1.083	19.52	2.083	7.77	3.08	4.40
0.167	3.79	1.167	19.52	2.167	7.77	3.17	4.40
0.250	4.26	1.250	132.58	2.250	6.82	3.25	4.13
0.333	4.26	1.333	132.58	2.333	6.82	3.33	4.13
0.417	4.90	1.417	24.19	2.417	6.10	3.42	3.90
0.500	4.90	1.500	24.19	2.500	6.10	3.50	3.90
0.583	5.82	1.583	14.88	2.583	5.54	3.58	3.69
0.667	5.82	1.667	14.88	2.667	5.54	3.67	3.69
0.750	7.29	1.750	11.18	2.750	5.09	3.75	3.51
0.833	7.29	1.833	11.18	2.833	5.09	3.83	3.51
0.917	10.14	1.917	9.12	2.917	4.72	3.92	3.35
1.000	10.14	2.000	9.12	3.000	4.72	4.00	3.35

Unit Hyd Qpeak (cms)= 2.521

PEAK FLOW (cms)= 0.270 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 10.095
TOTAL RAINFALL (mm)= 51.117
RUNOFF COEFFICIENT = 0.197

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

CALIB	NASHYD (0103)	ID= 1 DT= 5.0 min

Area (ha)= 0.76 Curve Number (CN)= 66.9
Ia (mm)= 7.28 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.05

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.79	1.083	19.52	2.083	7.77	3.08	4.40
0.167	3.79	1.167	19.52	2.167	7.77	3.17	4.40
0.250	4.26	1.250	132.58	2.250	6.82	3.25	4.13
0.333	4.26	1.333	132.58	2.333	6.82	3.33	4.13
0.417	4.90	1.417	24.19	2.417	6.10	3.42	3.90
0.500	4.90	1.500	24.19	2.500	6.10	3.50	3.90
0.583	5.82	1.583	14.88	2.583	5.54	3.58	3.69
0.667	5.82	1.667	14.88	2.667	5.54	3.67	3.69
0.750	7.29	1.750	11.18	2.750	5.09	3.75	3.51
0.833	7.29	1.833	11.18	2.833	5.09	3.83	3.51
0.917	10.14	1.917	9.12	2.917	4.72	3.92	3.35
1.000	10.14	2.000	9.12	3.000	4.72	4.00	3.35

Unit Hyd Qpeak (cms)= 0.581

PEAK FLOW (cms)= 0.047 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 8.650
TOTAL RAINFALL (mm)= 51.117
RUNOFF COEFFICIENT = 0.169

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

CALIB	STANDHYD (0013)	ID= 1 DT= 5.0 min

Area (ha)= 5.22
Total Imp(%)= 30.00 Dir. Conn.(%)= 20.70

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.57	3.65
Dep. Storage	(mm)=	1.50	5.00
Average Slope	(%)=	10.00	10.00
Length	(m)=	186.55	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.79	1.083	19.52	2.083	7.77	3.08	4.40
0.167	3.79	1.167	19.52	2.167	7.77	3.17	4.40
0.250	4.26	1.250	132.58	2.250	6.82	3.25	4.13
0.333	4.26	1.333	132.58	2.333	6.82	3.33	4.13
0.417	4.90	1.417	24.19	2.417	6.10	3.42	3.90
0.500	4.90	1.500	24.19	2.500	6.10	3.50	3.90
0.583	5.82	1.583	14.88	2.583	5.54	3.58	3.69
0.667	5.82	1.667	14.88	2.667	5.54	3.67	3.69
0.750	7.29	1.750	11.18	2.750	5.09	3.75	3.51
0.833	7.29	1.833	11.18	2.833	5.09	3.83	3.51
0.917	10.14	1.917	9.12	2.917	4.72	3.92	3.35
1.000	10.14	2.000	9.12	3.000	4.72	4.00	3.35

				TOTALS
Max.Eff.Inten.(mm/hr)=		132.58	56.90	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.66 (ii)	6.25 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.32	0.15	
PEAK FLOW	(cms)=	0.40	0.43	0.747 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	49.62	21.23	27.10
TOTAL RAINFALL	(mm)=	51.12	51.12	51.12
RUNOFF COEFFICIENT	=	0.97	0.42	0.53

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
 V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
 V    V   I    SS     U   U   A A   L
  V  V    I      SS   U   U  AAAAA  L
  V  V    I       SS  U   U  A   A  L
   VV     I    SSSSS  UUUUU  A   A  LLLLL

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


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DATE: 11-08-2024                          TIME: 08:45:48

USER:


COMMENTS: _____________________________________________________________
```

```
  ************************************************
  ** SIMULATION : 25yr 4hr 10min Chicago        **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 822.740
| Ptotal= 61.88 mm |                          B=   0.000
--------------------                          C=   0.725
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    4.77 |  1.00   23.97 |'  2.00    9.68 |  3.00    5.53
               0.17    5.36 |  1.17  154.98 |'  2.17    8.51 |  3.17    5.19
               0.33    6.14 |  1.33   29.61 |'  2.33    7.63 |  3.33    4.90
               0.50    7.28 |  1.50   18.34 |'  2.50    6.94 |  3.50    4.65
               0.67    9.09 |  1.67   13.85 |'  2.67    6.38 |  3.67    4.43
               0.83   12.58 |  1.83   11.32 |'  2.83    5.92 |  3.83    4.23


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=   1.26   Curve Number   (CN)= 67.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.21   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.14

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

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
               0.167    4.77 | 1.167   23.97 | 2.167    9.68 |  3.17    5.53
               0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
               0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
               0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
               0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
               0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
               0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
               0.750    9.09 | 1.750   13.85 | 2.750    6.38 |  3.75    4.43
               0.833    9.09 | 1.833   13.85 | 2.833    6.38 |  3.83    4.43
               0.917   12.58 | 1.917   11.32 | 2.917    5.92 |  3.92    4.23
               1.000   12.58 | 2.000   11.32 | 3.000    5.92 |  4.00    4.23

--------------------
| CALIB            |
| STANDHYD (  0015)|   Area    (ha)=   1.41
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.90   Dir. Conn.(%)=  29.10
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.52         0.89
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       6.00         6.00
     Length            (m)=      42.00        20.00
     Mannings n             =     0.013        0.250

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

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
               0.167    4.77 | 1.167   23.97 | 2.167    9.68 |  3.17    5.53
               0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
               0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
               0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
               0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
               0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
               0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
               0.750    9.09 | 1.750   13.85 | 2.750    6.38 |  3.75    4.43
               0.833    9.09 | 1.833   13.85 | 2.833    6.38 |  3.83    4.43
               0.917   12.58 | 1.917   11.32 | 2.917    5.92 |  3.92    4.23
               1.000   12.58 | 2.000   11.32 | 3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98        76.33
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       0.74 (ii)    4.57 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.23
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.18         0.19          0.363 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33          1.33
     RUNOFF VOLUME    (mm)=      60.38        28.94         38.09
     TOTAL RAINFALL   (mm)=      61.88        61.88         61.88
     RUNOFF COEFFICIENT   =       0.98         0.47          0.62

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):     1.26   0.079     1.42     16.81
      + ID2= 2 (  0102):     3.96   0.387     1.33     14.68
        ==========================================================
        ID = 3 (  0003):     5.22   0.455     1.33     15.20

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

--------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0003):     5.22   0.455     1.33     15.20
      + ID2= 2 (  0103):     0.76   0.067     1.33     12.62
        ==========================================================
        ID = 1 (  0003):     5.98   0.523     1.33     14.87

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

--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0003):     5.98   0.523     1.33     14.87
      + ID2= 2 (  0015):     1.41   0.363     1.33     38.09
        ==========================================================
```

```
     Unit Hyd Qpeak  (cms)=   0.344

     PEAK FLOW       (cms)=   0.079 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  16.813
     TOTAL RAINFALL   (mm)=  61.875
     RUNOFF COEFFICIENT   =   0.272

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   3.96   Curve Number   (CN)= 67.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.19   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.06

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

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
               0.167    4.77 | 1.167   23.97 | 2.167    9.68 |  3.17    5.53
               0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
               0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
               0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
               0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
               0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
               0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
               0.750    9.09 | 1.750   13.85 | 2.750    6.38 |  3.75    4.43
               0.833    9.09 | 1.833   13.85 | 2.833    6.38 |  3.83    4.43
               0.917   12.58 | 1.917   11.32 | 2.917    5.92 |  3.92    4.23
               1.000   12.58 | 2.000   11.32 | 3.000    5.92 |  4.00    4.23

     Unit Hyd Qpeak  (cms)=   2.521

     PEAK FLOW       (cms)=   0.387 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  14.683
     TOTAL RAINFALL   (mm)=  61.875
     RUNOFF COEFFICIENT   =   0.237

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0103)|   Area    (ha)=   0.76   Curve Number   (CN)= 66.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.28   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.05

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

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
               0.167    4.77 | 1.167   23.97 | 2.167    9.68 |  3.17    5.53
               0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
               0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
               0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
               0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
               0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
               0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
               0.750    9.09 | 1.750   13.85 | 2.750    6.38 |  3.75    4.43
               0.833    9.09 | 1.833   13.85 | 2.833    6.38 |  3.83    4.43
               0.917   12.58 | 1.917   11.32 | 2.917    5.92 |  3.92    4.23
               1.000   12.58 | 2.000   11.32 | 3.000    5.92 |  4.00    4.23

     Unit Hyd Qpeak  (cms)=   0.581

     PEAK FLOW       (cms)=   0.067 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  12.615
     TOTAL RAINFALL   (mm)=  61.875
     RUNOFF COEFFICIENT   =   0.204

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

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--------------------
| CALIB            |
| STANDHYD (  0013)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57         3.65
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=      10.00        10.00
     Length            (m)=     186.55        30.00
     Mannings n             =     0.013        0.250

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

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
               0.167    4.77 | 1.167   23.97 | 2.167    9.68 |  3.17    5.53
               0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
               0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
               0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
               0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
               0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
               0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
               0.750    9.09 | 1.750   13.85 | 2.750    6.38 |  3.75    4.43
               0.833    9.09 | 1.833   13.85 | 2.833    6.38 |  3.83    4.43
               0.917   12.58 | 1.917   11.32 | 2.917    5.92 |  3.92    4.23
               1.000   12.58 | 2.000   11.32 | 3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98        77.44
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.56 (ii)    5.62 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.46         0.60          0.976 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      60.38        29.09         35.56
     TOTAL RAINFALL   (mm)=      61.88        61.88         61.88
     RUNOFF COEFFICIENT   =       0.98         0.47          0.57

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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```
        ID = 3 (  0003):     7.39   0.886     1.33     19.30

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

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
        V  V    I       SS  U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


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DATE: 11-08-2024                          TIME: 08:45:48

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 50yr 4hr 10min Chicago        **
  ************************************************


-------------------
| CHICAGO STORM   |    IDF curve parameters: A= 893.800
| Ptotal= 69.47 mm |                          B=   0.000
-------------------                          C=   0.719
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    5.47 |  1.00   27.09 |  2.00   11.03 |  3.00    6.33
                0.17    6.13 |  1.17  170.70 |  2.17    9.71 |  3.17    5.95
                0.33    7.02 |  1.33   33.42 |  2.33    8.71 |  3.33    5.62
                0.50    8.31 |  1.50   20.79 |  2.50    7.93 |  3.50    5.33
                0.67   10.36 |  1.67   15.73 |  2.67    7.29 |  3.67    5.08
                0.83   14.30 |  1.83   12.89 |  2.83    6.77 |  3.83    4.85


--------------------------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD  (  0101)|   Area    (ha)=   1.26   Curve Number   (CN)= 67.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.21   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.14

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
                0.167   5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
                0.250   6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
                0.333   6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
                0.417   7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
                0.500   7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
                0.583   8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
                0.667   8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
                0.750  10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
                0.833  10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
                0.917  14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
                1.000  14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

-------------------
| CALIB           |
| STANDHYD (  0015)|   Area    (ha)=   1.41
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.90   Dir. Conn.(%)=  29.10
-------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        0.52         0.89
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=        6.00         6.00
     Length            (m)=       42.00        20.00
     Mannings n             =      0.013        0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
                0.167   5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
                0.250   6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
                0.333   6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
                0.417   7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
                0.500   7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
                0.583   8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
                0.667   8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
                0.750  10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
                0.833  10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
                0.917  14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
                1.000  14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Max.Eff.Inten.(mm/hr)=     170.70        91.42
               over (min)          5.00         5.00
     Storage Coeff.  (min)=       0.72 (ii)    4.40 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.23
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.19         0.22          0.419 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      67.97        34.78          44.44
     TOTAL RAINFALL   (mm)=      69.47        69.47          69.47
     RUNOFF COEFFICIENT   =       0.98         0.50           0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):     1.26   0.098     1.42    20.91
      + ID2= 2 (  0102):     3.96   0.476     1.33    18.25
        ==========================================================
        ID = 3 (  0003):     5.22   0.563     1.33    18.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0003):     5.22   0.563     1.33    18.89
      + ID2= 2 (  0103):     0.76   0.083     1.33    15.71
        ==========================================================
        ID = 1 (  0003):     5.98   0.645     1.33    18.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0003):     5.98   0.645     1.33    18.49
      + ID2= 2 (  0015):     1.41   0.419     1.33    44.44
        ==========================================================
```

```
     Unit Hyd Qpeak  (cms)=   0.344

     PEAK FLOW       (cms)=   0.098 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  20.907
     TOTAL RAINFALL   (mm)=  69.467
     RUNOFF COEFFICIENT   =   0.301

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

--------------------------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD  (  0102)|   Area    (ha)=   3.96   Curve Number   (CN)= 67.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.19   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.06

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
                0.167   5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
                0.250   6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
                0.333   6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
                0.417   7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
                0.500   7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
                0.583   8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
                0.667   8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
                0.750  10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
                0.833  10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
                0.917  14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
                1.000  14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Unit Hyd Qpeak  (cms)=   2.521

     PEAK FLOW       (cms)=   0.476 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  18.249
     TOTAL RAINFALL   (mm)=  69.467
     RUNOFF COEFFICIENT   =   0.263

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

--------------------------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD  (  0103)|   Area    (ha)=   0.76   Curve Number   (CN)= 66.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.28   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.05

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
                0.167   5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
                0.250   6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
                0.333   6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
                0.417   7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
                0.500   7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
                0.583   8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
                0.667   8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
                0.750  10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
                0.833  10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
                0.917  14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
                1.000  14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Unit Hyd Qpeak  (cms)=   0.581

     PEAK FLOW       (cms)=   0.083 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  15.706
     TOTAL RAINFALL   (mm)=  69.467
     RUNOFF COEFFICIENT   =   0.226

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

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-------------------
| CALIB           |
| STANDHYD (  0013)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
-------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        1.57         3.65
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=       10.00        10.00
     Length            (m)=      186.55        30.00
     Mannings n             =      0.013        0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
                0.167   5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
                0.250   6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
                0.333   6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
                0.417   7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
                0.500   7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
                0.583   8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
                0.667   8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
                0.750  10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
                0.833  10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
                0.917  14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
                1.000  14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Max.Eff.Inten.(mm/hr)=     170.70        92.71
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.50 (ii)    6.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.51         0.69          1.097 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      67.97        34.94          41.78
     TOTAL RAINFALL   (mm)=      69.47        69.47          69.47
     RUNOFF COEFFICIENT   =       0.98         0.50           0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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        ID = 3 (  0003):     7.39   1.064     1.33    23.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0013)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
-------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        1.57         3.65
     Dep. Storage     (mm)=        1.50         5.00
     Average Slope     (%)=       10.00        10.00
     Length            (m)=      186.55        30.00
     Mannings n             =      0.013        0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
                0.167   5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
                0.250   6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
                0.333   6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
                0.417   7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
                0.500   7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
                0.583   8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
                0.667   8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
                0.750  10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
                0.833  10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
                0.917  14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
                1.000  14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Max.Eff.Inten.(mm/hr)=     170.70        92.71
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.50 (ii)    6.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.51         0.69          1.097 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      67.97        34.94          41.78
     TOTAL RAINFALL   (mm)=      69.47        69.47          69.47
     RUNOFF COEFFICIENT   =       0.98         0.50           0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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```
 V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
 V    V   I    SS     U   U   A A   L
  V  V    I      SS   U   U  AAAAA  L
  V  V    I       SS  U   U  A   A  L
   VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\9453acac-6d
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\9453acac-6d

DATE: 11-08-2024                          TIME: 08:45:48

USER:


COMMENTS: _____________________________________________________
```

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  ************************************************
  ** SIMULATION : 100yr 4hr 10min Chicago       **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 953.290
| Ptotal= 77.41 mm |                          B=   0.000
--------------------                          C=   0.711
                       used in:   INTENSITY =  A / (t + B)^C

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

      TIME    RAIN |   TIME    RAIN |'  TIME    RAIN |   TIME    RAIN
       hrs   mm/hr |    hrs   mm/hr |'   hrs   mm/hr |    hrs   mm/hr
      0.00    6.26 |   1.00   30.45 |'  2.00   12.53 |   3.00    7.23
      0.17    7.01 |   1.17  185.45 |'  2.17   11.04 |   3.17    6.80
      0.33    8.02 |   1.33   37.49 |'  2.33    9.92 |   3.33    6.43
      0.50    9.47 |   1.50   23.45 |'  2.50    9.04 |   3.50    6.10
      0.67   11.77 |   1.67   17.80 |'  2.67    8.32 |   3.67    5.82
      0.83   16.19 |   1.83   14.61 |'  2.83    7.73 |   3.83    5.56

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=   1.26   Curve Number   (CN)= 67.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.21   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.14

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

                          ---- TRANSFORMED HYETOGRAPH ----
      TIME    RAIN |   TIME    RAIN |'  TIME    RAIN |   TIME    RAIN
       hrs   mm/hr |    hrs   mm/hr |'   hrs   mm/hr |    hrs   mm/hr
     0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
     0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
     0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
     0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
     0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
     0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
     0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
     0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
     0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
     0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
     0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
     1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56
```

```
     Unit Hyd Qpeak  (cms)=   0.344

     PEAK FLOW       (cms)=   0.118 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  25.483
     TOTAL RAINFALL   (mm)=  77.410
     RUNOFF COEFFICIENT   =   0.329

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   3.96   Curve Number   (CN)= 67.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.19   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.06

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

                          ---- TRANSFORMED HYETOGRAPH ----
      TIME    RAIN |   TIME    RAIN |'  TIME    RAIN |   TIME    RAIN
       hrs   mm/hr |    hrs   mm/hr |'   hrs   mm/hr |    hrs   mm/hr
     0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
     0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
     0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
     0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
     0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
     0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
     0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
     0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
     0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
     0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
     0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
     1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Unit Hyd Qpeak  (cms)=   2.521

     PEAK FLOW       (cms)=   0.569 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  22.234
     TOTAL RAINFALL   (mm)=  77.410
     RUNOFF COEFFICIENT   =   0.287

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0103)|   Area    (ha)=   0.76   Curve Number   (CN)= 66.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.28   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.05

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

                          ---- TRANSFORMED HYETOGRAPH ----
      TIME    RAIN |   TIME    RAIN |'  TIME    RAIN |   TIME    RAIN
       hrs   mm/hr |    hrs   mm/hr |'   hrs   mm/hr |    hrs   mm/hr
     0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
     0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
     0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
     0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
     0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
     0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
     0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
     0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
     0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
     0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
     0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
     1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Unit Hyd Qpeak  (cms)=   0.581

     PEAK FLOW       (cms)=   0.099 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  19.165
     TOTAL RAINFALL   (mm)=  77.410
     RUNOFF COEFFICIENT   =   0.248

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

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--------------------
| CALIB            |
| STANDHYD (  0015)|   Area    (ha)=   1.41
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.90   Dir. Conn.(%)=  29.10
--------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.52         0.89
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      6.00         6.00
     Length            (m)=     42.00        20.00
     Mannings n             =    0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
      TIME    RAIN |   TIME    RAIN |'  TIME    RAIN |   TIME    RAIN
       hrs   mm/hr |    hrs   mm/hr |'   hrs   mm/hr |    hrs   mm/hr
     0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
     0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
     0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
     0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
     0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
     0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
     0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
     0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
     0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
     0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
     0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
     1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       106.73
               over (min)          5.00         5.00
     Storage Coeff.  (min)=       0.69 (ii)    4.26 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.23
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.21         0.26          0.474 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      75.91        41.11          51.24
     TOTAL RAINFALL   (mm)=      77.41        77.41          77.41
     RUNOFF COEFFICIENT   =       0.98         0.53           0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):     1.26   0.118     1.42    25.48
      + ID2= 2 (  0102):     3.96   0.569     1.33    22.23
        ==========================================================
        ID = 3 (  0003):     5.22   0.675     1.33    23.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0003):     5.22   0.675     1.33    23.02
      + ID2= 2 (  0103):     0.76   0.099     1.33    19.16
        ==========================================================
        ID = 1 (  0003):     5.98   0.774     1.33    22.53

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0003):     5.98   0.774     1.33    22.53
      + ID2= 2 (  0015):     1.41   0.474     1.33    51.24
        ==========================================================
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        ID = 3 (  0003):     7.39   1.248     1.33    28.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0013)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
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                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      1.57         3.65
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=     10.00        10.00
     Length            (m)=    186.55        30.00
     Mannings n             =    0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
      TIME    RAIN |   TIME    RAIN |'  TIME    RAIN |   TIME    RAIN
       hrs   mm/hr |    hrs   mm/hr |'   hrs   mm/hr |    hrs   mm/hr
     0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
     0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
     0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
     0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
     0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
     0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
     0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
     0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
     0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
     0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
     0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
     1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       108.19
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.45 (ii)    6.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.56         0.81          1.258 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      75.91        41.29          48.46
     TOTAL RAINFALL   (mm)=      77.41        77.41          77.41
     RUNOFF COEFFICIENT   =       0.98         0.53           0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
         V V    I       SS  U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\42274741-47
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\42274741-47


DATE: 11-08-2024                          TIME: 08:45:48

USER:


COMMENTS: _____________________________________________________


----------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : Hurricane Hazel (Regional)    **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\cmartin\AppD
|                  |              ata\Local\Temp\
|                  |              475b8c60-e583-467e-9c13-707b8b3dd18d\eeae85f6
| Ptotal=212.00 mm |    Comments: Hazel
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    6.00 |  3.00   13.00 |   6.00   23.00 |  9.00   53.00
               1.00    4.00 |  4.00   17.00 |   7.00   13.00 | 10.00   38.00
               2.00    6.00 |  5.00   13.00 |   8.00   13.00 | 11.00   13.00

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| CALIB             |
| NASHYD   (  0101)|   Area    (ha)=   1.26   Curve Number   (CN)= 67.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.21   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.14

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 |  3.083   13.00 |  6.083   23.00 |  9.08   53.00
               0.167    6.00 |  3.167   13.00 |  6.167   23.00 |  9.17   53.00
               0.250    6.00 |  3.250   13.00 |  6.250   23.00 |  9.25   53.00
               0.333    6.00 |  3.333   13.00 |  6.333   23.00 |  9.33   53.00
               0.417    6.00 |  3.417   13.00 |  6.417   23.00 |  9.42   53.00
               0.500    6.00 |  3.500   13.00 |  6.500   23.00 |  9.50   53.00
               0.583    6.00 |  3.583   13.00 |  6.583   23.00 |  9.58   53.00
               0.667    6.00 |  3.667   13.00 |  6.667   23.00 |  9.67   53.00
               0.750    6.00 |  3.750   13.00 |  6.750   23.00 |  9.75   53.00
               0.833    6.00 |  3.833   13.00 |  6.833   23.00 |  9.83   53.00
               0.917    6.00 |  3.917   13.00 |  6.917   23.00 |  9.92   53.00
               1.000    6.00 |  4.000   13.00 |  7.000   23.00 | 10.00   53.00
               1.083    4.00 |  4.083   17.00 |  7.083   13.00 | 10.08   38.00
               1.167    4.00 |  4.167   17.00 |  7.167   13.00 | 10.17   38.00
               1.250    4.00 |  4.250   17.00 |  7.250   13.00 | 10.25   38.00
               1.333    4.00 |  4.333   17.00 |  7.333   13.00 | 10.33   38.00
               1.417    4.00 |  4.417   17.00 |  7.417   13.00 | 10.42   38.00
               1.500    4.00 |  4.500   17.00 |  7.500   13.00 | 10.50   38.00
               1.583    4.00 |  4.583   17.00 |  7.583   13.00 | 10.58   38.00
               1.667    4.00 |  4.667   17.00 |  7.667   13.00 | 10.67   38.00
               1.750    4.00 |  4.750   17.00 |  7.750   13.00 | 10.75   38.00
               1.833    4.00 |  4.833   17.00 |  7.833   13.00 | 10.83   38.00
               1.917    4.00 |  4.917   17.00 |  7.917   13.00 | 10.92   38.00
               2.000    4.00 |  5.000   17.00 |  8.000   13.00 | 11.00   38.00
               2.083    6.00 |  5.083   13.00 |  8.083   13.00 | 11.08   13.00
               2.167    6.00 |  5.167   13.00 |  8.167   13.00 | 11.17   13.00
               2.250    6.00 |  5.250   13.00 |  8.250   13.00 | 11.25   13.00
               2.333    6.00 |  5.333   13.00 |  8.333   13.00 | 11.33   13.00
               2.417    6.00 |  5.417   13.00 |  8.417   13.00 | 11.42   13.00
               2.500    6.00 |  5.500   13.00 |  8.500   13.00 | 11.50   13.00
               2.583    6.00 |  5.583   13.00 |  8.583   13.00 | 11.58   13.00
               2.667    6.00 |  5.667   13.00 |  8.667   13.00 | 11.67   13.00
               2.750    6.00 |  5.750   13.00 |  8.750   13.00 | 11.75   13.00
               2.833    6.00 |  5.833   13.00 |  8.833   13.00 | 11.83   13.00
               2.917    6.00 |  5.917   13.00 |  8.917   13.00 | 11.92   13.00
               3.000    6.00 |  6.000   13.00 |  9.000   13.00 | 12.00   13.00

    Unit Hyd Qpeak  (cms)=   0.344

    PEAK FLOW       (cms)=   0.146 (i)
    TIME TO PEAK    (hrs)=  10.000
    RUNOFF VOLUME    (mm)= 127.476
    TOTAL RAINFALL   (mm)= 212.000
    RUNOFF COEFFICIENT   =   0.601

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

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| CALIB             |
| NASHYD   (  0102)|   Area    (ha)=   3.96   Curve Number   (CN)= 67.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.19   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.06

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 |  3.083   13.00 |  6.083   23.00 |  9.08   53.00
               0.167    6.00 |  3.167   13.00 |  6.167   23.00 |  9.17   53.00
               0.250    6.00 |  3.250   13.00 |  6.250   23.00 |  9.25   53.00
               0.333    6.00 |  3.333   13.00 |  6.333   23.00 |  9.33   53.00
               0.417    6.00 |  3.417   13.00 |  6.417   23.00 |  9.42   53.00
               0.500    6.00 |  3.500   13.00 |  6.500   23.00 |  9.50   53.00
               0.583    6.00 |  3.583   13.00 |  6.583   23.00 |  9.58   53.00
               0.667    6.00 |  3.667   13.00 |  6.667   23.00 |  9.67   53.00
               0.750    6.00 |  3.750   13.00 |  6.750   23.00 |  9.75   53.00
               0.833    6.00 |  3.833   13.00 |  6.833   23.00 |  9.83   53.00
               0.917    6.00 |  3.917   13.00 |  6.917   23.00 |  9.92   53.00
               1.000    6.00 |  4.000   13.00 |  7.000   23.00 | 10.00   53.00
               1.083    4.00 |  4.083   17.00 |  7.083   13.00 | 10.08   38.00
               1.167    4.00 |  4.167   17.00 |  7.167   13.00 | 10.17   38.00
               1.250    4.00 |  4.250   17.00 |  7.250   13.00 | 10.25   38.00
               1.333    4.00 |  4.333   17.00 |  7.333   13.00 | 10.33   38.00
               1.417    4.00 |  4.417   17.00 |  7.417   13.00 | 10.42   38.00
               1.500    4.00 |  4.500   17.00 |  7.500   13.00 | 10.50   38.00
               1.583    4.00 |  4.583   17.00 |  7.583   13.00 | 10.58   38.00
               1.667    4.00 |  4.667   17.00 |  7.667   13.00 | 10.67   38.00
               1.750    4.00 |  4.750   17.00 |  7.750   13.00 | 10.75   38.00
               1.833    4.00 |  4.833   17.00 |  7.833   13.00 | 10.83   38.00
               1.917    4.00 |  4.917   17.00 |  7.917   13.00 | 10.92   38.00
               2.000    4.00 |  5.000   17.00 |  8.000   13.00 | 11.00   38.00
               2.083    6.00 |  5.083   13.00 |  8.083   13.00 | 11.08   13.00
               2.167    6.00 |  5.167   13.00 |  8.167   13.00 | 11.17   13.00
               2.250    6.00 |  5.250   13.00 |  8.250   13.00 | 11.25   13.00
               2.333    6.00 |  5.333   13.00 |  8.333   13.00 | 11.33   13.00
               2.417    6.00 |  5.417   13.00 |  8.417   13.00 | 11.42   13.00
               2.500    6.00 |  5.500   13.00 |  8.500   13.00 | 11.50   13.00
               2.583    6.00 |  5.583   13.00 |  8.583   13.00 | 11.58   13.00
               2.667    6.00 |  5.667   13.00 |  8.667   13.00 | 11.67   13.00
               2.750    6.00 |  5.750   13.00 |  8.750   13.00 | 11.75   13.00
               2.833    6.00 |  5.833   13.00 |  8.833   13.00 | 11.83   13.00
               2.917    6.00 |  5.917   13.00 |  8.917   13.00 | 11.92   13.00
               3.000    6.00 |  6.000   13.00 |  9.000   13.00 | 12.00   13.00

    Unit Hyd Qpeak  (cms)=   2.521

    PEAK FLOW       (cms)=   0.402 (i)
    TIME TO PEAK    (hrs)=  10.000
    RUNOFF VOLUME    (mm)= 110.787

    TOTAL RAINFALL   (mm)= 212.000
    RUNOFF COEFFICIENT   =   0.523

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

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| CALIB             |
| NASHYD   (  0103)|   Area    (ha)=   0.76   Curve Number   (CN)= 66.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.28   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.05

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 |  3.083   13.00 |  6.083   23.00 |  9.08   53.00
               0.167    6.00 |  3.167   13.00 |  6.167   23.00 |  9.17   53.00
               0.250    6.00 |  3.250   13.00 |  6.250   23.00 |  9.25   53.00
               0.333    6.00 |  3.333   13.00 |  6.333   23.00 |  9.33   53.00
               0.417    6.00 |  3.417   13.00 |  6.417   23.00 |  9.42   53.00
               0.500    6.00 |  3.500   13.00 |  6.500   23.00 |  9.50   53.00
               0.583    6.00 |  3.583   13.00 |  6.583   23.00 |  9.58   53.00
               0.667    6.00 |  3.667   13.00 |  6.667   23.00 |  9.67   53.00
               0.750    6.00 |  3.750   13.00 |  6.750   23.00 |  9.75   53.00
               0.833    6.00 |  3.833   13.00 |  6.833   23.00 |  9.83   53.00
               0.917    6.00 |  3.917   13.00 |  6.917   23.00 |  9.92   53.00
               1.000    6.00 |  4.000   13.00 |  7.000   23.00 | 10.00   53.00
               1.083    4.00 |  4.083   17.00 |  7.083   13.00 | 10.08   38.00
               1.167    4.00 |  4.167   17.00 |  7.167   13.00 | 10.17   38.00
               1.250    4.00 |  4.250   17.00 |  7.250   13.00 | 10.25   38.00
               1.333    4.00 |  4.333   17.00 |  7.333   13.00 | 10.33   38.00
               1.417    4.00 |  4.417   17.00 |  7.417   13.00 | 10.42   38.00
               1.500    4.00 |  4.500   17.00 |  7.500   13.00 | 10.50   38.00
               1.583    4.00 |  4.583   17.00 |  7.583   13.00 | 10.58   38.00
               1.667    4.00 |  4.667   17.00 |  7.667   13.00 | 10.67   38.00
               1.750    4.00 |  4.750   17.00 |  7.750   13.00 | 10.75   38.00
               1.833    4.00 |  4.833   17.00 |  7.833   13.00 | 10.83   38.00
               1.917    4.00 |  4.917   17.00 |  7.917   13.00 | 10.92   38.00
               2.000    4.00 |  5.000   17.00 |  8.000   13.00 | 11.00   38.00
               2.083    6.00 |  5.083   13.00 |  8.083   13.00 | 11.08   13.00
               2.167    6.00 |  5.167   13.00 |  8.167   13.00 | 11.17   13.00
               2.250    6.00 |  5.250   13.00 |  8.250   13.00 | 11.25   13.00
               2.333    6.00 |  5.333   13.00 |  8.333   13.00 | 11.33   13.00
               2.417    6.00 |  5.417   13.00 |  8.417   13.00 | 11.42   13.00
               2.500    6.00 |  5.500   13.00 |  8.500   13.00 | 11.50   13.00
               2.583    6.00 |  5.583   13.00 |  8.583   13.00 | 11.58   13.00
               2.667    6.00 |  5.667   13.00 |  8.667   13.00 | 11.67   13.00
               2.750    6.00 |  5.750   13.00 |  8.750   13.00 | 11.75   13.00
               2.833    6.00 |  5.833   13.00 |  8.833   13.00 | 11.83   13.00
               2.917    6.00 |  5.917   13.00 |  8.917   13.00 | 11.92   13.00
               3.000    6.00 |  6.000   13.00 |  9.000   13.00 | 12.00   13.00

    Unit Hyd Qpeak  (cms)=   0.581

    PEAK FLOW       (cms)=   0.068 (i)
    TIME TO PEAK    (hrs)=  10.000
    RUNOFF VOLUME    (mm)=  96.784
    TOTAL RAINFALL   (mm)= 212.000
    RUNOFF COEFFICIENT   =   0.457

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

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-------------------
| CALIB             |
| STANDHYD (  0015)|   Area    (ha)=   1.41
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.90   Dir. Conn.(%)=  29.10
-------------------

                     IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.52          0.89
    Dep. Storage     (mm)=       1.50          5.00
    Average Slope     (%)=       6.00          6.00
    Length            (m)=      42.00         20.00
    Mannings n           =      0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 |  3.083   13.00 |  6.083   23.00 |  9.08   53.00
               0.167    6.00 |  3.167   13.00 |  6.167   23.00 |  9.17   53.00
               0.250    6.00 |  3.250   13.00 |  6.250   23.00 |  9.25   53.00
               0.333    6.00 |  3.333   13.00 |  6.333   23.00 |  9.33   53.00
               0.417    6.00 |  3.417   13.00 |  6.417   23.00 |  9.42   53.00
               0.500    6.00 |  3.500   13.00 |  6.500   23.00 |  9.50   53.00
               0.583    6.00 |  3.583   13.00 |  6.583   23.00 |  9.58   53.00
               0.667    6.00 |  3.667   13.00 |  6.667   23.00 |  9.67   53.00
               0.750    6.00 |  3.750   13.00 |  6.750   23.00 |  9.75   53.00
               0.833    6.00 |  3.833   13.00 |  6.833   23.00 |  9.83   53.00
               0.917    6.00 |  3.917   13.00 |  6.917   23.00 |  9.92   53.00
               1.000    6.00 |  4.000   13.00 |  7.000   23.00 | 10.00   53.00
               1.083    4.00 |  4.083   17.00 |  7.083   13.00 | 10.08   38.00
               1.167    4.00 |  4.167   17.00 |  7.167   13.00 | 10.17   38.00
               1.250    4.00 |  4.250   17.00 |  7.250   13.00 | 10.25   38.00
               1.333    4.00 |  4.333   17.00 |  7.333   13.00 | 10.33   38.00
               1.417    4.00 |  4.417   17.00 |  7.417   13.00 | 10.42   38.00
               1.500    4.00 |  4.500   17.00 |  7.500   13.00 | 10.50   38.00
               1.583    4.00 |  4.583   17.00 |  7.583   13.00 | 10.58   38.00
               1.667    4.00 |  4.667   17.00 |  7.667   13.00 | 10.67   38.00
               1.750    4.00 |  4.750   17.00 |  7.750   13.00 | 10.75   38.00
               1.833    4.00 |  4.833   17.00 |  7.833   13.00 | 10.83   38.00
               1.917    4.00 |  4.917   17.00 |  7.917   13.00 | 10.92   38.00
               2.000    4.00 |  5.000   17.00 |  8.000   13.00 | 11.00   38.00
               2.083    6.00 |  5.083   13.00 |  8.083   13.00 | 11.08   13.00
               2.167    6.00 |  5.167   13.00 |  8.167   13.00 | 11.17   13.00
               2.250    6.00 |  5.250   13.00 |  8.250   13.00 | 11.25   13.00
               2.333    6.00 |  5.333   13.00 |  8.333   13.00 | 11.33   13.00
               2.417    6.00 |  5.417   13.00 |  8.417   13.00 | 11.42   13.00
               2.500    6.00 |  5.500   13.00 |  8.500   13.00 | 11.50   13.00
               2.583    6.00 |  5.583   13.00 |  8.583   13.00 | 11.58   13.00
               2.667    6.00 |  5.667   13.00 |  8.667   13.00 | 11.67   13.00
               2.750    6.00 |  5.750   13.00 |  8.750   13.00 | 11.75   13.00
               2.833    6.00 |  5.833   13.00 |  8.833   13.00 | 11.83   13.00
               2.917    6.00 |  5.917   13.00 |  8.917   13.00 | 11.92   13.00
               3.000    6.00 |  6.000   13.00 |  9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00         55.18
              over (min)        5.00         10.00
    Storage Coeff.  (min)=      1.14 (ii)     5.39 (ii)
    Unit Hyd. Tpeak (min)=      5.00         10.00
    Unit Hyd. peak  (cms)=      0.34          0.16
                                                    *TOTALS*
    PEAK FLOW       (cms)=      0.06          0.14      0.196 (iii)
    TIME TO PEAK    (hrs)=      9.33         10.00       10.00
    RUNOFF VOLUME    (mm)=    210.50        163.13      176.91
    TOTAL RAINFALL   (mm)=    212.00        212.00      212.00
    RUNOFF COEFFICIENT   =      0.99          0.77        0.83

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  80.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0101):     1.26   0.146   10.00   127.48
     + ID2= 2 (  0102):     3.96   0.402   10.00   110.79
       ================================================
       ID = 3 (  0003):     5.22   0.547   10.00   114.82

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| ADD HYD  (  0003)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     5.22   0.547   10.00   114.82
     + ID2= 2 (  0103):     0.76   0.068   10.00    96.78
       ================================================
       ID = 1 (  0003):     5.98   0.615   10.00   112.52

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)     (cms)    (hrs)     (mm)
       ID1= 1 (  0003):      5.98   0.615    10.00   112.52
     + ID2= 2 (  0015):      1.41   0.196    10.00   176.91
       ================================================
       ID = 3 (  0003):      7.39   0.811    10.00   124.81

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB
| STANDHYD (  0013)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      1.57         3.65
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=     10.00        10.00
     Length            (m)=    186.55        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        55.69
           over (min)             5.00        10.00
     Storage Coeff.  (min)=       2.40 (ii)    7.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.14
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.16         0.56         0.722 (iii)
     TIME TO PEAK    (hrs)=       9.67        10.00        10.00
     RUNOFF VOLUME    (mm)=     210.50       163.45       173.19
     TOTAL RAINFALL   (mm)=     212.00       212.00       212.00
     RUNOFF COEFFICIENT   =       0.99         0.77         0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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FINISH

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

       V     V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V     V   I    SS     U   U   A A   L
        V   V    I      SS   U   U  AAAAA  L
         V V     I       SS  U   U  A   A  L
          V      I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\4dd2c1fa-f8
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\4dd2c1fa-f8


DATE: 11-08-2024                          TIME: 08:57:04

USER:


COMMENTS: _____________________________________________________


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  ************************************************
  ** SIMULATION : 25mm 4hr 10min Chicago        **
  ************************************************


--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 475.610
| Ptotal= 33.31 mm |                          B=   0.000
--------------------                          C=   0.738
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    2.45 |  1.00   12.69 |  2.00    5.04 |  3.00    2.85
               0.17    2.76 |  1.17   86.95 |  2.17    4.42 |  3.17    2.67
               0.33    3.17 |  1.33   15.73 |  2.33    3.95 |  3.33    2.52
               0.50    3.77 |  1.50    9.66 |  2.50    3.59 |  3.50    2.39
               0.67    4.72 |  1.67    7.25 |  2.67    3.30 |  3.67    2.27
               0.83    6.58 |  1.83    5.91 |  2.83    3.05 |  3.83    2.17


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--------------------
| MODIFY STORM     |    MODIFYING PARAMETERS
--------------------    Time shift  (min)     =  0.00

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

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--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=   1.26   Curve Number   (CN)= 67.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.21   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.14

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

                          ---- TRANSFORMED HYETOGRAPH ----
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```
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Unit Hyd Qpeak  (cms)=   0.344

     PEAK FLOW       (cms)=   0.008 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=   2.251
     TOTAL RAINFALL   (mm)=  24.999
     RUNOFF COEFFICIENT   =   0.090

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

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--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   3.96   Curve Number   (CN)= 67.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.19   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.06

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Unit Hyd Qpeak  (cms)=   2.521

     PEAK FLOW       (cms)=   0.042 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   1.974
     TOTAL RAINFALL   (mm)=  24.999
     RUNOFF COEFFICIENT   =   0.079

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

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--------------------
| CALIB            |
| NASHYD   (  0103)|   Area    (ha)=   0.76   Curve Number   (CN)= 66.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.28   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.05

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Unit Hyd Qpeak  (cms)=   0.581

     PEAK FLOW       (cms)=   0.007 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   1.670
     TOTAL RAINFALL   (mm)=  24.999
     RUNOFF COEFFICIENT   =   0.067

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

--------------------------------------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0015)|   Area    (ha)=   1.41
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.90   Dir. Conn.(%)=  29.10
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.52          0.89
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       6.00          6.00
     Length            (m)=      42.00         20.00
     Mannings n            =      0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25        11.97
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     1.05 (ii)    8.88 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.34         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.07         0.02        0.088 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42         1.33
     RUNOFF VOLUME    (mm)=    23.50        10.72
     TOTAL RAINFALL   (mm)=    25.00        25.00        25.00
     RUNOFF COEFFICIENT   =     0.94         0.22         0.43

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* =  80.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0101):     1.26   0.008     1.42     2.25
     + ID2= 2 (  0102):     3.96   0.042     1.33     1.97
       ================================================
       ID = 3 (  0003):     5.22   0.048     1.33     2.04

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

--------------------
| ADD HYD  (  0003)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     5.22   0.048     1.33     2.04
```

```
     + ID2= 2 (  0103):     0.76   0.007     1.33     1.67
       ================================================
       ID = 1 (  0003):     5.98   0.055     1.33     1.99

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     5.98   0.055     1.33     1.99
     + ID2= 2 (  0015):     1.41   0.088     1.33    10.72
       ================================================
       ID = 3 (  0003):     7.39   0.143     1.33     3.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0013)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57          3.65
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=      10.00         10.00
     Length            (m)=     186.55         30.00
     Mannings n            =      0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25        12.23
               over (min)        5.00        15.00
     Storage Coeff.  (min)=     2.21 (ii)   10.70 (ii)
     Unit Hyd. Tpeak (min)=     5.00        15.00
     Unit Hyd. peak  (cms)=     0.30         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.19         0.07         0.223 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.50         1.33
     RUNOFF VOLUME    (mm)=    23.50         5.53         9.25
     TOTAL RAINFALL   (mm)=    25.00        25.00        25.00
     RUNOFF COEFFICIENT   =     0.94         0.22         0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* =  80.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 FINISH
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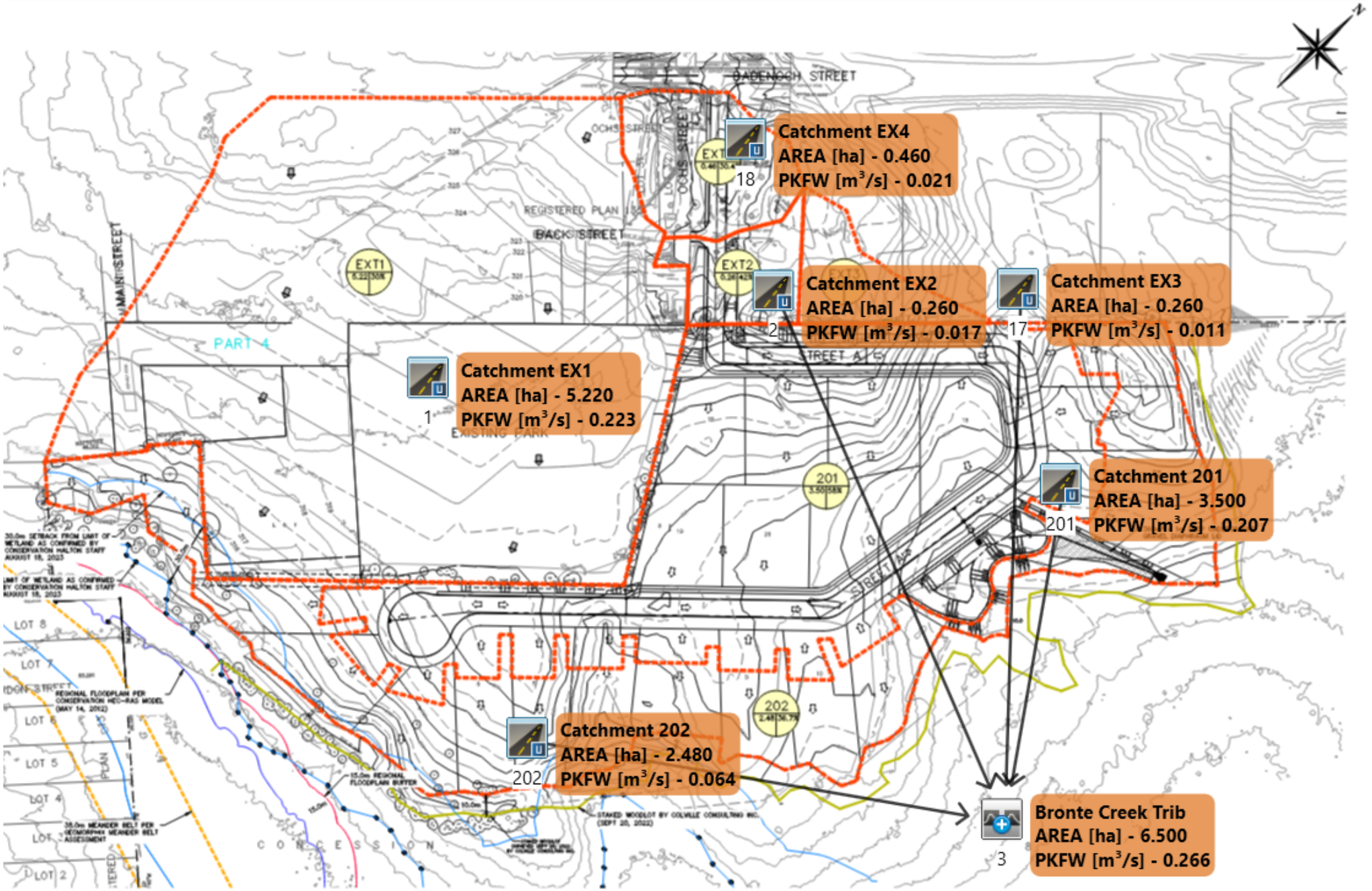
Post-Development Uncontrolled Visual-Otthymo Schematic



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

       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
         V V    I       SS  U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

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


   Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
   Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\fbc119fe-34
   Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\fbc119fe-34

 DATE: 11-08-2024                          TIME: 09:01:02

 USER:


 COMMENTS: _____________________________________________________


 ----------------------------------------------------------------------------------------------------------------
   ************************************************
   ** SIMULATION : 2yr 4hr 10Min Chicago         **
   ************************************************

 --------------------
 | CHICAGO STORM    |     IDF curve parameters: A= 475.610
 | Ptotal= 33.31 mm |                           B=   0.000
 --------------------                           C=   0.738
                         used in:   INTENSITY =  A / (t + B)^C

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

                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.00    2.45 |  1.00   12.69 |'  2.00    5.04 |  3.00    2.85
                 0.17    2.76 |  1.17   86.95 |'  2.17    4.42 |  3.17    2.67
                 0.33    3.17 |  1.33   15.73 |'  2.33    3.95 |  3.33    2.52
                 0.50    3.77 |  1.50    9.66 |'  2.50    3.59 |  3.50    2.39
                 0.67    4.72 |  1.67    7.25 |'  2.67    3.30 |  3.67    2.27
                 0.83    6.58 |  1.83    5.91 |'  2.83    3.05 |  3.83    2.17


 ----------------------------------------------------------------------------------------------------------------
 --------------------
 | CALIB            |
 | STANDHYD (  0201)|   Area    (ha)=   3.50
 |ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
 --------------------
                                IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=         2.03          1.47
      Dep. Storage     (mm)=         1.50          5.00
      Average Slope     (%)=         4.00          4.00
      Length            (m)=       152.75         20.00
      Mannings n             =      0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    2.45 | 1.083   12.69 | 2.083    5.04 |  3.08    2.85
                0.167    2.45 | 1.167   12.69 | 2.167    5.04 |  3.17    2.85
                0.250    2.76 | 1.250   86.95 | 2.250    4.42 |  3.25    2.67
                0.333    2.76 | 1.333   86.95 | 2.333    4.42 |  3.33    2.67
                0.417    3.17 | 1.417   15.73 | 2.417    3.95 |  3.42    2.52
                0.500    3.17 | 1.500   15.73 | 2.500    3.95 |  3.50    2.52
                0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
                0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
                0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
                0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
                0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
                1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

      Max.Eff.Inten.(mm/hr)=       86.95         47.32
           over (min)              5.00         10.00
      Storage Coeff.  (min)=       2.55 (ii)     9.06 (ii)
      Unit Hyd. Tpeak (min)=       5.00         10.00
      Unit Hyd. peak  (cms)=       0.29          0.12
                                                          *TOTALS*
      PEAK FLOW       (cms)=       0.00          0.13          0.134 (iii)
      TIME TO PEAK    (hrs)=       1.33          1.42          1.42
      RUNOFF VOLUME    (mm)=      32.31         12.87         12.97
      TOTAL RAINFALL   (mm)=      33.31         33.31         33.31
      RUNOFF COEFFICIENT   =       0.97          0.39          0.39

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

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 ----------------------------------------------------------------------------------------------------------------
 --------------------
 | CALIB            |
 | STANDHYD (  0017)|   Area    (ha)=   0.26
 |ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
 --------------------
                                IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=         0.08          0.18
      Dep. Storage     (mm)=         1.50          5.00
      Average Slope     (%)=         4.00         10.00
      Length            (m)=        41.63         30.00
      Mannings n             =      0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    2.45 | 1.083   12.69 | 2.083    5.04 |  3.08    2.85
                0.167    2.45 | 1.167   12.69 | 2.167    5.04 |  3.17    2.85
                0.250    2.76 | 1.250   86.95 | 2.250    4.42 |  3.25    2.67
                0.333    2.76 | 1.333   86.95 | 2.333    4.42 |  3.33    2.67
                0.417    3.17 | 1.417   15.73 | 2.417    3.95 |  3.42    2.52
                0.500    3.17 | 1.500   15.73 | 2.500    3.95 |  3.50    2.52
                0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
                0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
                0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
                0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
                0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
                1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

      Max.Eff.Inten.(mm/hr)=       86.95         28.43
                0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
                0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
                0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
                0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
                0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
                1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

      Max.Eff.Inten.(mm/hr)=       86.95         67.96
           over (min)              5.00         10.00
      Storage Coeff.  (min)=       2.30 (ii)     6.71 (ii)
      Unit Hyd. Tpeak (min)=       5.00         10.00
      Unit Hyd. peak  (cms)=       0.30          0.14
                                                          *TOTALS*
      PEAK FLOW       (cms)=       0.17          0.20          0.330 (iii)
      TIME TO PEAK    (hrs)=       1.33          1.42          1.33
      RUNOFF VOLUME    (mm)=      31.81         14.72         18.12
      TOTAL RAINFALL   (mm)=      33.31         33.31         33.31
      RUNOFF COEFFICIENT   =       0.95          0.44          0.54

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

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 ----------------------------------------------------------------------------------------------------------------
 --------------------
 | CALIB            |
 | STANDHYD (  0002)|   Area    (ha)=   0.26
 |ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  31.00
 --------------------
                                IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=         0.11          0.15
      Dep. Storage     (mm)=         1.50          5.00
      Average Slope     (%)=         6.00          6.00
      Length            (m)=        41.63         20.00
      Mannings n             =      0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    2.45 | 1.083   12.69 | 2.083    5.04 |  3.08    2.85
                0.167    2.45 | 1.167   12.69 | 2.167    5.04 |  3.17    2.85
                0.250    2.76 | 1.250   86.95 | 2.250    4.42 |  3.25    2.67
                0.333    2.76 | 1.333   86.95 | 2.333    4.42 |  3.33    2.67
                0.417    3.17 | 1.417   15.73 | 2.417    3.95 |  3.42    2.52
                0.500    3.17 | 1.500   15.73 | 2.500    3.95 |  3.50    2.52
                0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
                0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
                0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
                0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
                0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
                1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

      Max.Eff.Inten.(mm/hr)=       86.95         26.82
           over (min)              5.00         10.00
      Storage Coeff.  (min)=       0.93 (ii)     5.48 (ii)
      Unit Hyd. Tpeak (min)=       5.00         10.00
      Unit Hyd. peak  (cms)=       0.34          0.16
                                                          *TOTALS*
      PEAK FLOW       (cms)=       0.02          0.01          0.026 (iii)
      TIME TO PEAK    (hrs)=       1.33          1.42          1.33
      RUNOFF VOLUME    (mm)=      31.81         10.27         16.93
      TOTAL RAINFALL   (mm)=      33.31         33.31         33.31
      RUNOFF COEFFICIENT   =       0.95          0.31          0.51

 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 ----------------------------------------------------------------------------------------------------------------
 --------------------
 | CALIB            |
                 over (min)              5.00         10.00
      Storage Coeff.  (min)=       1.05 (ii)     7.11 (ii)
      Unit Hyd. Tpeak (min)=       5.00         10.00
      Unit Hyd. peak  (cms)=       0.34          0.14
                                                          *TOTALS*
      PEAK FLOW       (cms)=       0.01          0.01          0.017 (iii)
      TIME TO PEAK    (hrs)=       1.33          1.42          1.33
      RUNOFF VOLUME    (mm)=      31.81         10.52         13.78
      TOTAL RAINFALL   (mm)=      33.31         33.31         33.31
      RUNOFF COEFFICIENT   =       0.95          0.32          0.41

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

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 ----------------------------------------------------------------------------------------------------------------
 --------------------
 | ADD HYD  (  0003)|
 |  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
 --------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0017):     0.26   0.017     1.33     13.78
      + ID2= 2 (  0002):     0.26   0.026     1.33     16.93
        ==========================================================
        ID = 3 (  0003):     0.52   0.044     1.33     15.36

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
 ----------------------------------------------------------------------------------------------------------------
 --------------------
 | ADD HYD  (  0003)|
 |  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
 --------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0003):     0.52   0.044     1.33     15.36
      + ID2= 2 (  0201):     3.50   0.330     1.33     18.12
        ==========================================================
        ID = 1 (  0003):     4.02   0.374     1.33     17.76

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
 ----------------------------------------------------------------------------------------------------------------
 --------------------
 | ADD HYD  (  0003)|
 |  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
 --------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0003):     4.02   0.374     1.33     17.76
      + ID2= 2 (  0202):     2.48   0.134     1.42     12.97
        ==========================================================
        ID = 3 (  0003):     6.50   0.478     1.33     15.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
 ----------------------------------------------------------------------------------------------------------------
 --------------------
 | CALIB            |
 | STANDHYD (  0001)|   Area    (ha)=   5.22
 |ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
 --------------------
                                IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=         1.57          3.65
      Dep. Storage     (mm)=         1.50          5.00
      Average Slope     (%)=        10.00         10.00
      Length            (m)=       186.55         30.00
      Mannings n             =      0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    2.45 | 1.083   12.69 | 2.083    5.04 |  3.08    2.85
                0.167    2.45 | 1.167   12.69 | 2.167    5.04 |  3.17    2.85
                0.250    2.76 | 1.250   86.95 | 2.250    4.42 |  3.25    2.67
                0.333    2.76 | 1.333   86.95 | 2.333    4.42 |  3.33    2.67
                0.417    3.17 | 1.417   15.73 | 2.417    3.95 |  3.42    2.52
                0.500    3.17 | 1.500   15.73 | 2.500    3.95 |  3.50    2.52
                0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
                0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
```

0.750	4.72	1.750	7.25	2.750	3.30	3.75	2.27
0.833	4.72	1.833	7.25	2.833	3.30	3.83	2.27
0.917	6.58	1.917	5.91	2.917	3.05	3.92	2.17
1.000	6.58	2.000	5.91	3.000	3.05	4.00	2.17

Max.Eff.Inten.(mm/hr)=	86.95	24.11	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.97 (ii)	8.44 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.31	0.12	
			TOTALS
PEAK FLOW (cms)=	0.26	0.17	0.380 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	31.81	9.83	14.38
TOTAL RAINFALL (mm)=	33.31	33.31	33.31
RUNOFF COEFFICIENT =	0.95	0.30	0.43

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0018)	Area (ha)=	0.46	
ID= 1 DT= 5.0 min	Total Imp(%)=	30.40	Dir. Conn.(%)= 21.70

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.32
Dep. Storage (mm)=	1.50	5.00
Average Slope (%)=	2.00	4.00
Length (m)=	55.38	20.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.45	1.083	12.69	2.083	5.04	3.08	2.85
0.167	2.45	1.167	12.69	2.167	5.04	3.17	2.85
0.250	2.76	1.250	86.95	2.250	4.42	3.25	2.67
0.333	2.76	1.333	86.95	2.333	4.42	3.33	2.67
0.417	3.17	1.417	15.73	2.417	3.95	3.42	2.52
0.500	3.17	1.500	15.73	2.500	3.95	3.50	2.52
0.583	3.77	1.583	9.66	2.583	3.59	3.58	2.39
0.667	3.77	1.667	9.66	2.667	3.59	3.67	2.39
0.750	4.72	1.750	7.25	2.750	3.30	3.75	2.27
0.833	4.72	1.833	7.25	2.833	3.30	3.83	2.27
0.917	6.58	1.917	5.91	2.917	3.05	3.92	2.17
1.000	6.58	2.000	5.91	3.000	3.05	4.00	2.17

Max.Eff.Inten.(mm/hr)=	86.95	23.75	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.54 (ii)	8.26 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.13	
			TOTALS
PEAK FLOW (cms)=	0.02	0.01	0.035 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	31.81	9.77	14.54
TOTAL RAINFALL (mm)=	33.31	33.31	33.31
RUNOFF COEFFICIENT =	0.95	0.29	0.44

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
 V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
 V    V   I    SS     U   U   A A   L
  V  V    I      SS   U   U  AAAAA  L
  V  V    I       SS  U   U  A   A  L
   VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\17438399-58
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\17438399-58

DATE: 11-08-2024                          TIME: 09:01:02

USER:


COMMENTS: _____________________________________________________
```

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  ************************************************
  ** SIMULATION : 5yr 4hr 10min Chicago          **
  ************************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 632.750
| Ptotal= 43.59 mm |                           B=   0.000
--------------------                           C=   0.741
                        used in:   INTENSITY =  A / (t + B)^C

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

          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.00    3.17 |  1.00   16.54 |  2.00    6.54 |  3.00    3.69
          0.17    3.57 |  1.17  114.88 |  2.17    5.73 |  3.17    3.46
          0.33    4.11 |  1.33   20.52 |  2.33    5.13 |  3.33    3.26
          0.50    4.88 |  1.50   12.57 |  2.50    4.65 |  3.50    3.09
          0.67    6.13 |  1.67    9.43 |  2.67    4.27 |  3.67    2.94
          0.83    8.55 |  1.83    7.68 |  2.83    3.95 |  3.83    2.80


--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0201)| Area    (ha)=   3.50
|ID= 1 DT= 5.0 min | Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     2.03          1.47
     Dep. Storage     (mm)=     1.50          5.00
     Average Slope     (%)=     4.00          4.00
     Length            (m)=   152.75         20.00
     Mannings n            =    0.013         0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.083   3.17 |  1.083  16.54 |  2.083   6.54 |  3.08    3.69
          0.167   3.17 |  1.167  16.54 |  2.167   6.54 |  3.17    3.69
          0.250   3.57 |  1.250 114.88 |  2.250   5.73 |  3.25    3.46
          0.333   3.57 |  1.333 114.88 |  2.333   5.73 |  3.33    3.46
          0.417   4.11 |  1.417  20.52 |  2.417   5.13 |  3.42    3.26
          0.500   4.11 |  1.500  20.52 |  2.500   5.13 |  3.50    3.26
          0.583   4.88 |  1.583  12.57 |  2.583   4.65 |  3.58    3.09
          0.667   4.88 |  1.667  12.57 |  2.667   4.65 |  3.67    3.09
          0.750   6.13 |  1.750   9.43 |  2.750   4.27 |  3.75    2.94
          0.833   6.13 |  1.833   9.43 |  2.833   4.27 |  3.83    2.94
          0.917   8.55 |  1.917   7.68 |  2.917   3.95 |  3.92    2.80
          1.000   8.55 |  2.000   7.68 |  3.000   3.95 |  4.00    2.80

     Max.Eff.Inten.(mm/hr)=    114.88        78.65
          over (min)           5.00         10.00
     Storage Coeff.  (min)=    2.28 (ii)     7.59 (ii)
     Unit Hyd. Tpeak (min)=    5.00         10.00
     Unit Hyd. peak  (cms)=    0.30          0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=    0.00          0.24       0.238 (iii)
     TIME TO PEAK    (hrs)=    1.33          1.42       1.42
     RUNOFF VOLUME    (mm)=   42.59         20.21      20.32
     TOTAL RAINFALL   (mm)=   43.59         43.59      43.59
     RUNOFF COEFFICIENT   =    0.98          0.46       0.47

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0017)| Area    (ha)=   0.26
|ID= 1 DT= 5.0 min | Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     0.08          0.18
     Dep. Storage     (mm)=     1.50          5.00
     Average Slope     (%)=     4.00         10.00
     Length            (m)=    41.63         30.00
     Mannings n            =    0.013         0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.083   3.17 |  1.083  16.54 |  2.083   6.54 |  3.08    3.69
          0.167   3.17 |  1.167  16.54 |  2.167   6.54 |  3.17    3.69
          0.250   3.57 |  1.250 114.88 |  2.250   5.73 |  3.25    3.46
          0.333   3.57 |  1.333 114.88 |  2.333   5.73 |  3.33    3.46
          0.417   4.11 |  1.417  20.52 |  2.417   5.13 |  3.42    3.26
          0.500   4.11 |  1.500  20.52 |  2.500   5.13 |  3.50    3.26
          0.583   4.88 |  1.583  12.57 |  2.583   4.65 |  3.58    3.09
          0.667   4.88 |  1.667  12.57 |  2.667   4.65 |  3.67    3.09
          0.750   6.13 |  1.750   9.43 |  2.750   4.27 |  3.75    2.94
          0.833   6.13 |  1.833   9.43 |  2.833   4.27 |  3.83    2.94
          0.917   8.55 |  1.917   7.68 |  2.917   3.95 |  3.92    2.80
          1.000   8.55 |  2.000   7.68 |  3.000   3.95 |  4.00    2.80

     Max.Eff.Inten.(mm/hr)=    114.88        49.49
          over (min)           5.00         10.00
     Storage Coeff.  (min)=    0.94 (ii)     5.80 (ii)
     Unit Hyd. Tpeak (min)=    5.00         10.00
     Unit Hyd. peak  (cms)=    0.34          0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=    0.01          0.02       0.028 (iii)
     TIME TO PEAK    (hrs)=    1.33          1.42       1.33
     RUNOFF VOLUME    (mm)=   42.09         17.06      20.91
     TOTAL RAINFALL   (mm)=   43.59         43.59      43.59
     RUNOFF COEFFICIENT   =    0.97          0.39       0.48

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26    0.028     1.33    20.91
     + ID2= 2 (  0002):     0.26    0.045     1.33    24.58
       ==========================================================
       ID = 3 (  0003):     0.52    0.073     1.33    22.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     0.52    0.073     1.33    22.74
     + ID2= 2 (  0201):     3.50    0.486     1.33    26.48
       ==========================================================
       ID = 1 (  0003):     4.02    0.560     1.33    26.00

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     4.02    0.560     1.33    26.00
     + ID2= 2 (  0202):     2.48    0.238     1.42    20.32
       ==========================================================
       ID = 3 (  0003):     6.50    0.754     1.33    23.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0001)| Area    (ha)=   5.22
|ID= 1 DT= 5.0 min | Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     1.57          3.65
     Dep. Storage     (mm)=     1.50          5.00
     Average Slope     (%)=    10.00         10.00
     Length            (m)=   186.55         30.00
     Mannings n            =    0.013         0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.083   3.17 |  1.083  16.54 |  2.083   6.54 |  3.08    3.69
          0.167   3.17 |  1.167  16.54 |  2.167   6.54 |  3.17    3.69
          0.250   3.57 |  1.250 114.88 |  2.250   5.73 |  3.25    3.46
          0.333   3.57 |  1.333 114.88 |  2.333   5.73 |  3.33    3.46
          0.417   4.11 |  1.417  20.52 |  2.417   5.13 |  3.42    3.26
          0.500   4.11 |  1.500  20.52 |  2.500   5.13 |  3.50    3.26
          0.583   4.88 |  1.583  12.57 |  2.583   4.65 |  3.58    3.09
          0.667   4.88 |  1.667  12.57 |  2.667   4.65 |  3.67    3.09
```

0.750	6.13	1.750	9.43	2.750	4.27	3.75	2.94
0.833	6.13	1.833	9.43	2.833	4.27	3.83	2.94
0.917	8.55	1.917	7.68	2.917	3.95	3.92	2.80
1.000	8.55	2.000	7.68	3.000	3.95	4.00	2.80

Max.Eff.Inten.(mm/hr)=	114.88	42.67	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.76 (ii)	6.91 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.14	
			TOTALS
PEAK FLOW (cms)=	0.34	0.32	0.589 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	42.09	16.12	21.49
TOTAL RAINFALL (mm)=	43.59	43.59	43.59
RUNOFF COEFFICIENT =	0.97	0.37	0.49

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0018)	Area (ha)=	0.46	
ID= 1 DT= 5.0 min	Total Imp(%)=	30.40	Dir. Conn.(%)= 21.70

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.32
Dep. Storage (mm)=	1.50	5.00
Average Slope (%)=	2.00	4.00
Length (m)=	55.38	20.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.17	1.083	16.54	2.083	6.54	3.08	3.69
0.167	3.17	1.167	16.54	2.167	6.54	3.17	3.69
0.250	3.57	1.250	114.88	2.250	5.73	3.25	3.46
0.333	3.57	1.333	114.88	2.333	5.73	3.33	3.46
0.417	4.11	1.417	20.52	2.417	5.13	3.42	3.26
0.500	4.11	1.500	20.52	2.500	5.13	3.50	3.26
0.583	4.88	1.583	12.57	2.583	4.65	3.58	3.09
0.667	4.88	1.667	12.57	2.667	4.65	3.67	3.09
0.750	6.13	1.750	9.43	2.750	4.27	3.75	2.94
0.833	6.13	1.833	9.43	2.833	4.27	3.83	2.94
0.917	8.55	1.917	7.68	2.917	3.95	3.92	2.80
1.000	8.55	2.000	7.68	3.000	3.95	4.00	2.80

Max.Eff.Inten.(mm/hr)=	114.88	42.09	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.38 (ii)	6.72 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.14	
			TOTALS
PEAK FLOW (cms)=	0.03	0.03	0.053 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	42.09	16.03	21.68
TOTAL RAINFALL (mm)=	43.59	43.59	43.59
RUNOFF COEFFICIENT =	0.97	0.37	0.50

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
 V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
 V    V   I    SS     U   U   A A   L
  V  V    I      SS   U   U  AAAAA  L
  V  V    I       SS  U   U  A   A  L
   VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\b9d5599c-13
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\b9d5599c-13

DATE: 11-08-2024                          TIME: 09:01:02

USER:


COMMENTS: _____________________________________________________
```

```
  ************************************************
  ** SIMULATION : 10yr 4hr 10min Chicago        **
  ************************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 721.920
| Ptotal= 51.12 mm |                           B=   0.000
--------------------                           C=   0.736
                        used in:   INTENSITY =  A / (t + B)^C

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

          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.00    3.79 |  1.00   19.52 |'  2.00    7.77 |  3.00    4.40
          0.17    4.26 |  1.17  132.58 |'  2.17    6.82 |  3.17    4.13
          0.33    4.90 |  1.33   24.19 |'  2.33    6.10 |  3.33    3.90
          0.50    5.82 |  1.50   14.88 |'  2.50    5.54 |  3.50    3.69
          0.67    7.29 |  1.67   11.18 |'  2.67    5.09 |  3.67    3.51
          0.83   10.14 |  1.83    9.12 |'  2.83    4.72 |  3.83    3.35


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.03         1.47
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      4.00         4.00
     Length            (m)=    152.75        20.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.083    3.79 | 1.083   19.52 |' 2.083    7.77 |  3.08    4.40
          0.167    3.79 | 1.167   19.52 |' 2.167    7.77 |  3.17    4.40
          0.250    4.26 | 1.250  132.58 |' 2.250    6.82 |  3.25    4.13
          0.333    4.26 | 1.333  132.58 |' 2.333    6.82 |  3.33    4.13
          0.417    4.90 | 1.417   24.19 |' 2.417    6.10 |  3.42    3.90
          0.500    4.90 | 1.500   24.19 |' 2.500    6.10 |  3.50    3.90
```

```
          0.583    5.82 | 1.583   14.88 |' 2.583    5.54 |  3.58    3.69
          0.667    5.82 | 1.667   14.88 |' 2.667    5.54 |  3.67    3.69
          0.750    7.29 | 1.750   11.18 |' 2.750    5.09 |  3.75    3.51
          0.833    7.29 | 1.833   11.18 |' 2.833    5.09 |  3.83    3.51
          0.917   10.14 | 1.917    9.12 |' 2.917    4.72 |  3.92    3.35
          1.000   10.14 | 2.000    9.12 |' 3.000    4.72 |  4.00    3.35

     Max.Eff.Inten.(mm/hr)=     132.58       101.79
           over (min)             5.00        10.00
     Storage Coeff.  (min)=       2.16 (ii)    6.95 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.31       0.316 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42       1.42
     RUNOFF VOLUME    (mm)=      50.12        26.01      26.13
     TOTAL RAINFALL   (mm)=      51.12        51.12      51.12
     RUNOFF COEFFICIENT   =       0.98         0.51       0.51

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.91         1.57
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         4.00
     Length            (m)=    128.58        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.083    3.79 | 1.083   19.52 |' 2.083    7.77 |  3.08    4.40
          0.167    3.79 | 1.167   19.52 |' 2.167    7.77 |  3.17    4.40
          0.250    4.26 | 1.250  132.58 |' 2.250    6.82 |  3.25    4.13
          0.333    4.26 | 1.333  132.58 |' 2.333    6.82 |  3.33    4.13
          0.417    4.90 | 1.417   24.19 |' 2.417    6.10 |  3.42    3.90
          0.500    4.90 | 1.500   24.19 |' 2.500    6.10 |  3.50    3.90
          0.583    5.82 | 1.583   14.88 |' 2.583    5.54 |  3.58    3.69
          0.667    5.82 | 1.667   14.88 |' 2.667    5.54 |  3.67    3.69
          0.750    7.29 | 1.750   11.18 |' 2.750    5.09 |  3.75    3.51
          0.833    7.29 | 1.833   11.18 |' 2.833    5.09 |  3.83    3.51
          0.917   10.14 | 1.917    9.12 |' 2.917    4.72 |  3.92    3.35
          1.000   10.14 | 2.000    9.12 |' 3.000    4.72 |  4.00    3.35

     Max.Eff.Inten.(mm/hr)=     132.58        65.50
```

```
           over (min)             5.00        10.00
     Storage Coeff.  (min)=       0.89 (ii)    5.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.03       0.036 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=      49.62        22.35      26.53
     TOTAL RAINFALL   (mm)=      51.12        51.12      51.12
     RUNOFF COEFFICIENT   =       0.97         0.44       0.52

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.036     1.33    26.53
     + ID2= 2 (  0002):     0.26   0.056     1.33    30.52
       ==========================================================
       ID = 3 (  0003):     0.52   0.092     1.33    28.52

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     0.52   0.092     1.33    28.52
     + ID2= 2 (  0201):     3.50   0.608     1.33    32.90
       ==========================================================
       ID = 1 (  0003):     4.02   0.701     1.33    32.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     4.02   0.701     1.33    32.34
     + ID2= 2 (  0202):     2.48   0.316     1.42    26.13
       ==========================================================
       ID = 3 (  0003):     6.50   0.967     1.33    29.97

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      1.57         3.65
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=     10.00        10.00
     Length            (m)=    186.55        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.083    3.79 | 1.083   19.52 |' 2.083    7.77 |  3.08    4.40
          0.167    3.79 | 1.167   19.52 |' 2.167    7.77 |  3.17    4.40
          0.250    4.26 | 1.250  132.58 |' 2.250    6.82 |  3.25    4.13
          0.333    4.26 | 1.333  132.58 |' 2.333    6.82 |  3.33    4.13
          0.417    4.90 | 1.417   24.19 |' 2.417    6.10 |  3.42    3.90
          0.500    4.90 | 1.500   24.19 |' 2.500    6.10 |  3.50    3.90
          0.583    5.82 | 1.583   14.88 |' 2.583    5.54 |  3.58    3.69
          0.667    5.82 | 1.667   14.88 |' 2.667    5.54 |  3.67    3.69
```

0.750	7.29	1.750	11.18	2.750	5.09	3.75	3.51
0.833	7.29	1.833	11.18	2.833	5.09	3.83	3.51
0.917	10.14	1.917	9.12	2.917	4.72	3.92	3.35
1.000	10.14	2.000	9.12	3.000	4.72	4.00	3.35

Max.Eff.Inten.(mm/hr)=	132.58	56.90	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.66 (ii)	6.25 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.15	
			TOTALS
PEAK FLOW (cms)=	0.40	0.43	0.747 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	49.62	21.23	27.10
TOTAL RAINFALL (mm)=	51.12	51.12	51.12
RUNOFF COEFFICIENT =	0.97	0.42	0.53

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0018)	Area (ha)=	0.46	
ID= 1 DT= 5.0 min	Total Imp(%)=	30.40	Dir. Conn.(%)= 21.70

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.32
Dep. Storage (mm)=	1.50	5.00
Average Slope (%)=	2.00	4.00
Length (m)=	55.38	20.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.79	1.083	19.52	2.083	7.77	3.08	4.40
0.167	3.79	1.167	19.52	2.167	7.77	3.17	4.40
0.250	4.26	1.250	132.58	2.250	6.82	3.25	4.13
0.333	4.26	1.333	132.58	2.333	6.82	3.33	4.13
0.417	4.90	1.417	24.19	2.417	6.10	3.42	3.90
0.500	4.90	1.500	24.19	2.500	6.10	3.50	3.90
0.583	5.82	1.583	14.88	2.583	5.54	3.58	3.69
0.667	5.82	1.667	14.88	2.667	5.54	3.67	3.69
0.750	7.29	1.750	11.18	2.750	5.09	3.75	3.51
0.833	7.29	1.833	11.18	2.833	5.09	3.83	3.51
0.917	10.14	1.917	9.12	2.917	4.72	3.92	3.35
1.000	10.14	2.000	9.12	3.000	4.72	4.00	3.35

Max.Eff.Inten.(mm/hr)=	132.58	56.17	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.30 (ii)	6.06 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.15	
			TOTALS
PEAK FLOW (cms)=	0.04	0.04	0.067 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	49.62	21.12	27.30
TOTAL RAINFALL (mm)=	51.12	51.12	51.12
RUNOFF COEFFICIENT =	0.97	0.41	0.53

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
 V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
 V    V   I    SS     U   U   A A   L
  V  V    I      SS   U   U  AAAAA  L
  V  V    I       SS  U   U  A   A  L
   VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\5664af61-8b
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\5664af61-8b

DATE: 11-08-2024                          TIME: 09:01:02

USER:


COMMENTS: _____________________________________________________________
```

```
  ************************************************
  ** SIMULATION : 25yr 4hr 10min Chicago        **
  ************************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 822.740
| Ptotal= 61.88 mm |                           B=   0.000
--------------------                           C=   0.725
                        used in:   INTENSITY =  A / (t + B)^C

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

          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.00    4.77 |  1.00   23.97 |'  2.00    9.68 |  3.00    5.53
          0.17    5.36 |  1.17  154.98 |'  2.17    8.51 |  3.17    5.19
          0.33    6.14 |  1.33   29.61 |'  2.33    7.63 |  3.33    4.90
          0.50    7.28 |  1.50   18.34 |'  2.50    6.94 |  3.50    4.65
          0.67    9.09 |  1.67   13.85 |'  2.67    6.38 |  3.67    4.43
          0.83   12.58 |  1.83   11.32 |'  2.83    5.92 |  3.83    4.23


--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0201)| Area    (ha)=   3.50
|ID= 1 DT= 5.0 min | Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     2.03          1.47
     Dep. Storage     (mm)=     1.50          5.00
     Average Slope     (%)=     4.00          4.00
     Length            (m)=   152.75         20.00
     Mannings n            =    0.013         0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
         0.167    4.77 | 1.167   23.97 | 2.167    9.68 |  3.17    5.53
         0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
         0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
         0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
         0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
```

```
                  0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
                  0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
                  0.750    9.09 | 1.750   13.85 | 2.750    6.38 |  3.75    4.43
                  0.833    9.09 | 1.833   13.85 | 2.833    6.38 |  3.83    4.43
                  0.917   12.58 | 1.917   11.32 | 2.917    5.92 |  3.92    4.23
                  1.000   12.58 | 2.000   11.32 | 3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98       181.44
           over (min)          5.00        10.00
     Storage Coeff.  (min)=    1.82 (ii)     6.10 (ii)
     Unit Hyd. Tpeak (min)=    5.00        10.00
     Unit Hyd. peak  (cms)=    0.32         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=    0.30         0.54          0.779 (iii)
     TIME TO PEAK    (hrs)=    1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=   60.38        37.94         42.40
     TOTAL RAINFALL   (mm)=   61.88        61.88         61.88
     RUNOFF COEFFICIENT   =    0.98         0.61          0.69

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0202)| Area    (ha)=   2.48
|ID= 1 DT= 5.0 min | Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     0.91          1.57
     Dep. Storage     (mm)=     1.00          5.00
     Average Slope     (%)=     2.00          4.00
     Length            (m)=   128.58         30.00
     Mannings n            =    0.013         0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
         0.167    4.77 | 1.167   23.97 | 2.167    9.68 |  3.17    5.53
         0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
         0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
         0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
         0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
         0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
         0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
         0.750    9.09 | 1.750   13.85 | 2.750    6.38 |  3.75    4.43
         0.833    9.09 | 1.833   13.85 | 2.833    6.38 |  3.83    4.43
         0.917   12.58 | 1.917   11.32 | 2.917    5.92 |  3.92    4.23
         1.000   12.58 | 2.000   11.32 | 3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98       134.24
           over (min)          5.00        10.00
     Storage Coeff.  (min)=    2.03 (ii)     6.31 (ii)
     Unit Hyd. Tpeak (min)=    5.00        10.00
     Unit Hyd. peak  (cms)=    0.31         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=    0.01         0.43          0.427 (iii)
     TIME TO PEAK    (hrs)=    1.33         1.42          1.42
     RUNOFF VOLUME    (mm)=   60.88        34.77         34.90
     TOTAL RAINFALL   (mm)=   61.88        61.88         61.88
     RUNOFF COEFFICIENT   =    0.98         0.56          0.56

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0017)| Area    (ha)=   0.26
|ID= 1 DT= 5.0 min | Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     0.08          0.18
     Dep. Storage     (mm)=     1.50          5.00
     Average Slope     (%)=     4.00         10.00
     Length            (m)=    41.63         30.00
     Mannings n            =    0.013         0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
         0.167    4.77 | 1.168   23.97 | 2.167    9.68 |  3.17    5.53
         0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
         0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
         0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
         0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
         0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
         0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
         0.750    9.09 | 1.750   13.85 | 2.750    6.38 |  3.75    4.43
         0.833    9.09 | 1.833   13.85 | 2.833    6.38 |  3.83    4.43
         0.917   12.58 | 1.917   11.32 | 2.917    5.92 |  3.92    4.23
         1.000   12.58 | 2.000   11.32 | 3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98        88.44
```

```
                  over (min)          5.00         5.00
     Storage Coeff.  (min)=    0.84 (ii)     4.69 (ii)
     Unit Hyd. Tpeak (min)=    5.00         5.00
     Unit Hyd. peak  (cms)=    0.34         0.22
                                                        *TOTALS*
     PEAK FLOW       (cms)=    0.02         0.04          0.060 (iii)
     TIME TO PEAK    (hrs)=    1.33         1.33          1.33
     RUNOFF VOLUME    (mm)=   60.38        30.43         35.03
     TOTAL RAINFALL   (mm)=   61.88        61.88         61.88
     RUNOFF COEFFICIENT   =    0.98         0.49          0.57

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.060     1.33     35.03
     + ID2= 2 (  0002):     0.26   0.070     1.33     39.37
       ==========================================================
       ID = 3 (  0003):     0.52   0.131     1.33     37.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     0.52   0.131     1.33     37.20
     + ID2= 2 (  0201):     3.50   0.779     1.33     42.40
       ==========================================================
       ID = 1 (  0003):     4.02   0.909     1.33     41.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     4.02   0.909     1.33     41.73
     + ID2= 2 (  0202):     2.48   0.427     1.42     34.90
       ==========================================================
       ID = 3 (  0003):     6.50   1.283     1.33     39.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0001)| Area    (ha)=   5.22
|ID= 1 DT= 5.0 min | Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     1.57          3.65
     Dep. Storage     (mm)=     1.50          5.00
     Average Slope     (%)=    10.00         10.00
     Length            (m)=   186.55         30.00
     Mannings n            =    0.013         0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
         0.167    4.77 | 1.167   23.97 | 2.167    9.68 |  3.17    5.53
         0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
         0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
         0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
         0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
         0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
         0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
```

0.750	9.09	1.750	13.85	2.750	6.38	3.75	4.43
0.833	9.09	1.833	13.85	2.833	6.38	3.83	4.43
0.917	12.58	1.917	11.32	2.917	5.92	3.92	4.23
1.000	12.58	2.000	11.32	3.000	5.92	4.00	4.23

Max.Eff.Inten.(mm/hr)=	154.98	77.44	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.56 (ii)	5.62 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.15	
			TOTALS
PEAK FLOW (cms)=	0.46	0.60	0.976 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	60.38	29.09	35.56
TOTAL RAINFALL (mm)=	61.88	61.88	61.88
RUNOFF COEFFICIENT =	0.98	0.47	0.57

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0018)	Area (ha)=	0.46	
ID= 1 DT= 5.0 min	Total Imp(%)=	30.40	Dir. Conn.(%)= 21.70

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.32
Dep. Storage (mm)=	1.50	5.00
Average Slope (%)=	2.00	4.00
Length (m)=	55.38	20.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.77	1.083	23.97	2.083	9.68	3.08	5.53
0.167	4.77	1.167	23.97	2.167	9.68	3.17	5.53
0.250	5.36	1.250	154.98	2.250	8.51	3.25	5.19
0.333	5.36	1.333	154.98	2.333	8.51	3.33	5.19
0.417	6.14	1.417	29.61	2.417	7.63	3.42	4.90
0.500	6.14	1.500	29.61	2.500	7.63	3.50	4.90
0.583	7.28	1.583	18.34	2.583	6.94	3.58	4.65
0.667	7.28	1.667	18.34	2.667	6.94	3.67	4.65
0.750	9.09	1.750	13.85	2.750	6.38	3.75	4.43
0.833	9.09	1.833	13.85	2.833	6.38	3.83	4.43
0.917	12.58	1.917	11.32	2.917	5.92	3.92	4.23
1.000	12.58	2.000	11.32	3.000	5.92	4.00	4.23

Max.Eff.Inten.(mm/hr)=	154.98	76.50	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.22 (ii)	5.43 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.16	
			TOTALS
PEAK FLOW (cms)=	0.04	0.05	0.088 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	60.38	28.96	35.77
TOTAL RAINFALL (mm)=	61.88	61.88	61.88
RUNOFF COEFFICIENT =	0.98	0.47	0.58

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
 V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
 V    V   I    SS     U   U   A A   L
  V  V    I      SS   U   U  AAAAA  L
  V  V    I       SS  U   U  A   A  L
   VV     I    SSSSS  UUUUU  A   A  LLLLL

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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\cd322883-d1
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\cd322883-d1

DATE: 11-08-2024                          TIME: 09:01:02

USER:


COMMENTS: _____
```

```
  ************************************************
  ** SIMULATION : 50yr 4hr 10min Chicago        **
  ************************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 893.800
| Ptotal= 69.47 mm |                           B=   0.000
--------------------                           C=   0.719
                        used in:   INTENSITY =  A / (t + B)^C

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	5.47	1.00	27.09	2.00	11.03	3.00	6.33
0.17	6.13	1.17	170.70	2.17	9.71	3.17	5.95
0.33	7.02	1.33	33.42	2.33	8.71	3.33	5.62
0.50	8.31	1.50	20.79	2.50	7.93	3.50	5.33
0.67	10.36	1.67	15.73	2.67	7.29	3.67	5.08
0.83	14.30	1.83	12.89	2.83	6.77	3.83	4.85

```
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.03          1.47
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       4.00          4.00
     Length            (m)=     152.75         20.00
     Mannings n             =     0.013         0.250

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

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.47	1.083	27.09	2.083	11.03	3.08	6.33
0.167	5.47	1.167	27.09	2.167	11.03	3.17	6.33
0.250	6.13	1.250	170.70	2.250	9.71	3.25	5.95
0.333	6.13	1.333	170.70	2.333	9.71	3.33	5.95
0.417	7.02	1.417	33.42	2.417	8.71	3.42	5.62
0.500	7.02	1.500	33.42	2.500	8.71	3.50	5.62
0.583	8.31	1.583	20.79	2.583	7.93	3.58	5.33
0.667	8.31	1.667	20.79	2.667	7.93	3.67	5.33
0.750	10.36	1.750	15.73	2.750	7.29	3.75	5.08
0.833	10.36	1.833	15.73	2.833	7.29	3.83	5.08
0.917	14.30	1.917	12.89	2.917	6.77	3.92	4.85
1.000	14.30	2.000	12.89	3.000	6.77	4.00	4.85

```
     Max.Eff.Inten.(mm/hr)=     170.70       157.89
           over (min)        5.00         10.00
     Storage Coeff.  (min)=     1.95 (ii)     5.97 (ii)
     Unit Hyd. Tpeak (min)=     5.00         10.00
     Unit Hyd. peak  (cms)=     0.31          0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=     0.01          0.51          0.509 (iii)
     TIME TO PEAK    (hrs)=     1.33          1.42          1.42
     RUNOFF VOLUME    (mm)=    68.47         41.19         41.32
     TOTAL RAINFALL   (mm)=    69.47         69.47         69.47
     RUNOFF COEFFICIENT   =     0.99          0.59          0.59

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08          0.18
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       4.00         10.00
     Length            (m)=      41.63         30.00
     Mannings n             =     0.013         0.250

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

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.47	1.083	27.09	2.083	11.03	3.08	6.33
0.167	5.47	1.167	27.09	2.167	11.03	3.17	6.33
0.250	6.13	1.250	170.70	2.250	9.71	3.25	5.95
0.333	6.13	1.333	170.70	2.333	9.71	3.33	5.95
0.417	7.02	1.417	33.42	2.417	8.71	3.42	5.62
0.500	7.02	1.500	33.42	2.500	8.71	3.50	5.62
0.583	8.31	1.583	20.79	2.583	7.93	3.58	5.33
0.667	8.31	1.667	20.79	2.667	7.93	3.67	5.33
0.750	10.36	1.750	15.73	2.750	7.29	3.75	5.08
0.833	10.36	1.833	15.73	2.833	7.29	3.83	5.08
0.917	14.30	1.917	12.89	2.917	6.77	3.92	4.85
1.000	14.30	2.000	12.89	3.000	6.77	4.00	4.85

```
     Max.Eff.Inten.(mm/hr)=     170.70       105.41
```

0.583	8.31	1.583	20.79	2.583	7.93	3.58	5.33
0.667	8.31	1.667	20.79	2.667	7.93	3.67	5.33
0.750	10.36	1.750	15.73	2.750	7.29	3.75	5.08
0.833	10.36	1.833	15.73	2.833	7.29	3.83	5.08
0.917	14.30	1.917	12.89	2.917	6.77	3.92	4.85
1.000	14.30	2.000	12.89	3.000	6.77	4.00	4.85

```
     Max.Eff.Inten.(mm/hr)=     170.70       211.45
           over (min)        5.00         10.00
     Storage Coeff.  (min)=     1.75 (ii)     5.87 (ii)
     Unit Hyd. Tpeak (min)=     5.00         10.00
     Unit Hyd. peak  (cms)=     0.32          0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=     0.33          0.63          0.904 (iii)
     TIME TO PEAK    (hrs)=     1.33          1.42          1.33
     RUNOFF VOLUME    (mm)=    67.97         44.62         49.26
     TOTAL RAINFALL   (mm)=    69.47         69.47         69.47
     RUNOFF COEFFICIENT   =     0.98          0.64          0.71

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  31.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.11          0.15
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       6.00          6.00
     Length            (m)=      41.63         20.00
     Mannings n             =     0.013         0.250

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

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.47	1.083	27.09	2.083	11.03	3.08	6.33
0.167	5.47	1.167	27.09	2.167	11.03	3.17	6.33
0.250	6.13	1.250	170.70	2.250	9.71	3.25	5.95
0.333	6.13	1.333	170.70	2.333	9.71	3.33	5.95
0.417	7.02	1.417	33.42	2.417	8.71	3.42	5.62
0.500	7.02	1.500	33.42	2.500	8.71	3.50	5.62
0.583	8.31	1.583	20.79	2.583	7.93	3.58	5.33
0.667	8.31	1.667	20.79	2.667	7.93	3.67	5.33
0.750	10.36	1.750	15.73	2.750	7.29	3.75	5.08
0.833	10.36	1.833	15.73	2.833	7.29	3.83	5.08
0.917	14.30	1.917	12.89	2.917	6.77	3.92	4.85
1.000	14.30	2.000	12.89	3.000	6.77	4.00	4.85

```
     Max.Eff.Inten.(mm/hr)=     170.70       100.71
           over (min)        5.00          5.00
     Storage Coeff.  (min)=     0.71 (ii)     4.19 (ii)
     Unit Hyd. Tpeak (min)=     5.00          5.00
     Unit Hyd. peak  (cms)=     0.34          0.24
                                                    *TOTALS*
     PEAK FLOW       (cms)=     0.04          0.04          0.081 (iii)
     TIME TO PEAK    (hrs)=     1.33          1.33          1.33
     RUNOFF VOLUME    (mm)=    67.97         35.90         45.83
     TOTAL RAINFALL   (mm)=    69.47         69.47         69.47
     RUNOFF COEFFICIENT   =     0.98          0.52          0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------
| CALIB            |
```

```
           over (min)        5.00          5.00
     Storage Coeff.  (min)=     0.80 (ii)     4.39 (ii)
     Unit Hyd. Tpeak (min)=     5.00          5.00
     Unit Hyd. peak  (cms)=     0.34          0.23
                                                    *TOTALS*
     PEAK FLOW       (cms)=     0.02          0.05          0.071 (iii)
     TIME TO PEAK    (hrs)=     1.33          1.33          1.33
     RUNOFF VOLUME    (mm)=    67.97         36.43         41.27
     TOTAL RAINFALL   (mm)=    69.47         69.47         69.47
     RUNOFF COEFFICIENT   =     0.98          0.52          0.59

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.071     1.33     41.27
     + ID2= 2 (  0002):     0.26   0.081     1.33     45.83
       ========================================================
       ID = 3 (  0003):     0.52   0.152     1.33     43.55

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     0.52   0.152     1.33     43.55
     + ID2= 2 (  0201):     3.50   0.904     1.33     49.26
       ========================================================
       ID = 1 (  0003):     4.02   1.055     1.33     48.53

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     4.02   1.055     1.33     48.53
     + ID2= 2 (  0202):     2.48   0.509     1.42     41.32
       ========================================================
       ID = 3 (  0003):     6.50   1.511     1.33     45.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57          3.65
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=      10.00         10.00
     Length            (m)=     186.55         30.00
     Mannings n             =     0.013         0.250

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

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.47	1.083	27.09	2.083	11.03	3.08	6.33
0.167	5.47	1.167	27.09	2.167	11.03	3.17	6.33
0.250	6.13	1.250	170.70	2.250	9.71	3.25	5.95
0.333	6.13	1.333	170.70	2.333	9.71	3.33	5.95
0.417	7.02	1.417	33.42	2.417	8.71	3.42	5.62
0.500	7.02	1.500	33.42	2.500	8.71	3.50	5.62
0.583	8.31	1.583	20.79	2.583	7.93	3.58	5.33
0.667	8.31	1.667	20.79	2.667	7.93	3.67	5.33

0.750	10.36	1.750	15.73	2.750	7.29	3.75	5.08
0.833	10.36	1.833	15.73	2.833	7.29	3.83	5.08
0.917	14.30	1.917	12.89	2.917	6.77	3.92	4.85
1.000	14.30	2.000	12.89	3.000	6.77	4.00	4.85

Max.Eff.Inten.(mm/hr)=	170.70	92.71	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.50 (ii)	6.32 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.15	
			TOTALS
PEAK FLOW (cms)=	0.51	0.69	1.097 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	67.97	34.94	41.78
TOTAL RAINFALL (mm)=	69.47	69.47	69.47
RUNOFF COEFFICIENT =	0.98	0.50	0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0018) | Area (ha)= 0.46
ID= 1 DT= 5.0 min | Total Imp(%)= 30.40 Dir. Conn.(%)= 21.70

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.32
Dep. Storage (mm)=	1.50	5.00
Average Slope (%)=	2.00	4.00
Length (m)=	55.38	20.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.47	1.083	27.09	2.083	11.03	3.08	6.33
0.167	5.47	1.167	27.09	2.167	11.03	3.17	6.33
0.250	6.13	1.250	170.70	2.250	9.71	3.25	5.95
0.333	6.13	1.333	170.70	2.333	9.71	3.33	5.95
0.417	7.02	1.417	33.42	2.417	8.71	3.42	5.62
0.500	7.02	1.500	33.42	2.500	8.71	3.50	5.62
0.583	8.31	1.583	20.79	2.583	7.93	3.58	5.33
0.667	8.31	1.667	20.79	2.667	7.93	3.67	5.33
0.750	10.36	1.750	15.73	2.750	7.29	3.75	5.08
0.833	10.36	1.833	15.73	2.833	7.29	3.83	5.08
0.917	14.30	1.917	12.89	2.917	6.77	3.92	4.85
1.000	14.30	2.000	12.89	3.000	6.77	4.00	4.85

Max.Eff.Inten.(mm/hr)=	170.70	91.61	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.18 (ii)	6.04 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.15	
			TOTALS
PEAK FLOW (cms)=	0.05	0.06	0.099 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	67.97	34.81	42.00
TOTAL RAINFALL (mm)=	69.47	69.47	69.47
RUNOFF COEFFICIENT =	0.98	0.50	0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
 V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
 V    V   I    SS     U   U   A A   L
  V  V    I      SS   U   U  AAAAA  L
  V  V    I       SS  U   U  A   A  L
   VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\fd81c924-5d
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\fd81c924-5d


DATE: 11-08-2024                          TIME: 09:01:03

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 100yr 4hr 10min Chicago       **
  ************************************************


--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 953.290
| Ptotal= 77.41 mm |                           B=   0.000
--------------------                           C=   0.711
                        used in:   INTENSITY =  A / (t + B)^C

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

          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.00    6.26 |  1.00   30.45 |'  2.00   12.53 |  3.00    7.23
          0.17    7.01 |  1.17  185.45 |'  2.17   11.04 |  3.17    6.80
          0.33    8.02 |  1.33   37.49 |'  2.33    9.92 |  3.33    6.43
          0.50    9.47 |  1.50   23.45 |'  2.50    9.04 |  3.50    6.10
          0.67   11.77 |  1.67   17.80 |'  2.67    8.32 |  3.67    5.82
          0.83   16.19 |  1.83   14.61 |'  2.83    7.73 |  3.83    5.56


--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0201)| Area    (ha)=   3.50
|ID= 1 DT= 5.0 min | Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.03         1.47
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      4.00         4.00
     Length            (m)=    152.75        20.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
          0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
          0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
          0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
          0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
          0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
```

```
          0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
          0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
          0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
          0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
          0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
          1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       241.04
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     1.70 (ii)    5.68 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.32         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.36         0.73       1.028 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=    75.91        51.75      56.56
     TOTAL RAINFALL   (mm)=    77.41        77.41      77.41
     RUNOFF COEFFICIENT   =     0.98         0.67       0.73

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* = 80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0202)| Area    (ha)=   2.48
|ID= 1 DT= 5.0 min | Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.91         1.57
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         4.00
     Length            (m)=    128.58        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
          0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
          0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
          0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
          0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
          0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
          0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
          0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
          0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
          0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
          0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
          1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       181.43
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     1.88 (ii)    5.69 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.32         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.01         0.59       0.591 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.42
     RUNOFF VOLUME    (mm)=    76.41        48.07      48.21
     TOTAL RAINFALL   (mm)=    77.41        77.41      77.41
     RUNOFF COEFFICIENT   =     0.99         0.62       0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* = 80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0017)| Area    (ha)=   0.26
|ID= 1 DT= 5.0 min | Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.08         0.18
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      4.00        10.00
     Length            (m)=     41.63        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
          0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
          0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
          0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
          0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
          0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
          0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
          0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
          0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
          0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
          0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
          1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       122.54
```

```
               over (min)        5.00         5.00
     Storage Coeff.  (min)=     0.78 (ii)    4.16 (ii)
     Unit Hyd. Tpeak (min)=     5.00         5.00
     Unit Hyd. peak  (cms)=     0.34         0.24
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.02         0.06       0.082 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=    75.91        42.92      47.99
     TOTAL RAINFALL   (mm)=    77.41        77.41      77.41
     RUNOFF COEFFICIENT   =     0.98         0.55       0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* = 80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26    0.082     1.33    47.99
     + ID2= 2 (  0002):     0.26    0.091     1.33    52.74
       ==========================================================
       ID = 3 (  0003):     0.52    0.173     1.33    50.36

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     0.52    0.173     1.33    50.36
     + ID2= 2 (  0201):     3.50    1.028     1.33    56.56
       ==========================================================
       ID = 1 (  0003):     4.02    1.201     1.33    55.76

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     4.02    1.201     1.33    55.76
     + ID2= 2 (  0202):     2.48    0.591     1.42    48.21
       ==========================================================
       ID = 3 (  0003):     6.50    1.740     1.33    52.88

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0001)| Area    (ha)=   5.22
|ID= 1 DT= 5.0 min | Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      1.57         3.65
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=     10.00        10.00
     Length            (m)=    186.55        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
          0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
          0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
          0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
          0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
          0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
          0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
          0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
```

	0.750	11.77	1.750	17.80	2.750	8.32	3.75	5.82
	0.833	11.77	1.833	17.80	2.833	8.32	3.83	5.82
	0.917	16.19	1.917	14.61	2.917	7.73	3.92	5.56
	1.000	16.19	2.000	14.61	3.000	7.73	4.00	5.56

Max.Eff.Inten.(mm/hr)=	185.45	108.19	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.45 (ii)	6.11 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.15	
			TOTALS
PEAK FLOW (cms)=	0.56	0.81	1.258 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	75.91	41.29	48.46
TOTAL RAINFALL (mm)=	77.41	77.41	77.41
RUNOFF COEFFICIENT =	0.98	0.53	0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0018)	Area (ha)=	0.46	
ID= 1 DT= 5.0 min	Total Imp(%)=	30.40	Dir. Conn.(%)= 21.70

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.32
Dep. Storage (mm)=	1.50	5.00
Average Slope (%)=	2.00	4.00
Length (m)=	55.38	20.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.26	1.083	30.45	2.083	12.53	3.08	7.23
0.167	6.26	1.167	30.45	2.167	12.53	3.17	7.23
0.250	7.01	1.250	185.45	2.250	11.04	3.25	6.80
0.333	7.01	1.333	185.45	2.333	11.04	3.33	6.80
0.417	8.02	1.417	37.49	2.417	9.92	3.42	6.43
0.500	8.02	1.500	37.49	2.500	9.92	3.50	6.43
0.583	9.47	1.583	23.45	2.583	9.04	3.58	6.10
0.667	9.47	1.667	23.45	2.667	9.04	3.67	6.10
0.750	11.77	1.750	17.80	2.750	8.32	3.75	5.82
0.833	11.77	1.833	17.80	2.833	8.32	3.83	5.82
0.917	16.19	1.917	14.61	2.917	7.73	3.92	5.56
1.000	16.19	2.000	14.61	3.000	7.73	4.00	5.56

Max.Eff.Inten.(mm/hr)=	185.45	106.95	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.14 (ii)	5.85 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.15	
			TOTALS
PEAK FLOW (cms)=	0.05	0.07	0.113 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	75.91	41.14	48.68
TOTAL RAINFALL (mm)=	77.41	77.41	77.41
RUNOFF COEFFICIENT =	0.98	0.53	0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
         V V    I       SS  U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\62e33252-a2
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\62e33252-a2


DATE: 11-08-2024                          TIME: 09:01:03

USER:


COMMENTS: _____________________________________________________


-------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : Hurricane Hazel (Regional)    **
  ************************************************


-------------------
|    READ STORM    |     Filename: C:\Users\cmartin\AppD
|                  |               ata\Local\Temp\
|                  |               07e8a009-fbe7-4e9c-84bb-a205d8c3d4b9\eeae85f6
| Ptotal=212.00 mm |     Comments: Hazel
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    6.00 |  3.00   13.00 |'  6.00   23.00 |  9.00   53.00
               1.00    4.00 |  4.00   17.00 |'  7.00   13.00 | 10.00   38.00
               2.00    6.00 |  5.00   13.00 |'  8.00   13.00 | 11.00   13.00

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| CALIB             |
| STANDHYD (  0201) |   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     2.03         1.47
     Dep. Storage     (mm)=     1.50         5.00
     Average Slope     (%)=     4.00         4.00
     Length            (m)=   152.75        20.00
     Mannings n            =    0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00        58.81
           over (min)           5.00        10.00
    Storage Coeff.  (min)=      1.14 (ii)    5.28 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.34         0.16
                                                    *TOTALS*
    PEAK FLOW       (cms)=      0.01         0.02       0.036 (iii)
    TIME TO PEAK    (hrs)=      9.33        10.00        10.00
    RUNOFF VOLUME    (mm)=    210.50       165.33       179.32
    TOTAL RAINFALL   (mm)=    212.00       212.00       212.00
    RUNOFF COEFFICIENT   =      0.99         0.78         0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* = 80.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| CALIB             |
| STANDHYD (  0202) |   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     0.91         1.57
     Dep. Storage     (mm)=     1.00         5.00
     Average Slope     (%)=     2.00         4.00
     Length            (m)=   128.58        30.00
     Mannings n            =    0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00        97.88
           over (min)           5.00        10.00
    Storage Coeff.  (min)=      2.80 (ii)    6.62 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.28         0.14
                                                    *TOTALS*
    PEAK FLOW       (cms)=      0.10         0.40       0.501 (iii)
    TIME TO PEAK    (hrs)=      9.75        10.00        10.00
    RUNOFF VOLUME    (mm)=    210.50       180.65       186.59
    TOTAL RAINFALL   (mm)=    212.00       212.00       212.00
    RUNOFF COEFFICIENT   =      0.99         0.85         0.88

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* = 80.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| CALIB             |
| STANDHYD (  0002) |   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  42.00   Dir. Conn.(%)=  31.00
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     0.11         0.15
     Dep. Storage     (mm)=     1.50         5.00
     Average Slope     (%)=     6.00         6.00
     Length            (m)=    41.63        20.00
     Mannings n            =    0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Max.Eff.Inten.(mm/hr)=      53.00        79.69
           over (min)           5.00        10.00
    Storage Coeff.  (min)=      3.11 (ii)    8.39 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.27         0.12
                                                    *TOTALS*
    PEAK FLOW       (cms)=      0.00         0.35       0.348 (iii)
    TIME TO PEAK    (hrs)=      9.58        10.00        10.00
    RUNOFF VOLUME    (mm)=    211.00       174.97       175.15
    TOTAL RAINFALL   (mm)=    212.00       212.00       212.00
    RUNOFF COEFFICIENT   =      1.00         0.83         0.83

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* = 80.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| CALIB             |
| STANDHYD (  0017) |   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     0.08         0.18
     Dep. Storage     (mm)=     1.50         5.00
     Average Slope     (%)=     4.00        10.00
     Length            (m)=    41.63        30.00
     Mannings n            =    0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
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              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        60.61
           over (min)            5.00        10.00
     Storage Coeff.  (min)=      1.28 (ii)    5.76 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.33         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.01         0.03          0.036 (iii)
     TIME TO PEAK    (hrs)=      9.33        10.00         10.00
     RUNOFF VOLUME    (mm)=    210.50       166.35        173.14
     TOTAL RAINFALL   (mm)=    212.00       212.00        212.00
     RUNOFF COEFFICIENT   =      0.99         0.78          0.82

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.036    10.00   173.14
     + ID2= 2 (  0002):     0.26   0.036    10.00   179.32
       ==========================================
       ID = 3 (  0003):     0.52   0.073    10.00   176.23

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

--------------------
| ADD HYD  (  0003)|
|   3 +  2 =  1    |        AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0003):     0.52   0.073    10.00   176.23
     + ID2= 2 (  0201):     3.50   0.501    10.00   186.59
       ==========================================
       ID = 1 (  0003):     4.02   0.574    10.00   185.25

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     4.02   0.574    10.00   185.25
     + ID2= 2 (  0202):     2.48   0.348    10.00   175.15
       ==========================================
       ID = 3 (  0003):     6.50   0.922    10.00   181.40

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

--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57         3.65
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=      10.00        10.00
     Length            (m)=     186.55        30.00
     Mannings n            =      0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
      TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
       hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
     0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
     0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
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              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        55.69
           over (min)            5.00        10.00
     Storage Coeff.  (min)=      2.40 (ii)    7.03 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.30         0.14
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.16         0.56          0.722 (iii)
     TIME TO PEAK    (hrs)=      9.67        10.00         10.00
     RUNOFF VOLUME    (mm)=    210.50       163.45        173.19
     TOTAL RAINFALL   (mm)=    212.00       212.00        212.00
     RUNOFF COEFFICIENT   =      0.99         0.77          0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.32
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         4.00
     Length            (m)=      55.38        20.00
     Mannings n            =      0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
      TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
       hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
     0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
     0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
     0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
     0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
     0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
     0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
     0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
     0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
     0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
     0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
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              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        55.26
           over (min)            5.00        10.00
     Storage Coeff.  (min)=      1.88 (ii)    6.67 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.32         0.14
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.01         0.05          0.064 (iii)
     TIME TO PEAK    (hrs)=      9.50        10.00         10.00
     RUNOFF VOLUME    (mm)=    210.50       163.18        173.44
     TOTAL RAINFALL   (mm)=    212.00       212.00        212.00
     RUNOFF COEFFICIENT   =      0.99         0.77          0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
         V V    I       SS  U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\90e02d60-89
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\90e02d60-89


DATE: 11-08-2024                          TIME: 09:01:03

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 25mm 4hr 10min Chicago        **
  ************************************************


--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 475.610
| Ptotal= 33.31 mm |                          B=   0.000
--------------------                          C=   0.738
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    2.45 |  1.00   12.69 |  2.00    5.04 |  3.00    2.85
               0.17    2.76 |  1.17   86.95 |  2.17    4.42 |  3.17    2.67
               0.33    3.17 |  1.33   15.73 |  2.33    3.95 |  3.33    2.52
               0.50    3.77 |  1.50    9.66 |  2.50    3.59 |  3.50    2.39
               0.67    4.72 |  1.67    7.25 |  2.67    3.30 |  3.67    2.27
               0.83    6.58 |  1.83    5.91 |  2.83    3.05 |  3.83    2.17


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--------------------
| MODIFY STORM     |    MODIFYING PARAMETERS
--------------------    Time shift  (min)    =  0.00

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

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--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.03          1.47
     Dep. Storage     (mm)=      1.50          5.00
     Average Slope     (%)=      4.00          4.00
     Length            (m)=    152.75         20.00
     Mannings n            =     0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25         26.34
               over (min)        5.00         15.00
     Storage Coeff.  (min)=       2.86 (ii)   11.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.28          0.09
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.00          0.06          0.064 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.50           1.50
     RUNOFF VOLUME    (mm)=      24.00          7.65           7.73
     TOTAL RAINFALL   (mm)=      25.00         25.00          25.00
     RUNOFF COEFFICIENT   =       0.96          0.31           0.31

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.08          0.18
     Dep. Storage     (mm)=      1.50          5.00
     Average Slope     (%)=      4.00         10.00
     Length            (m)=     41.63         30.00
     Mannings n            =     0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
```

```
     Mannings n            =     0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25         13.84
               over (min)        5.00         10.00
     Storage Coeff.  (min)=       1.05 (ii)    8.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.34          0.12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.00           0.017 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.42           1.33
     RUNOFF VOLUME    (mm)=      23.50          5.83          11.28
     TOTAL RAINFALL   (mm)=      25.00         25.00          25.00
     RUNOFF COEFFICIENT   =       0.94          0.23           0.45

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.91          1.57
     Dep. Storage     (mm)=      1.00          5.00
     Average Slope     (%)=      2.00          4.00
     Length            (m)=    128.58         30.00
     Mannings n            =     0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25         26.34
               over (min)        5.00         15.00
     Storage Coeff.  (min)=       2.86 (ii)   11.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.28          0.09
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.00          0.06          0.064 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.50           1.50
     RUNOFF VOLUME    (mm)=      24.00          7.65           7.73
     TOTAL RAINFALL   (mm)=      25.00         25.00          25.00
     RUNOFF COEFFICIENT   =       0.96          0.31           0.31

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.011     1.33     8.67
     + ID2= 2 (  0002):     2.48   0.064     1.50     7.73
       ==========================================================
       ID = 3 (  0003):     2.74   0.075     1.50     7.84

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|   2 +  1 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 2 (  0003):     2.74   0.075     1.50     7.84
     + ID2= 1 (  0201):     3.50   0.207     1.33    11.88
       ==========================================================
       ID = 3 (  0003):     6.24   0.282     1.33    10.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      1.57          3.65
     Dep. Storage     (mm)=      1.50          5.00
     Average Slope     (%)=     10.00         10.00
     Length            (m)=    186.55         30.00
     Mannings n            =     0.013         0.250

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25         14.80
               over (min)        5.00         10.00
     Storage Coeff.  (min)=       1.18 (ii)    9.05 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.33          0.12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.00           0.011 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.42           1.33
     RUNOFF VOLUME    (mm)=      23.50          6.00           8.67
     TOTAL RAINFALL   (mm)=      25.00         25.00          25.00
     RUNOFF COEFFICIENT   =       0.94          0.24           0.35

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     4.02   0.235     1.33    11.63
     + ID2= 2 (  0202):     2.48   0.064     1.50     7.73
       ==========================================================
       ID = 3 (  0003):     6.50   0.266     1.33    10.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0003):     4.02   0.235     1.33    11.63
     + ID2= 2 (  0202):     2.48   0.064     1.50     7.73
       ==========================================================
       ID = 3 (  0003):     6.50   0.266     1.33    10.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      1.57          3.65
     Dep. Storage     (mm)=      1.50          5.00
     Average Slope     (%)=     10.00         10.00
     Length            (m)=    186.55         30.00
     Mannings n            =     0.013         0.250
```

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.84	1.083	9.52	2.083	3.78	3.08	2.14
0.167	1.84	1.167	9.52	2.167	3.78	3.17	2.14
0.250	2.07	1.250	65.25	2.250	3.32	3.25	2.01
0.333	2.07	1.333	65.25	2.333	3.32	3.33	2.01
0.417	2.38	1.417	11.81	2.417	2.97	3.42	1.89
0.500	2.38	1.500	11.81	2.500	2.97	3.50	1.89
0.583	2.83	1.583	7.25	2.583	2.69	3.58	1.79
0.667	2.83	1.667	7.25	2.667	2.69	3.67	1.79
0.750	3.55	1.750	5.44	2.750	2.47	3.75	1.70
0.833	3.55	1.833	5.44	2.833	2.47	3.83	1.70
0.917	4.94	1.917	4.44	2.917	2.29	3.92	1.63
1.000	4.94	2.000	4.44	3.000	2.29	4.00	1.63

Max.Eff.Inten.(mm/hr)=	65.25	12.23	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.21 (ii)	10.70 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.30	0.09	
			TOTALS
PEAK FLOW (cms)=	0.19	0.07	0.223 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	23.50	5.53	9.25
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.94	0.22	0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0018) | Area (ha)= 0.46
ID= 1 DT= 5.0 min | Total Imp(%)= 30.40 Dir. Conn.(%)= 21.70

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.14	0.32
Dep. Storage (mm)=	1.50	5.00
Average Slope (%)=	2.00	4.00
Length (m)=	55.38	20.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.84	1.083	9.52	2.083	3.78	3.08	2.14
0.167	1.84	1.167	9.52	2.167	3.78	3.17	2.14
0.250	2.07	1.250	65.25	2.250	3.32	3.25	2.01
0.333	2.07	1.333	65.25	2.333	3.32	3.33	2.01
0.417	2.38	1.417	11.81	2.417	2.97	3.42	1.89
0.500	2.38	1.500	11.81	2.500	2.97	3.50	1.89
0.583	2.83	1.583	7.25	2.583	2.69	3.58	1.79
0.667	2.83	1.667	7.25	2.667	2.69	3.67	1.79
0.750	3.55	1.750	5.44	2.750	2.47	3.75	1.70
0.833	3.55	1.833	5.44	2.833	2.47	3.83	1.70
0.917	4.94	1.917	4.44	2.917	2.29	3.92	1.63
1.000	4.94	2.000	4.44	3.000	2.29	4.00	1.63

Max.Eff.Inten.(mm/hr)=	65.25	12.01	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.73 (ii)	10.56 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.32	0.09	
			TOTALS
PEAK FLOW (cms)=	0.02	0.01	0.021 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	23.50	5.49	9.38
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.94	0.22	0.38

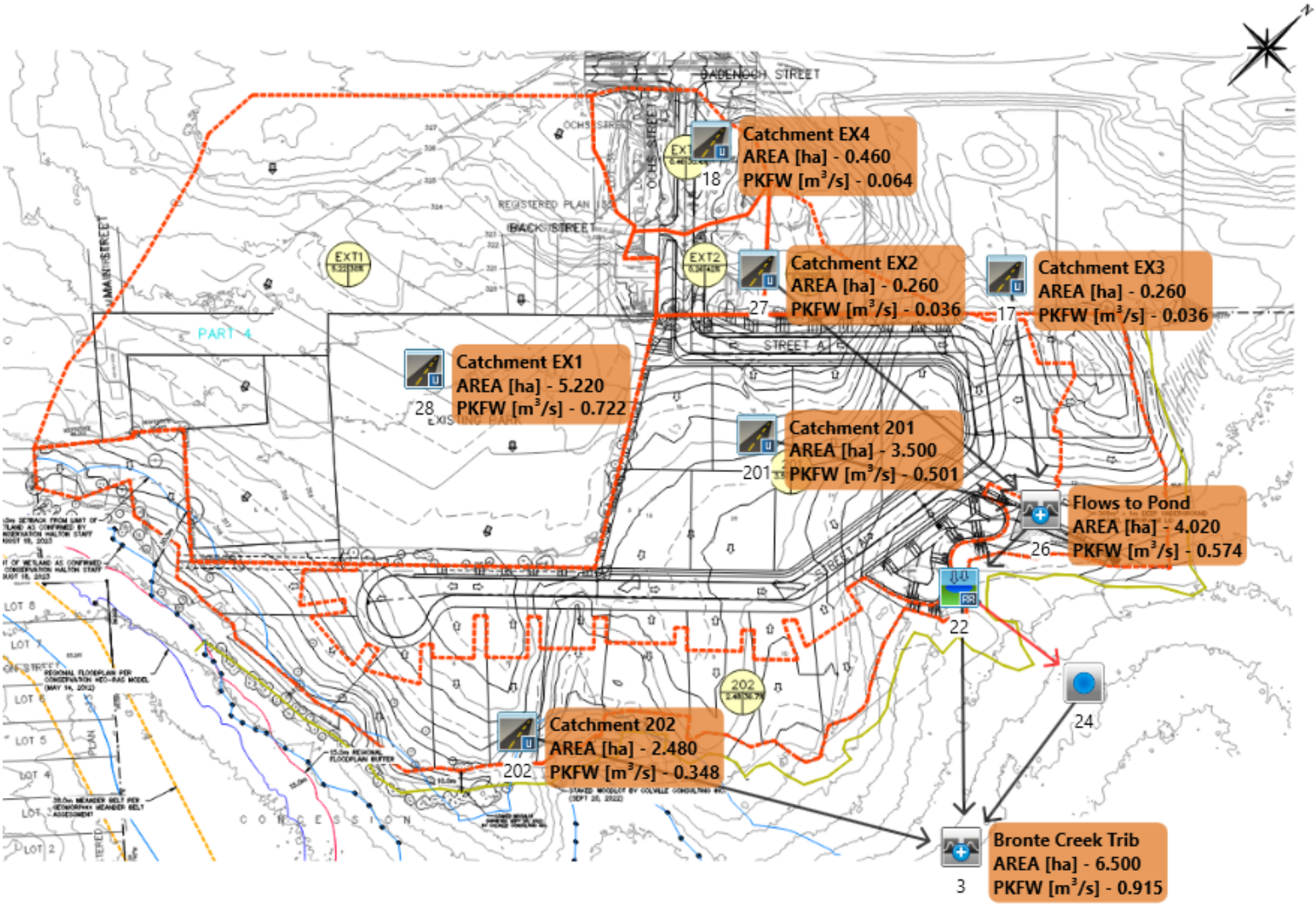
***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

FINISH

==========

Post-Development Controlled Visual-Otthymo Schematic



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

       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
        V  V    I       SS  U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


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DATE: 11-08-2024                          TIME: 09:08:43

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 2yr 4hr 10min Chicago         **
  ************************************************


--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 475.610
| Ptotal= 33.31 mm |                           B=   0.000
--------------------                           C=   0.738
                        used in:   INTENSITY =  A / (t + B)^C

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

          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs  mm/hr |   hrs  mm/hr |'   hrs  mm/hr |   hrs  mm/hr
          0.00    2.45 |  1.00   12.69 |  2.00    5.04 |  3.00    2.85
          0.17    2.76 |  1.17   86.95 |  2.17    4.42 |  3.17    2.67
          0.33    3.17 |  1.33   15.73 |  2.33    3.95 |  3.33    2.52
          0.50    3.77 |  1.50    9.66 |  2.50    3.59 |  3.50    2.39
          0.67    4.72 |  1.67    7.25 |  2.67    3.30 |  3.67    2.27
          0.83    6.58 |  1.83    5.91 |  2.83    3.05 |  3.83    2.17


--------------------------------------------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.03         1.47
     Dep. Storage     (mm)=      1.70         5.00
     Average Slope     (%)=      4.00         4.00
     Length            (m)=    152.75        20.00
     Mannings n             =    0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs  mm/hr |   hrs  mm/hr |'   hrs  mm/hr |   hrs  mm/hr
          0.083    2.45 | 1.083   12.69 | 2.083    5.04 |  3.08    2.85
          0.167    2.45 | 1.167   12.69 | 2.167    5.04 |  3.17    2.85
          0.250    2.76 | 1.250   86.95 | 2.250    4.42 |  3.25    2.67
          0.333    2.76 | 1.333   86.95 | 2.333    4.42 |  3.33    2.67
          0.417    3.17 | 1.417   15.73 | 2.417    3.95 |  3.42    2.52
          0.500    3.17 | 1.500   15.73 | 2.500    3.95 |  3.50    2.52
          0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
          0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
          0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
          0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
          0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
          1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

     Max.Eff.Inten.(mm/hr)=      86.95        28.43
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     1.05 (ii)    7.11 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.34         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.01         0.01       0.017 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=    31.81        10.52      13.78
     TOTAL RAINFALL   (mm)=    33.31        33.31      33.31
     RUNOFF COEFFICIENT   =     0.95         0.32       0.41

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0026)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.017     1.33    13.78
     + ID2= 2 (  0201):     3.50   0.330     1.33    18.08
     ==========================================================
       ID = 3 (  0026):     3.76   0.347     1.33    17.78

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

--------------------
| ADD HYD  (  0026)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0026):     3.76   0.347     1.33    17.78
     + ID2= 2 (  0027):     0.26   0.026     1.33    16.87
     ==========================================================
       ID = 1 (  0026):     4.02   0.374     1.33    17.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |    (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0130     0.0540
                         0.0030     0.0020    |   0.1100     0.0720
                         0.0090     0.0160    |   0.4340     0.0980
```

```
                         0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
                         0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
                         0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
                         0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
                         0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
                         1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

     Max.Eff.Inten.(mm/hr)=      86.95        67.96
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     2.30 (ii)    6.71 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.30         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.17         0.20       0.330 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=    31.61        14.72      18.08
     TOTAL RAINFALL   (mm)=    33.31        33.31      33.31
     RUNOFF COEFFICIENT   =     0.95         0.44       0.54

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
| STANDHYD (  0027)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  30.50
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.11         0.15
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      6.00         6.00
     Length            (m)=     41.63        20.00
     Mannings n             =    0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs  mm/hr |   hrs  mm/hr |'   hrs  mm/hr |   hrs  mm/hr
          0.083    2.45 | 1.083   12.69 | 2.083    5.04 |  3.08    2.85
          0.167    2.45 | 1.167   12.69 | 2.167    5.04 |  3.17    2.85
          0.250    2.76 | 1.250   86.95 | 2.250    4.42 |  3.25    2.67
          0.333    2.76 | 1.333   86.95 | 2.333    4.42 |  3.33    2.67
          0.417    3.17 | 1.417   15.73 | 2.417    3.95 |  3.42    2.52
          0.500    3.17 | 1.500   15.73 | 2.500    3.95 |  3.50    2.52
          0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
          0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
          0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
          0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
          0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
          1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

     Max.Eff.Inten.(mm/hr)=      86.95        27.24
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     0.93 (ii)    5.51 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.34         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.02         0.01       0.026 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=    31.81        10.34      16.87
     TOTAL RAINFALL   (mm)=    33.31        33.31      33.31
     RUNOFF COEFFICIENT   =     0.95         0.31       0.51

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
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| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.08         0.18
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      4.00        10.00
     Length            (m)=     41.63        30.00
     Mannings n             =    0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs  mm/hr |   hrs  mm/hr |'   hrs  mm/hr |   hrs  mm/hr
          0.083    2.45 | 1.083   12.69 | 2.083    5.04 |  3.08    2.85
          0.167    2.45 | 1.167   12.69 | 2.167    5.04 |  3.17    2.85
          0.250    2.76 | 1.250   86.95 | 2.250    4.42 |  3.25    2.67
          0.333    2.76 | 1.333   86.95 | 2.333    4.42 |  3.33    2.67
          0.417    3.17 | 1.417   15.73 | 2.417    3.95 |  3.42    2.52
          0.500    3.17 | 1.500   15.73 | 2.500    3.95 |  3.50    2.52
          0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
          0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
          0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
          0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
          0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
          1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

     Max.Eff.Inten.(mm/hr)=      86.95        28.43
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     1.05 (ii)    7.11 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.34         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.01         0.01       0.017 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=    31.81        10.52      13.78
     TOTAL RAINFALL   (mm)=    33.31        33.31      33.31
     RUNOFF COEFFICIENT   =     0.95         0.32       0.41

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0026)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.017     1.33    13.78
     + ID2= 2 (  0201):     3.50   0.330     1.33    18.08
     ==========================================================
       ID = 3 (  0026):     3.76   0.347     1.33    17.78

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

--------------------
| ADD HYD  (  0026)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0026):     3.76   0.347     1.33    17.78
     + ID2= 2 (  0027):     0.26   0.026     1.33    16.87
     ==========================================================
       ID = 1 (  0026):     4.02   0.374     1.33    17.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |    (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0130     0.0540
                         0.0030     0.0020    |   0.1100     0.0720
                         0.0090     0.0160    |   0.4340     0.0980
```

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                         0.0090     0.0210    |   0.5160     0.1030
                         0.0100     0.0260    |   0.6920     0.1140
                         0.0120     0.0390    |   1.8600     0.1540

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (  0026)     4.020     0.374      1.33      17.72
     OUTFLOW: ID= 1 (  0022)     4.020     0.021      3.67      17.68
     OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00       0.00

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.49
                    TIME SHIFT OF PEAK FLOW         (min)=140.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0554

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  --------------------------
  | Junction Command(0024) |
  --------------------------

                              AREA     QPEAK    TPEAK     R.V.
                              (ha)     (cms)    (hrs)     (mm)
     INFLOW : ID= 3(  0022)    0.00     0.00     0.00      0.00
     OUTFLOW: ID= 2(  0024)    0.00     0.00     0.00      0.00

--------------------------------------------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.91         1.57
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         4.00
     Length            (m)=    128.58        30.00
     Mannings n             =    0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs  mm/hr |   hrs  mm/hr |'   hrs  mm/hr |   hrs  mm/hr
          0.083    2.45 | 1.083   12.69 | 2.083    5.04 |  3.08    2.85
          0.167    2.45 | 1.167   12.69 | 2.167    5.04 |  3.17    2.85
          0.250    2.76 | 1.250   86.95 | 2.250    4.42 |  3.25    2.67
          0.333    2.76 | 1.333   86.95 | 2.333    4.42 |  3.33    2.67
          0.417    3.17 | 1.417   15.73 | 2.417    3.95 |  3.42    2.52
          0.500    3.17 | 1.500   15.73 | 2.500    3.95 |  3.50    2.52
          0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
          0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
          0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
          0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
          0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
          1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

     Max.Eff.Inten.(mm/hr)=      86.95        47.32
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     2.55 (ii)    9.06 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.29         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.00         0.13       0.134 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.42
     RUNOFF VOLUME    (mm)=    32.31        12.87      12.97
     TOTAL RAINFALL   (mm)=    33.31        33.31      33.31
     RUNOFF COEFFICIENT   =     0.97         0.39       0.39

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0003)|
|   1 +   2 =   3  |        AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0202):     2.48   0.134     1.42    12.97
    + ID2= 2 (  0022):     4.02   0.021     3.67    17.68
      ==========================================
      ID = 3 (  0003):     6.50   0.144     1.42    15.88

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

--------------------
| ADD HYD  (  0003)|
|   3 +   2 =   1  |        AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0024 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
      ID1= 3 (  0003):     6.50   0.144     1.42    15.88
    + ID2= 2 (  0024):     0.00   0.000     0.00     0.00
      ==========================================
      ID = 1 (  0003):     6.50   0.144     1.42    15.88

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14          0.32
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          4.00
     Length            (m)=      55.38         20.00
     Mannings n             =    0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    2.45 | 1.083   12.69 | 2.083    5.04 |  3.08    2.85
              0.167    2.45 | 1.167   12.69 | 2.167    5.04 |  3.17    2.85
              0.250    2.76 | 1.250   86.95 | 2.250    4.42 |  3.25    2.67
              0.333    2.76 | 1.333   86.95 | 2.333    4.42 |  3.33    2.67
              0.417    3.17 | 1.417   15.73 | 2.417    3.95 |  3.42    2.52
              0.500    3.17 | 1.500   15.73 | 2.500    3.95 |  3.50    2.52
              0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
              0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
              0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
              0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
              0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
              1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

     Max.Eff.Inten.(mm/hr)=      86.95         23.75
               over (min)        5.00         10.00
     Storage Coeff.  (min)=      1.54 (ii)     8.26 (ii)
     Unit Hyd. Tpeak (min)=      5.00         10.00
     Unit Hyd. peak  (cms)=      0.33          0.13
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.02          0.01          0.035 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.42           1.33
     RUNOFF VOLUME    (mm)=     31.81          9.77          14.54
     TOTAL RAINFALL   (mm)=     33.31         33.31          33.31
     RUNOFF COEFFICIENT   =      0.95          0.29           0.44

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* = 80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57          3.65
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=      10.00         10.00
     Length            (m)=     186.55         30.00
     Mannings n             =    0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    2.45 | 1.083   12.69 | 2.083    5.04 |  3.08    2.85
              0.167    2.45 | 1.167   12.69 | 2.167    5.04 |  3.17    2.85
              0.250    2.76 | 1.250   86.95 | 2.250    4.42 |  3.25    2.67
              0.333    2.76 | 1.333   86.95 | 2.333    4.42 |  3.33    2.67
              0.417    3.17 | 1.417   15.73 | 2.417    3.95 |  3.42    2.52
              0.500    3.17 | 1.500   15.73 | 2.500    3.95 |  3.50    2.52
              0.583    3.77 | 1.583    9.66 | 2.583    3.59 |  3.58    2.39
              0.667    3.77 | 1.667    9.66 | 2.667    3.59 |  3.67    2.39
              0.750    4.72 | 1.750    7.25 | 2.750    3.30 |  3.75    2.27
              0.833    4.72 | 1.833    7.25 | 2.833    3.30 |  3.83    2.27
              0.917    6.58 | 1.917    5.91 | 2.917    3.05 |  3.92    2.17
              1.000    6.58 | 2.000    5.91 | 3.000    3.05 |  4.00    2.17

     Max.Eff.Inten.(mm/hr)=      86.95         24.11
               over (min)        5.00         10.00
     Storage Coeff.  (min)=      1.97 (ii)     8.44 (ii)
     Unit Hyd. Tpeak (min)=      5.00         10.00
     Unit Hyd. peak  (cms)=      0.31          0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.26          0.17          0.380 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.42           1.33
     RUNOFF VOLUME    (mm)=     31.81          9.83          14.38
     TOTAL RAINFALL   (mm)=     33.31         33.31          33.31
     RUNOFF COEFFICIENT   =      0.95          0.30           0.43

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* = 80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
         V V    I       SS  U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\fb0d1eaa-b1
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\fb0d1eaa-b1

DATE: 11-08-2024                          TIME: 09:08:43

USER:


COMMENTS: _____________________________________________________________


----------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 5yr 4hr 10min Chicago         **
  ************************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 632.750
| Ptotal= 43.59 mm |                           B=   0.000
--------------------                           C=   0.741
                        used in:   INTENSITY =  A / (t + B)^C

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

              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.00    3.17 |  1.00   16.54 |  2.00    6.54 |  3.00    3.69
             0.17    3.57 |  1.17  114.88 |  2.17    5.73 |  3.17    3.46
             0.33    4.11 |  1.33   20.52 |  2.33    5.13 |  3.33    3.26
             0.50    4.88 |  1.50   12.57 |  2.50    4.65 |  3.50    3.09
             0.67    6.13 |  1.67    9.43 |  2.67    4.27 |  3.67    2.94
             0.83    8.55 |  1.83    7.68 |  2.83    3.95 |  3.83    2.80


----------------------------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.03         1.47
     Dep. Storage     (mm)=       1.70         5.00
     Average Slope     (%)=       4.00         4.00
     Length            (m)=     152.75        20.00
     Mannings n             =     0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    3.17 |  1.083   16.54 |  2.083    6.54 |  3.08    3.69
             0.167    3.17 |  1.167   16.54 |  2.167    6.54 |  3.17    3.69
             0.250    3.57 |  1.250  114.88 |  2.250    5.73 |  3.25    3.46
             0.333    3.57 |  1.333  114.88 |  2.333    5.73 |  3.33    3.46
             0.417    4.11 |  1.417   20.52 |  2.417    5.13 |  3.42    3.26
             0.500    4.11 |  1.500   20.52 |  2.500    5.13 |  3.50    3.26
             0.583    4.88 |  1.583   12.57 |  2.583    4.65 |  3.58    3.09
             0.667    4.88 |  1.667   12.57 |  2.667    4.65 |  3.67    3.09
             0.750    6.13 |  1.750    9.43 |  2.750    4.27 |  3.75    2.94
             0.833    6.13 |  1.833    9.43 |  2.833    4.27 |  3.83    2.94
             0.917    8.55 |  1.917    7.68 |  2.917    3.95 |  3.92    2.80
             1.000    8.55 |  2.000    7.68 |  3.000    3.95 |  4.00    2.80
```

```
| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.18
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       4.00        10.00
     Length            (m)=      41.63        30.00
     Mannings n             =     0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    3.17 |  1.083   16.54 |  2.083    6.54 |  3.08    3.69
             0.167    3.17 |  1.167   16.54 |  2.167    6.54 |  3.17    3.69
             0.250    3.57 |  1.250  114.88 |  2.250    5.73 |  3.25    3.46
             0.333    3.57 |  1.333  114.88 |  2.333    5.73 |  3.33    3.46
             0.417    4.11 |  1.417   20.52 |  2.417    5.13 |  3.42    3.26
             0.500    4.11 |  1.500   20.52 |  2.500    5.13 |  3.50    3.26
             0.583    4.88 |  1.583   12.57 |  2.583    4.65 |  3.58    3.09
             0.667    4.88 |  1.667   12.57 |  2.667    4.65 |  3.67    3.09
             0.750    6.13 |  1.750    9.43 |  2.750    4.27 |  3.75    2.94
             0.833    6.13 |  1.833    9.43 |  2.833    4.27 |  3.83    2.94
             0.917    8.55 |  1.917    7.68 |  2.917    3.95 |  3.92    2.80
             1.000    8.55 |  2.000    7.68 |  3.000    3.95 |  4.00    2.80

     Max.Eff.Inten.(mm/hr)=     114.88        49.49
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     0.94 (ii)    5.80 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.34         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.01         0.02        0.028 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42         1.33
     RUNOFF VOLUME    (mm)=    42.09        17.06        20.91
     TOTAL RAINFALL   (mm)=    43.59        43.59        43.59
     RUNOFF COEFFICIENT   =     0.97         0.39         0.48

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0026)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.028     1.33    20.91
     + ID2= 2 (  0201):     3.50   0.486     1.33    26.44
       ========================================================
       ID = 3 (  0026):     3.76   0.515     1.33    26.06

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

--------------------
| ADD HYD  (  0026)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0026):     3.76   0.515     1.33    26.06
     + ID2= 2 (  0027):     0.26   0.045     1.33    24.52
       ========================================================
       ID = 1 (  0026):     4.02   0.560     1.33    25.96

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

--------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)  |    (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0130     0.0540
                          0.0030     0.0020   |   0.1100     0.0720
                          0.0090     0.0160   |   0.4340     0.0980
```

```
                0.583    4.88 | 1.583   12.57 | 2.583    4.65 |  3.58    3.09
                0.667    4.88 | 1.667   12.57 | 2.667    4.65 |  3.67    3.09
                0.750    6.13 | 1.750    9.43 | 2.750    4.27 |  3.75    2.94
                0.833    6.13 | 1.833    9.43 | 2.833    4.27 |  3.83    2.94
                0.917    8.55 | 1.917    7.68 | 2.917    3.95 |  3.92    2.80
                1.000    8.55 | 2.000    7.68 | 3.000    3.95 |  4.00    2.80

     Max.Eff.Inten.(mm/hr)=     114.88       109.65
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     2.06 (ii)    6.88 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.31         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.22         0.32        0.486 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42         1.33
     RUNOFF VOLUME    (mm)=    41.89        22.60        26.44
     TOTAL RAINFALL   (mm)=    43.59        43.59        43.59
     RUNOFF COEFFICIENT   =     0.96         0.52         0.61

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0027)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  30.50
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.11         0.15
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       6.00         6.00
     Length            (m)=      41.63        20.00
     Mannings n             =     0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    3.17 |  1.083   16.54 |  2.083    6.54 |  3.08    3.69
             0.167    3.17 |  1.167   16.54 |  2.167    6.54 |  3.17    3.69
             0.250    3.57 |  1.250  114.88 |  2.250    5.73 |  3.25    3.46
             0.333    3.57 |  1.333  114.88 |  2.333    5.73 |  3.33    3.46
             0.417    4.11 |  1.417   20.52 |  2.417    5.13 |  3.42    3.26
             0.500    4.11 |  1.500   20.52 |  2.500    5.13 |  3.50    3.26
             0.583    4.88 |  1.583   12.57 |  2.583    4.65 |  3.58    3.09
             0.667    4.88 |  1.667   12.57 |  2.667    4.65 |  3.67    3.09
             0.750    6.13 |  1.750    9.43 |  2.750    4.27 |  3.75    2.94
             0.833    6.13 |  1.833    9.43 |  2.833    4.27 |  3.83    2.94
             0.917    8.55 |  1.917    7.68 |  2.917    3.95 |  3.92    2.80
             1.000    8.55 |  2.000    7.68 |  3.000    3.95 |  4.00    2.80

     Max.Eff.Inten.(mm/hr)=     114.88        47.61
               over (min)        5.00         5.00
     Storage Coeff.  (min)=     0.83 (ii)    4.93 (ii)
     Unit Hyd. Tpeak (min)=     5.00         5.00
     Unit Hyd. peak  (cms)=     0.34         0.22
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.03         0.02        0.045 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.33         1.33
     RUNOFF VOLUME    (mm)=    42.09        16.81        24.52
     TOTAL RAINFALL   (mm)=    43.59        43.59        43.59
     RUNOFF COEFFICIENT   =     0.97         0.39         0.56

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
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                          0.0090     0.0210   |   0.5160     0.1030
                          0.0100     0.0260   |   0.6920     0.1140
                          0.0120     0.0390   |   1.8600     0.1540

                             AREA     QPEAK     TPEAK       R.V.
                             (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (  0026)     4.020     0.560     1.33      25.96
     OVERFLOW: ID= 1 (  0022)    4.020     0.068     2.08      25.92
     OVERFLOW:ID= 3 (  0003)     0.000     0.000     0.00       0.00

                     TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                     CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                     PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                     PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.16
                     TIME SHIFT OF PEAK FLOW         (min)= 45.00
                     MAXIMUM  STORAGE   USED       (ha.m.)=  0.0642

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

  --------------------------
  | Junction Command(0024) |
  --------------------------

                            AREA     QPEAK   TPEAK     R.V.
                            (ha)     (cms)   (hrs)     (mm)
    INFLOW : ID= 3(  0022)   0.00     0.00    0.00     0.00
    OUTFLOW: ID= 2(  0024)   0.00     0.00    0.00     0.00

----------------------------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.91         1.57
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         4.00
     Length            (m)=     128.58        30.00
     Mannings n             =     0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    3.17 |  1.083   16.54 |  2.083    6.54 |  3.08    3.69
             0.167    3.17 |  1.167   16.54 |  2.167    6.54 |  3.17    3.69
             0.250    3.57 |  1.250  114.88 |  2.250    5.73 |  3.25    3.46
             0.333    3.57 |  1.333  114.88 |  2.333    5.73 |  3.33    3.46
             0.417    4.11 |  1.417   20.52 |  2.417    5.13 |  3.42    3.26
             0.500    4.11 |  1.500   20.52 |  2.500    5.13 |  3.50    3.26
             0.583    4.88 |  1.583   12.57 |  2.583    4.65 |  3.58    3.09
             0.667    4.88 |  1.667   12.57 |  2.667    4.65 |  3.67    3.09
             0.750    6.13 |  1.750    9.43 |  2.750    4.27 |  3.75    2.94
             0.833    6.13 |  1.833    9.43 |  2.833    4.27 |  3.83    2.94
             0.917    8.55 |  1.917    7.68 |  2.917    3.95 |  3.92    2.80
             1.000    8.55 |  2.000    7.68 |  3.000    3.95 |  4.00    2.80

     Max.Eff.Inten.(mm/hr)=     114.88        78.65
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     2.28 (ii)    7.59 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.30         0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.00         0.24        0.238 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42         1.42
     RUNOFF VOLUME    (mm)=    42.59        20.21        20.32
     TOTAL RAINFALL   (mm)=    43.59        43.59        43.59
     RUNOFF COEFFICIENT   =     0.98         0.46         0.47

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0003)|
|   1 +   2 =   3  |        AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0202):     2.48   0.238     1.42    20.32
     + ID2= 2 (  0022):     4.02   0.068     2.08    25.92
       ================================================
       ID = 3 (  0003):     6.50   0.249     1.42    23.78

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


--------------------
| ADD HYD  (  0003)|
|   3 +   2 =   1  |        AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0024 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
       ID1= 3 (  0003):     6.50   0.249     1.42    23.78
     + ID2= 2 (  0024):     0.00   0.000     0.00     0.00
       ================================================
       ID = 1 (  0003):     6.50   0.249     1.42    23.78

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.14          0.32
    Dep. Storage     (mm)=       1.50          5.00
    Average Slope     (%)=       2.00          4.00
    Length            (m)=      55.38         20.00
    Mannings n           =      0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
     TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
     hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
   0.083    3.17 | 1.083   16.54 | 2.083    6.54 |  3.08    3.69
   0.167    3.17 | 1.167   16.54 | 2.167    6.54 |  3.17    3.69
   0.250    3.57 | 1.250  114.88 | 2.250    5.73 |  3.25    3.46
   0.333    3.57 | 1.333  114.88 | 2.333    5.73 |  3.33    3.46
   0.417    4.11 | 1.417   20.52 | 2.417    5.13 |  3.42    3.26
   0.500    4.11 | 1.500   20.52 | 2.500    5.13 |  3.50    3.26
   0.583    4.88 | 1.583   12.57 | 2.583    4.65 |  3.58    3.09
   0.667    4.88 | 1.667   12.57 | 2.667    4.65 |  3.67    3.09
   0.750    6.13 | 1.750    9.43 | 2.750    4.27 |  3.75    2.94
   0.833    6.13 | 1.833    9.43 | 2.833    4.27 |  3.83    2.94
   0.917    8.55 | 1.917    7.68 | 2.917    3.95 |  3.92    2.80
   1.000    8.55 | 2.000    7.68 | 3.000    3.95 |  4.00    2.80

    Max.Eff.Inten.(mm/hr)=     114.88        42.09
              over (min)          5.00        10.00
    Storage Coeff.  (min)=       1.38 (ii)    6.72 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.33         0.14
                                                      *TOTALS*
    PEAK FLOW       (cms)=       0.03         0.03        0.053 (iii)
    TIME TO PEAK    (hrs)=       1.33         1.42         1.33
    RUNOFF VOLUME    (mm)=      42.09        16.03        21.68
    TOTAL RAINFALL   (mm)=      43.59        43.59        43.59
    RUNOFF COEFFICIENT   =       0.97         0.37         0.50

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* =  80.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       1.57          3.65
    Dep. Storage     (mm)=       1.50          5.00
    Average Slope     (%)=      10.00         10.00
    Length            (m)=     186.55         30.00
    Mannings n           =      0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
     TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
     hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
   0.083    3.17 | 1.083   16.54 | 2.083    6.54 |  3.08    3.69
   0.167    3.17 | 1.167   16.54 | 2.167    6.54 |  3.17    3.69
   0.250    3.57 | 1.250  114.88 | 2.250    5.73 |  3.25    3.46
   0.333    3.57 | 1.333  114.88 | 2.333    5.73 |  3.33    3.46
   0.417    4.11 | 1.417   20.52 | 2.417    5.13 |  3.42    3.26
   0.500    4.11 | 1.500   20.52 | 2.500    5.13 |  3.50    3.26
   0.583    4.88 | 1.583   12.57 | 2.583    4.65 |  3.58    3.09
   0.667    4.88 | 1.667   12.57 | 2.667    4.65 |  3.67    3.09
   0.750    6.13 | 1.750    9.43 | 2.750    4.27 |  3.75    2.94
   0.833    6.13 | 1.833    9.43 | 2.833    4.27 |  3.83    2.94
   0.917    8.55 | 1.917    7.68 | 2.917    3.95 |  3.92    2.80
   1.000    8.55 | 2.000    7.68 | 3.000    3.95 |  4.00    2.80

    Max.Eff.Inten.(mm/hr)=     114.88        42.67
              over (min)          5.00        10.00
    Storage Coeff.  (min)=       1.76 (ii)    6.91 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.32         0.14
                                                      *TOTALS*
    PEAK FLOW       (cms)=       0.34         0.32        0.589 (iii)
    TIME TO PEAK    (hrs)=       1.33         1.42         1.33
    RUNOFF VOLUME    (mm)=      42.09        16.12        21.49
    TOTAL RAINFALL   (mm)=      43.59        43.59        43.59
    RUNOFF COEFFICIENT   =       0.97         0.37         0.49

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN* =  80.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
         V V    I       SS  U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\e9272cd5-a2
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\e9272cd5-a2

DATE: 11-08-2024                          TIME: 09:08:43

USER:


COMMENTS: _____________________________________________________________


----------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 10yr 4hr 10min Chicago        **
  ************************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 721.920
| Ptotal= 51.12 mm |                           B=   0.000
--------------------                           C=   0.736
                        used in:   INTENSITY =  A / (t + B)^C

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

              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.00    3.79 |  1.00   19.52 |  2.00    7.77 |  3.00    4.40
             0.17    4.26 |  1.17  132.58 |  2.17    6.82 |  3.17    4.13
             0.33    4.90 |  1.33   24.19 |  2.33    6.10 |  3.33    3.90
             0.50    5.82 |  1.50   14.88 |  2.50    5.54 |  3.50    3.69
             0.67    7.29 |  1.67   11.18 |  2.67    5.09 |  3.67    3.51
             0.83   10.14 |  1.83    9.12 |  2.83    4.72 |  3.83    3.35


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--------------------
| CALIB              |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.03         1.47
     Dep. Storage     (mm)=      1.70         5.00
     Average Slope     (%)=      4.00         4.00
     Length            (m)=    152.75        20.00
     Mannings n            =     0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    3.79 | 1.083   19.52 | 2.083    7.77 |  3.08    4.40
              0.167    3.79 | 1.167   19.52 | 2.167    7.77 |  3.17    4.40
              0.250    4.26 | 1.250  132.58 | 2.250    6.82 |  3.25    4.13
              0.333    4.26 | 1.333  132.58 | 2.333    6.82 |  3.33    4.13
              0.417    4.90 | 1.417   24.19 | 2.417    6.10 |  3.42    3.90
              0.500    4.90 | 1.500   24.19 | 2.500    6.10 |  3.50    3.90
```

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                0.583    5.82 | 1.583   14.88 | 2.583    5.54 |  3.58    3.69
                0.667    5.82 | 1.667   14.88 | 2.667    5.54 |  3.67    3.69
                0.750    7.29 | 1.750   11.18 | 2.750    5.09 |  3.75    3.51
                0.833    7.29 | 1.833   11.18 | 2.833    5.09 |  3.83    3.51
                0.917   10.14 | 1.917    9.12 | 2.917    4.72 |  3.92    3.35
                1.000   10.14 | 2.000    9.12 | 3.000    4.72 |  4.00    3.35

     Max.Eff.Inten.(mm/hr)=     132.58       139.82
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     1.94 (ii)    6.50 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.31         0.14
                                                        *TOTALS*
     PEAK FLOW       (cms)=     0.26         0.41         0.608 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42         1.33
     RUNOFF VOLUME    (mm)=    49.42        28.75        32.86
     TOTAL RAINFALL   (mm)=    51.12        51.12        51.12
     RUNOFF COEFFICIENT   =     0.97         0.56         0.64

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
| STANDHYD (  0027)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  30.50
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.11         0.15
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      6.00         6.00
     Length            (m)=     41.63        20.00
     Mannings n            =     0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    3.79 | 1.083   19.52 | 2.083    7.77 |  3.08    4.40
              0.167    3.79 | 1.167   19.52 | 2.167    7.77 |  3.17    4.40
              0.250    4.26 | 1.250  132.58 | 2.250    6.82 |  3.25    4.13
              0.333    4.26 | 1.333  132.58 | 2.333    6.82 |  3.33    4.13
              0.417    4.90 | 1.417   24.19 | 2.417    6.10 |  3.42    3.90
              0.500    4.90 | 1.500   24.19 | 2.500    6.10 |  3.50    3.90
              0.583    5.82 | 1.583   14.88 | 2.583    5.54 |  3.58    3.69
              0.667    5.82 | 1.667   14.88 | 2.667    5.54 |  3.67    3.69
              0.750    7.29 | 1.750   11.18 | 2.750    5.09 |  3.75    3.51
              0.833    7.29 | 1.833   11.18 | 2.833    5.09 |  3.83    3.51
              0.917   10.14 | 1.917    9.12 | 2.917    4.72 |  3.92    3.35
              1.000   10.14 | 2.000    9.12 | 3.000    4.72 |  4.00    3.35

     Max.Eff.Inten.(mm/hr)=     132.58        63.14
               over (min)        5.00         5.00
     Storage Coeff.  (min)=     0.79 (ii)    4.66 (ii)
     Unit Hyd. Tpeak (min)=     5.00         5.00
     Unit Hyd. peak  (cms)=     0.34         0.22
                                                        *TOTALS*
     PEAK FLOW       (cms)=     0.03         0.03         0.055 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.33         1.33
     RUNOFF VOLUME    (mm)=    49.62        22.05        30.45
     TOTAL RAINFALL   (mm)=    51.12        51.12        51.12
     RUNOFF COEFFICIENT   =     0.97         0.43         0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
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| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.08         0.18
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      4.00        10.00
     Length            (m)=     41.63        30.00
     Mannings n            =     0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    3.79 | 1.083   19.52 | 2.083    7.77 |  3.08    4.40
              0.167    3.79 | 1.167   19.52 | 2.167    7.77 |  3.17    4.40
              0.250    4.26 | 1.250  132.58 | 2.250    6.82 |  3.25    4.13
              0.333    4.26 | 1.333  132.58 | 2.333    6.82 |  3.33    4.13
              0.417    4.90 | 1.417   24.19 | 2.417    6.10 |  3.42    3.90
              0.500    4.90 | 1.500   24.19 | 2.500    6.10 |  3.50    3.90
              0.583    5.82 | 1.583   14.88 | 2.583    5.54 |  3.58    3.69
              0.667    5.82 | 1.667   14.88 | 2.667    5.54 |  3.67    3.69
              0.750    7.29 | 1.750   11.18 | 2.750    5.09 |  3.75    3.51
              0.833    7.29 | 1.833   11.18 | 2.833    5.09 |  3.83    3.51
              0.917   10.14 | 1.917    9.12 | 2.917    4.72 |  3.92    3.35
              1.000   10.14 | 2.000    9.12 | 3.000    4.72 |  4.00    3.35

     Max.Eff.Inten.(mm/hr)=     132.58        65.50
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     0.89 (ii)    5.23 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.34         0.16
                                                        *TOTALS*
     PEAK FLOW       (cms)=     0.01         0.03         0.036 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42         1.33
     RUNOFF VOLUME    (mm)=    49.62        22.35        26.53
     TOTAL RAINFALL   (mm)=    51.12        51.12        51.12
     RUNOFF COEFFICIENT   =     0.97         0.44         0.52

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0026)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.036     1.33    26.53
     + ID2= 2 (  0201):     3.50   0.608     1.33    32.86
     ========================================================
       ID = 3 (  0026):     3.76   0.645     1.33    32.43

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

--------------------
| ADD HYD  (  0026)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0026):     3.76   0.645     1.33    32.43
     + ID2= 2 (  0027):     0.26   0.055     1.33    30.45
     ========================================================
       ID = 1 (  0026):     4.02   0.700     1.33    32.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
----------------------------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |    (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0130     0.0540
                         0.0030     0.0020    |   0.1100     0.0720
                         0.0090     0.0160    |   0.4340     0.0980
```

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                         0.0090     0.0210    |   0.5160     0.1030
                         0.0100     0.0260    |   0.6920     0.1140
                         0.0120     0.0390    |   1.8600     0.1540

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (  0026)     4.020     0.700      1.33       32.30
     OUTFLOW: ID= 1 (  0022)     4.020     0.117      1.83       32.26
     OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00        0.00

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 16.74
                    TIME SHIFT OF PEAK FLOW          (min)= 30.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0726

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      -------------------------
      | Junction Command(0024) |
      -------------------------

                              AREA     QPEAK    TPEAK     R.V.
                              (ha)     (cms)    (hrs)     (mm)
     INFLOW : ID= 3(  0022)    0.00     0.00     0.00     0.00
     OUTFLOW: ID= 2(  0024)    0.00     0.00     0.00     0.00

----------------------------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.91         1.57
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         4.00
     Length            (m)=    128.58        30.00
     Mannings n            =     0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    3.79 | 1.083   19.52 | 2.083    7.77 |  3.08    4.40
              0.167    3.79 | 1.167   19.52 | 2.167    7.77 |  3.17    4.40
              0.250    4.26 | 1.250  132.58 | 2.250    6.82 |  3.25    4.13
              0.333    4.26 | 1.333  132.58 | 2.333    6.82 |  3.33    4.13
              0.417    4.90 | 1.417   24.19 | 2.417    6.10 |  3.42    3.90
              0.500    4.90 | 1.500   24.19 | 2.500    6.10 |  3.50    3.90
              0.583    5.82 | 1.583   14.88 | 2.583    5.54 |  3.58    3.69
              0.667    5.82 | 1.667   14.88 | 2.667    5.54 |  3.67    3.69
              0.750    7.29 | 1.750   11.18 | 2.750    5.09 |  3.75    3.51
              0.833    7.29 | 1.833   11.18 | 2.833    5.09 |  3.83    3.51
              0.917   10.14 | 1.917    9.12 | 2.917    4.72 |  3.92    3.35
              1.000   10.14 | 2.000    9.12 | 3.000    4.72 |  4.00    3.35

     Max.Eff.Inten.(mm/hr)=     132.58       101.79
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     2.16 (ii)    6.95 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.31         0.14
                                                        *TOTALS*
     PEAK FLOW       (cms)=     0.00         0.31         0.316 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42         1.42
     RUNOFF VOLUME    (mm)=    50.12        26.01        26.13
     TOTAL RAINFALL   (mm)=    51.12        51.12        51.12
     RUNOFF COEFFICIENT   =     0.98         0.51         0.51

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0003)|
|   1 +   2 =   3  |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0202):     2.48   0.316     1.42    26.13
    + ID2= 2 (  0022):     4.02   0.117     1.83    32.26
      ================================================
      ID = 3 (  0003):     6.50   0.329     1.42    29.92

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


--------------------
| ADD HYD  (  0003)|
|   3 +   2 =   1  |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0024 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
      ID1= 3 (  0003):     6.50   0.329     1.42    29.92
    + ID2= 2 (  0024):     0.00   0.000     0.00     0.00
      ================================================
      ID = 1 (  0003):     6.50   0.329     1.42    29.92

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14          0.32
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          4.00
     Length            (m)=      55.38         20.00
     Mannings n             =    0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    3.79 | 1.083   19.52 | 2.083    7.77 |  3.08    4.40
             0.167    3.79 | 1.167   19.52 | 2.167    7.77 |  3.17    4.40
             0.250    4.26 | 1.250  132.58 | 2.250    6.82 |  3.25    4.13
             0.333    4.26 | 1.333  132.58 | 2.333    6.82 |  3.33    4.13
             0.417    4.90 | 1.417   24.19 | 2.417    6.10 |  3.42    3.90
             0.500    4.90 | 1.500   24.19 | 2.500    6.10 |  3.50    3.90
             0.583    5.82 | 1.583   14.88 | 2.583    5.54 |  3.58    3.69
             0.667    5.82 | 1.667   14.88 | 2.667    5.54 |  3.67    3.69
             0.750    7.29 | 1.750   11.18 | 2.750    5.09 |  3.75    3.51
             0.833    7.29 | 1.833   11.18 | 2.833    5.09 |  3.83    3.51
             0.917   10.14 | 1.917    9.12 | 2.917    4.72 |  4.00    3.35
             1.000   10.14 | 2.000    9.12 | 3.000    4.72 |  4.00    3.35

     Max.Eff.Inten.(mm/hr)=     132.58         56.17
               over (min)        5.00         10.00
     Storage Coeff.  (min)=      1.30 (ii)     6.06 (ii)
     Unit Hyd. Tpeak (min)=      5.00         10.00
     Unit Hyd. peak  (cms)=      0.33          0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.04          0.04          0.067 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.42           1.33
     RUNOFF VOLUME    (mm)=     49.62         21.12          27.30
     TOTAL RAINFALL   (mm)=     51.12         51.12          51.12
     RUNOFF COEFFICIENT   =      0.97          0.41           0.53

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* = 80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57          3.65
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=      10.00         10.00
     Length            (m)=     186.55         30.00
     Mannings n             =    0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    3.79 | 1.083   19.52 | 2.083    7.77 |  3.08    4.40
             0.167    3.79 | 1.167   19.52 | 2.167    7.77 |  3.17    4.40
             0.250    4.26 | 1.250  132.58 | 2.250    6.82 |  3.25    4.13
             0.333    4.26 | 1.333  132.58 | 2.333    6.82 |  3.33    4.13
             0.417    4.90 | 1.417   24.19 | 2.417    6.10 |  3.42    3.90
             0.500    4.90 | 1.500   24.19 | 2.500    6.10 |  3.50    3.90
             0.583    5.82 | 1.583   14.88 | 2.583    5.54 |  3.58    3.69
             0.667    5.82 | 1.667   14.88 | 2.667    5.54 |  3.67    3.69
             0.750    7.29 | 1.750   11.18 | 2.750    5.09 |  3.75    3.51
             0.833    7.29 | 1.833   11.18 | 2.833    5.09 |  3.83    3.51
             0.917   10.14 | 1.917    9.12 | 2.917    4.72 |  4.00    3.35
             1.000   10.14 | 2.000    9.12 | 3.000    4.72 |  4.00    3.35

     Max.Eff.Inten.(mm/hr)=     132.58         56.90
               over (min)        5.00         10.00
     Storage Coeff.  (min)=      1.66 (ii)     6.25 (ii)
     Unit Hyd. Tpeak (min)=      5.00         10.00
     Unit Hyd. peak  (cms)=      0.32          0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.40          0.43          0.747 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.42           1.33
     RUNOFF VOLUME    (mm)=     49.62         21.23          27.10
     TOTAL RAINFALL   (mm)=     51.12         51.12          51.12
     RUNOFF COEFFICIENT   =      0.97          0.42           0.53

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* = 80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
        V  V    I       SS  U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\0e26e68f-37
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\0e26e68f-37


DATE: 11-08-2024                          TIME: 09:08:42

USER:


COMMENTS: _____________________________________________________________


----------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 25yr 4hr 10min Chicago        **
  ************************************************


--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 822.740
| Ptotal= 61.88 mm |                           B=   0.000
--------------------                           C=   0.725
                        used in:   INTENSITY =  A / (t + B)^C

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

              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.00    4.77 |  1.00   23.97 |'  2.00    9.68 |  3.00    5.53
             0.17    5.36 |  1.17  154.98 |'  2.17    8.51 |  3.17    5.19
             0.33    6.14 |  1.33   29.61 |'  2.33    7.63 |  3.33    4.90
             0.50    7.28 |  1.50   18.34 |'  2.50    6.94 |  3.50    4.65
             0.67    9.09 |  1.67   13.85 |'  2.67    6.38 |  3.67    4.43
             0.83   12.58 |  1.83   11.32 |'  2.83    5.92 |  3.83    4.23


--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.03         1.47
     Dep. Storage     (mm)=      1.70         5.00
     Average Slope     (%)=      4.00         4.00
     Length            (m)=    152.75        20.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    4.77 |  1.083   23.97 |'  2.083    9.68 |  3.08    5.53
              0.167    4.77 |  1.167   23.97 |'  2.167    9.68 |  3.17    5.53
              0.250    5.36 |  1.250  154.98 |'  2.250    8.51 |  3.25    5.19
              0.333    5.36 |  1.333  154.98 |'  2.333    8.51 |  3.33    5.19
              0.417    6.14 |  1.417   29.61 |'  2.417    7.63 |  3.42    4.90
              0.500    6.14 |  1.500   29.61 |'  2.500    7.63 |  3.50    4.90
```

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--------------------
| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.08         0.18
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      4.00        10.00
     Length            (m)=     41.63        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    4.77 |  1.083   23.97 |'  2.083    9.68 |  3.08    5.53
              0.167    4.77 |  1.167   23.97 |'  2.167    9.68 |  3.17    5.53
              0.250    5.36 |  1.250  154.98 |'  2.250    8.51 |  3.25    5.19
              0.333    5.36 |  1.333  154.98 |'  2.333    8.51 |  3.33    5.19
              0.417    6.14 |  1.417   29.61 |'  2.417    7.63 |  3.42    4.90
              0.500    6.14 |  1.500   29.61 |'  2.500    7.63 |  3.50    4.90
              0.583    7.28 |  1.583   18.34 |'  2.583    6.94 |  3.58    4.65
              0.667    7.28 |  1.667   18.34 |'  2.667    6.94 |  3.67    4.65
              0.750    9.09 |  1.750   13.85 |'  2.750    6.38 |  3.75    4.43
              0.833    9.09 |  1.833   13.85 |'  2.833    6.38 |  3.83    4.43
              0.917   12.58 |  1.917   11.32 |'  2.917    5.92 |  3.92    4.23
              1.000   12.58 |  2.000   11.32 |'  3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98        88.44
           over (min)      =       5.00         5.00
     Storage Coeff.  (min)=       0.84 (ii)    4.69 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.22
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.04        0.060 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33        1.33
     RUNOFF VOLUME    (mm)=      60.38        30.43       35.03
     TOTAL RAINFALL   (mm)=      61.88        61.88       61.88
     RUNOFF COEFFICIENT   =       0.98         0.49        0.57

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0026)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.060     1.33    35.03
     + ID2= 2 (  0201):     3.50   0.779     1.33    42.36
       ========================================================
       ID = 3 (  0026):     3.76   0.839     1.33    41.85

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

--------------------
| ADD HYD  (  0026)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0026):     3.76   0.839     1.33    41.85
     + ID2= 2 (  0027):     0.26   0.070     1.33    39.31
       ========================================================
       ID = 1 (  0026):     4.02   0.909     1.33    41.69

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |    (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0130     0.0540
                         0.0030     0.0020    |   0.1100     0.0720
                         0.0090     0.0160    |   0.4340     0.0980
```

```
                         0.583    7.28 |  1.583   18.34 |  2.583    6.94 |  3.58    4.65
                         0.667    7.28 |  1.667   18.34 |  2.667    6.94 |  3.67    4.65
                         0.750    9.09 |  1.750   13.85 |  2.750    6.38 |  3.75    4.43
                         0.833    9.09 |  1.833   13.85 |  2.833    6.38 |  3.83    4.43
                         0.917   12.58 |  1.917   11.32 |  2.917    5.92 |  3.92    4.23
                         1.000   12.58 |  2.000   11.32 |  3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98       181.44
           over (min)      =       5.00        10.00
     Storage Coeff.  (min)=       1.82 (ii)    6.10 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.30         0.54        0.779 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42        1.33
     RUNOFF VOLUME    (mm)=      60.18        37.94       42.36
     TOTAL RAINFALL   (mm)=      61.88        61.88       61.88
     RUNOFF COEFFICIENT   =       0.97         0.61        0.68

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
| STANDHYD (  0027)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  30.50
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.11         0.15
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      6.00         6.00
     Length            (m)=     41.63        20.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    4.77 |  1.083   23.97 |'  2.083    9.68 |  3.08    5.53
              0.167    4.77 |  1.167   23.97 |'  2.167    9.68 |  3.17    5.53
              0.250    5.36 |  1.250  154.98 |'  2.250    8.51 |  3.25    5.19
              0.333    5.36 |  1.333  154.98 |'  2.333    8.51 |  3.33    5.19
              0.417    6.14 |  1.417   29.61 |'  2.417    7.63 |  3.42    4.90
              0.500    6.14 |  1.500   29.61 |'  2.500    7.63 |  3.50    4.90
              0.583    7.28 |  1.583   18.34 |'  2.583    6.94 |  3.58    4.65
              0.667    7.28 |  1.667   18.34 |'  2.667    6.94 |  3.67    4.65
              0.750    9.09 |  1.750   13.85 |'  2.750    6.38 |  3.75    4.43
              0.833    9.09 |  1.833   13.85 |'  2.833    6.38 |  3.83    4.43
              0.917   12.58 |  1.917   11.32 |'  2.917    5.92 |  3.92    4.23
              1.000   12.58 |  2.000   11.32 |'  3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98        85.43
           over (min)      =       5.00         5.00
     Storage Coeff.  (min)=       0.74 (ii)    4.37 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.23
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.04        0.070 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33        1.33
     RUNOFF VOLUME    (mm)=      60.38        30.08       39.31
     TOTAL RAINFALL   (mm)=      61.88        61.88       61.88
     RUNOFF COEFFICIENT   =       0.98         0.49        0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
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```
                         0.0090     0.0210   |   0.5160     0.1030
                         0.0100     0.0260   |   0.6920     0.1140
                         0.0120     0.0390   |   1.8600     0.1540

                                    AREA     QPEAK     TPEAK       R.V.
                                    (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (  0026)     4.020     0.909      1.33       41.69
     OUTFLOW: ID= 1 (  0022)     4.020     0.236      1.67       41.65
     OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00        0.00

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 25.94
                    TIME SHIFT OF PEAK FLOW          (min)= 20.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0823

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  -------------------------
  | Junction Command(0024) |
  -------------------------

                              AREA     QPEAK    TPEAK     R.V.
                              (ha)     (cms)    (hrs)     (mm)
     INFLOW : ID= 3(  0022)    0.00     0.00     0.00      0.00
     OUTFLOW: ID= 2(  0024)    0.00     0.00     0.00      0.00

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.91         1.57
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         4.00
     Length            (m)=    128.58        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    4.77 |  1.083   23.97 |'  2.083    9.68 |  3.08    5.53
              0.167    4.77 |  1.167   23.97 |'  2.167    9.68 |  3.17    5.53
              0.250    5.36 |  1.250  154.98 |'  2.250    8.51 |  3.25    5.19
              0.333    5.36 |  1.333  154.98 |'  2.333    8.51 |  3.33    5.19
              0.417    6.14 |  1.417   29.61 |'  2.417    7.63 |  3.42    4.90
              0.500    6.14 |  1.500   29.61 |'  2.500    7.63 |  3.50    4.90
              0.583    7.28 |  1.583   18.34 |'  2.583    6.94 |  3.58    4.65
              0.667    7.28 |  1.667   18.34 |'  2.667    6.94 |  3.67    4.65
              0.750    9.09 |  1.750   13.85 |'  2.750    6.38 |  3.75    4.43
              0.833    9.09 |  1.833   13.85 |'  2.833    6.38 |  3.83    4.43
              0.917   12.58 |  1.917   11.32 |'  2.917    5.92 |  3.92    4.23
              1.000   12.58 |  2.000   11.32 |'  3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98       134.24
           over (min)      =       5.00        10.00
     Storage Coeff.  (min)=       2.03 (ii)    6.31 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.43        0.427 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42        1.42
     RUNOFF VOLUME    (mm)=      60.88        34.77       34.90
     TOTAL RAINFALL   (mm)=      61.88        61.88       61.88
     RUNOFF COEFFICIENT   =       0.98         0.56        0.56

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0003)|
|   1 +   2 =   3  |        AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0202):     2.48   0.427     1.42    34.90
    + ID2= 2 (  0022):     4.02   0.236     1.67    41.65
      ==========================================
      ID = 3 (  0003):     6.50   0.488     1.42    39.07

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


--------------------
| ADD HYD  (  0003)|
|   3 +   2 =   1  |        AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0024 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
      ID1= 3 (  0003):     6.50   0.488     1.42    39.07
    + ID2= 2 (  0024):     0.00   0.000     0.00     0.00
      ==========================================
      ID = 1 (  0003):     6.50   0.488     1.42    39.07

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14          0.32
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          4.00
     Length            (m)=      55.38         20.00
     Mannings n             =     0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
             0.167    4.77 | 1.167   23.97 | 2.167    9.68 |  3.17    5.53
             0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
             0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
             0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
             0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
             0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
             0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
             0.750    9.09 | 1.750   13.85 | 2.750    6.38 |  3.75    4.43
             0.833    9.09 | 1.833   13.85 | 2.833    6.38 |  3.83    4.43
             0.917   12.58 | 1.917   11.32 | 2.917    5.92 |  4.00    4.23
             1.000   12.58 | 2.000   11.32 | 3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98         76.50
               over (min)          5.00         10.00
     Storage Coeff.  (min)=       1.22 (ii)     5.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.33          0.16
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.04          0.05          0.088 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.42           1.33
     RUNOFF VOLUME    (mm)=      60.38         28.96          35.77
     TOTAL RAINFALL   (mm)=      61.88         61.88          61.88
     RUNOFF COEFFICIENT   =       0.98          0.47           0.58

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* = 80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57          3.65
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=      10.00         10.00
     Length            (m)=     186.55         30.00
     Mannings n             =     0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    4.77 | 1.083   23.97 | 2.083    9.68 |  3.08    5.53
             0.167    4.77 | 1.167   23.97 | 2.167    9.68 |  3.17    5.53
             0.250    5.36 | 1.250  154.98 | 2.250    8.51 |  3.25    5.19
             0.333    5.36 | 1.333  154.98 | 2.333    8.51 |  3.33    5.19
             0.417    6.14 | 1.417   29.61 | 2.417    7.63 |  3.42    4.90
             0.500    6.14 | 1.500   29.61 | 2.500    7.63 |  3.50    4.90
             0.583    7.28 | 1.583   18.34 | 2.583    6.94 |  3.58    4.65
             0.667    7.28 | 1.667   18.34 | 2.667    6.94 |  3.67    4.65
             0.750    9.09 | 1.750   13.85 | 2.750    6.38 |  3.75    4.43
             0.833    9.09 | 1.833   13.85 | 2.833    6.38 |  3.83    4.43
             0.917   12.58 | 1.917   11.32 | 2.917    5.92 |  4.00    4.23
             1.000   12.58 | 2.000   11.32 | 3.000    5.92 |  4.00    4.23

     Max.Eff.Inten.(mm/hr)=     154.98         77.44
               over (min)          5.00         10.00
     Storage Coeff.  (min)=       1.56 (ii)     5.62 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.33          0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.46          0.60          0.976 (iii)
     TIME TO PEAK    (hrs)=       1.33          1.42           1.33
     RUNOFF VOLUME    (mm)=      60.38         29.09          35.56
     TOTAL RAINFALL   (mm)=      61.88         61.88          61.88
     RUNOFF COEFFICIENT   =       0.98          0.47           0.57

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* = 80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
        V  V    I       SS  U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\7b63774b-63
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\7b63774b-63


DATE: 11-08-2024                          TIME: 09:08:43

USER:


COMMENTS: _____________________________________________________


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  ************************************************
  ** SIMULATION : 50yr 4hr 10min Chicago        **
  ************************************************


--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 893.800
| Ptotal= 69.47 mm |                           B=   0.000
--------------------                           C=   0.719
                        used in:   INTENSITY =  A / (t + B)^C

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

          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.00    5.47 |  1.00   27.09 |'  2.00   11.03 |  3.00    6.33
          0.17    6.13 |  1.17  170.70 |'  2.17    9.71 |  3.17    5.95
          0.33    7.02 |  1.33   33.42 |'  2.33    8.71 |  3.33    5.62
          0.50    8.31 |  1.50   20.79 |'  2.50    7.93 |  3.50    5.33
          0.67   10.36 |  1.67   15.73 |'  2.67    7.29 |  3.67    5.08
          0.83   14.30 |  1.83   12.89 |'  2.83    6.77 |  3.83    4.85


--------------------------------------------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.03         1.47
     Dep. Storage     (mm)=       1.70         5.00
     Average Slope     (%)=       4.00         4.00
     Length            (m)=     152.75        20.00
     Mannings n             =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
         0.167    5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
         0.250    6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
         0.333    6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
         0.417    7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
         0.500    7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
         0.583    8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
         0.667    8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
         0.750   10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
         0.833   10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
         0.917   14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
         1.000   14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Max.Eff.Inten.(mm/hr)=     170.70       105.41
               over (min)        5.00         5.00
     Storage Coeff.  (min)=     0.80 (ii)    4.39 (ii)
     Unit Hyd. Tpeak (min)=     5.00         5.00
     Unit Hyd. peak  (cms)=     0.34         0.23
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.02         0.05       0.071 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=    67.97        36.43      41.27
     TOTAL RAINFALL   (mm)=    69.47        69.47      69.47
     RUNOFF COEFFICIENT   =     0.98         0.52       0.59

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0026)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.071     1.33    41.27
     + ID2= 2 (  0201):     3.50   0.904     1.33    49.22
       ========================================================
       ID = 3 (  0026):     3.76   0.975     1.33    48.68

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

--------------------
| ADD HYD  (  0026)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0026):     3.76   0.975     1.33    48.68
     + ID2= 2 (  0027):     0.26   0.080     1.33    45.77
       ========================================================
       ID = 1 (  0026):     4.02   1.055     1.33    48.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |    (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0130     0.0540
                         0.0030     0.0020    |   0.1100     0.0720
                         0.0090     0.0160    |   0.4340     0.0980
```

```
                         0.583    8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
                         0.667    8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
                         0.750   10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
                         0.833   10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
                         0.917   14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
                         1.000   14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Max.Eff.Inten.(mm/hr)=     170.70       211.45
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     1.75 (ii)    5.87 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.32         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.33         0.63       0.904 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=    67.77        44.62      49.22
     TOTAL RAINFALL   (mm)=    69.47        69.47      69.47
     RUNOFF COEFFICIENT   =     0.98         0.64       0.71

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
| STANDHYD (  0027)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  30.50
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.11         0.15
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       6.00         6.00
     Length            (m)=      41.63        20.00
     Mannings n             =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
         0.167    5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
         0.250    6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
         0.333    6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
         0.417    7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
         0.500    7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
         0.583    8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
         0.667    8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
         0.750   10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
         0.833   10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
         0.917   14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
         1.000   14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Max.Eff.Inten.(mm/hr)=     170.70       101.93
               over (min)        5.00         5.00
     Storage Coeff.  (min)=     0.71 (ii)    4.21 (ii)
     Unit Hyd. Tpeak (min)=     5.00         5.00
     Unit Hyd. peak  (cms)=     0.34         0.24
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.04         0.04       0.080 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=    67.97        36.04      45.77
     TOTAL RAINFALL   (mm)=    69.47        69.47      69.47
     RUNOFF COEFFICIENT   =     0.98         0.52       0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
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| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.08         0.18
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       4.00        10.00
     Length            (m)=      41.63        30.00
     Mannings n             =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
         0.167    5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
         0.250    6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
         0.333    6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
         0.417    7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
         0.500    7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
         0.583    8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
         0.667    8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
         0.750   10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
         0.833   10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
         0.917   14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
         1.000   14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Max.Eff.Inten.(mm/hr)=     170.70       105.41
               over (min)        5.00         5.00
     Storage Coeff.  (min)=     0.80 (ii)    4.39 (ii)
     Unit Hyd. Tpeak (min)=     5.00         5.00
     Unit Hyd. peak  (cms)=     0.34         0.23
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.02         0.05       0.071 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=    67.97        36.43      41.27
     TOTAL RAINFALL   (mm)=    69.47        69.47      69.47
     RUNOFF COEFFICIENT   =     0.98         0.52       0.59

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0026)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.071     1.33    41.27
     + ID2= 2 (  0201):     3.50   0.904     1.33    49.22
       ========================================================
       ID = 3 (  0026):     3.76   0.975     1.33    48.68

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

--------------------
| ADD HYD  (  0026)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0026):     3.76   0.975     1.33    48.68
     + ID2= 2 (  0027):     0.26   0.080     1.33    45.77
       ========================================================
       ID = 1 (  0026):     4.02   1.055     1.33    48.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |    (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0130     0.0540
                         0.0030     0.0020    |   0.1100     0.0720
                         0.0090     0.0160    |   0.4340     0.0980
```

```
                         0.0090     0.0210    |   0.5160     0.1030
                         0.0100     0.0260    |   0.6920     0.1140
                         0.0120     0.0390    |   1.8600     0.1540

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (  0026)     4.020     1.055      1.33       48.49
     OUTFLOW: ID= 1 (  0022)     4.020     0.327      1.58       48.45
     OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00        0.00

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 30.97
                    TIME SHIFT OF PEAK FLOW          (min)= 15.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0896

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  -------------------------
  | Junction Command(0024) |
  -------------------------

                              AREA     QPEAK    TPEAK     R.V.
                              (ha)     (cms)    (hrs)     (mm)
     INFLOW : ID= 3(  0022)     0.00     0.00     0.00      0.00
     OUTFLOW: ID= 2(  0024)     0.00     0.00     0.00      0.00

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--------------------
| CALIB              |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------

                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.91         1.57
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         4.00
     Length            (m)=     128.58        30.00
     Mannings n             =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
         0.167    5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
         0.250    6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
         0.333    6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
         0.417    7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
         0.500    7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
         0.583    8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
         0.667    8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
         0.750   10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
         0.833   10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
         0.917   14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
         1.000   14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Max.Eff.Inten.(mm/hr)=     170.70       157.89
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     1.95 (ii)    5.97 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.31         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.01         0.51       0.509 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.42
     RUNOFF VOLUME    (mm)=    68.47        41.19      41.32
     TOTAL RAINFALL   (mm)=    69.47        69.47      69.47
     RUNOFF COEFFICIENT   =     0.99         0.59       0.59

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0003)|
|   1 +   2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0202):     2.48   0.509     1.42    41.32
     + ID2= 2 (  0022):     4.02   0.327     1.58    48.45
       ================================================
       ID = 3 (  0003):     6.50   0.632     1.42    45.73

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

--------------------
| ADD HYD  (  0003)|
|   3 +   2 =  1   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0024 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
       ID1= 3 (  0003):     6.50   0.632     1.42    45.73
     + ID2= 2 (  0024):     0.00   0.000     0.00     0.00
       ================================================
       ID = 1 (  0003):     6.50   0.632     1.42    45.73

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14         0.32
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=       2.00         4.00
     Length            (m)=      55.38        20.00
     Mannings n             =    0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
             0.167    5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
             0.250    6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
             0.333    6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
             0.417    7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
             0.500    7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
             0.583    8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
             0.667    8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
             0.750   10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
             0.833   10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
             0.917   14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
             1.000   14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Max.Eff.Inten.(mm/hr)=     170.70        91.61
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.18 (ii)    6.04 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.06          0.099 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      67.97        34.81          42.00
     TOTAL RAINFALL   (mm)=      69.47        69.47          69.47
     RUNOFF COEFFICIENT   =       0.98         0.50           0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* = 80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57         3.65
     Dep. Storage     (mm)=       1.50         5.00
     Average Slope     (%)=      10.00        10.00
     Length            (m)=     186.55        30.00
     Mannings n             =    0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    5.47 | 1.083   27.09 | 2.083   11.03 |  3.08    6.33
             0.167    5.47 | 1.167   27.09 | 2.167   11.03 |  3.17    6.33
             0.250    6.13 | 1.250  170.70 | 2.250    9.71 |  3.25    5.95
             0.333    6.13 | 1.333  170.70 | 2.333    9.71 |  3.33    5.95
             0.417    7.02 | 1.417   33.42 | 2.417    8.71 |  3.42    5.62
             0.500    7.02 | 1.500   33.42 | 2.500    8.71 |  3.50    5.62
             0.583    8.31 | 1.583   20.79 | 2.583    7.93 |  3.58    5.33
             0.667    8.31 | 1.667   20.79 | 2.667    7.93 |  3.67    5.33
             0.750   10.36 | 1.750   15.73 | 2.750    7.29 |  3.75    5.08
             0.833   10.36 | 1.833   15.73 | 2.833    7.29 |  3.83    5.08
             0.917   14.30 | 1.917   12.89 | 2.917    6.77 |  3.92    4.85
             1.000   14.30 | 2.000   12.89 | 3.000    6.77 |  4.00    4.85

     Max.Eff.Inten.(mm/hr)=     170.70        92.71
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.50 (ii)    6.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.51         0.69          1.097 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      67.97        34.94          41.78
     TOTAL RAINFALL   (mm)=      69.47        69.47          69.47
     RUNOFF COEFFICIENT   =       0.98         0.50           0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* = 80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
        V  V    I       SS  U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\19d0a497-3c
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\19d0a497-3c


DATE: 11-08-2024                          TIME: 09:08:42

USER:


COMMENTS: _____________________________________________________


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  ************************************************
  ** SIMULATION : 100yr 4hr 10min Chicago       **
  ************************************************


-------------------
| CHICAGO STORM   |     IDF curve parameters: A= 953.290
| Ptotal= 77.41 mm |                           B=   0.000
-------------------                           C=   0.711
                        used in:   INTENSITY =  A / (t + B)^C

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

          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
          0.00    6.26 |  1.00   30.45 |'  2.00   12.53 |  3.00    7.23
          0.17    7.01 |  1.17  185.45 |'  2.17   11.04 |  3.17    6.80
          0.33    8.02 |  1.33   37.49 |'  2.33    9.92 |  3.33    6.43
          0.50    9.47 |  1.50   23.45 |'  2.50    9.04 |  3.50    6.10
          0.67   11.77 |  1.67   17.80 |'  2.67    8.32 |  3.67    5.82
          0.83   16.19 |  1.83   14.61 |'  2.83    7.73 |  3.83    5.56


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-------------------
| CALIB             |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.03         1.47
     Dep. Storage     (mm)=      1.70         5.00
     Average Slope     (%)=      4.00         4.00
     Length            (m)=    152.75        20.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
         0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
         0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
         0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
         0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
         0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
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                0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
                0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
                0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
                0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
                0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
                1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       241.04
               over (min)          5.00        10.00
     Storage Coeff.  (min)=     1.70 (ii)    5.68 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.32         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.36         0.73       1.028 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=    75.71        51.75      56.52
     TOTAL RAINFALL   (mm)=    77.41        77.41      77.41
     RUNOFF COEFFICIENT   =     0.98         0.67       0.73

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| CALIB             |
| STANDHYD (  0027)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  30.50
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.11         0.15
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      6.00         6.00
     Length            (m)=     41.63        20.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
         0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
         0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
         0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
         0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
         0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
         0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
         0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
         0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
         0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
         0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
         1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       118.62
               over (min)          5.00         5.00
     Storage Coeff.  (min)=     0.69 (ii)    4.07 (ii)
     Unit Hyd. Tpeak (min)=     5.00         5.00
     Unit Hyd. peak  (cms)=     0.34         0.24
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.04         0.05       0.091 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=    75.91        42.49      52.67
     TOTAL RAINFALL   (mm)=    77.41        77.41      77.41
     RUNOFF COEFFICIENT   =     0.98         0.55       0.68

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB             |
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| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.08         0.18
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      4.00        10.00
     Length            (m)=     41.63        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
         0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
         0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
         0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
         0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
         0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
         0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
         0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
         0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
         0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
         0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
         1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       122.54
               over (min)          5.00         5.00
     Storage Coeff.  (min)=     0.78 (ii)    4.16 (ii)
     Unit Hyd. Tpeak (min)=     5.00         5.00
     Unit Hyd. peak  (cms)=     0.34         0.24
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.02         0.06       0.082 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=    75.91        42.92      47.99
     TOTAL RAINFALL   (mm)=    77.41        77.41      77.41
     RUNOFF COEFFICIENT   =     0.98         0.55       0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| ADD HYD  (  0026)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.082     1.33    47.99
     + ID2= 2 (  0201):     3.50   1.028     1.33    56.52
       ========================================================
       ID = 3 (  0026):     3.76   1.110     1.33    55.93

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

-------------------
| ADD HYD  (  0026)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0026):     3.76   1.110     1.33    55.93
     + ID2= 2 (  0027):     0.26   0.091     1.33    52.67
       ========================================================
       ID = 1 (  0026):     4.02   1.201     1.33    55.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------       (cms)     (ha.m.)   |    (cms)     (ha.m.)
                         0.0000     0.0000    |   0.0130     0.0540
                         0.0030     0.0020    |   0.1100     0.0720
                         0.0090     0.0160    |   0.4340     0.0980
```

```
                         0.0090     0.0210    |   0.5160     0.1030
                         0.0100     0.0260    |   0.6920     0.1140
                         0.0120     0.0390    |   1.8600     0.1540

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (  0026)     4.020     1.201      1.33      55.72
     OUTFLOW: ID= 1 (  0022)     4.020     0.419      1.58      55.68
     OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00       0.00

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 34.90
                    TIME SHIFT OF PEAK FLOW         (min)= 15.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0973

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

  --------------------------
  | Junction Command(0024) |
  --------------------------

                              AREA     QPEAK    TPEAK     R.V.
                              (ha)     (cms)    (hrs)     (mm)
     INFLOW : ID= 3(  0022)     0.00     0.00     0.00      0.00
     OUTFLOW: ID= 2(  0024)     0.00     0.00     0.00      0.00

--------------------------------------------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.91         1.57
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      2.00         4.00
     Length            (m)=    128.58        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
         0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
         0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
         0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
         0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
         0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
         0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
         0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
         0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
         0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
         0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
         1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       181.43
               over (min)          5.00        10.00
     Storage Coeff.  (min)=     1.88 (ii)    5.69 (ii)
     Unit Hyd. Tpeak (min)=     5.00        10.00
     Unit Hyd. peak  (cms)=     0.32         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=     0.01         0.59       0.591 (iii)
     TIME TO PEAK    (hrs)=     1.33         1.42       1.42
     RUNOFF VOLUME    (mm)=    76.41        48.07      48.21
     TOTAL RAINFALL   (mm)=    77.41        77.41      77.41
     RUNOFF COEFFICIENT   =     0.99         0.62       0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0202):     2.48   0.591     1.42    48.21
    + ID2= 2 (  0022):     4.02   0.419     1.58    55.68
      ==========================================
      ID = 3 (  0003):     6.50   0.833     1.42    52.83

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

--------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0024 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
      ID1= 3 (  0003):     6.50   0.833     1.42    52.83
    + ID2= 2 (  0024):     0.00   0.000     0.00     0.00
      ==========================================
      ID = 1 (  0003):     6.50   0.833     1.42    52.83

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14          0.32
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          4.00
     Length            (m)=      55.38         20.00
     Mannings n           =      0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
             0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
             0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
             0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
             0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
             0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
             0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
             0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
             0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
             0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
             0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
             1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       106.95
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.14 (ii)    5.85 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.07          0.113 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      75.91        41.14          48.68
     TOTAL RAINFALL   (mm)=      77.41        77.41          77.41
     RUNOFF COEFFICIENT   =       0.98         0.53           0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57          3.65
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=      10.00         10.00
     Length            (m)=     186.55         30.00
     Mannings n           =      0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    6.26 | 1.083   30.45 | 2.083   12.53 |  3.08    7.23
             0.167    6.26 | 1.167   30.45 | 2.167   12.53 |  3.17    7.23
             0.250    7.01 | 1.250  185.45 | 2.250   11.04 |  3.25    6.80
             0.333    7.01 | 1.333  185.45 | 2.333   11.04 |  3.33    6.80
             0.417    8.02 | 1.417   37.49 | 2.417    9.92 |  3.42    6.43
             0.500    8.02 | 1.500   37.49 | 2.500    9.92 |  3.50    6.43
             0.583    9.47 | 1.583   23.45 | 2.583    9.04 |  3.58    6.10
             0.667    9.47 | 1.667   23.45 | 2.667    9.04 |  3.67    6.10
             0.750   11.77 | 1.750   17.80 | 2.750    8.32 |  3.75    5.82
             0.833   11.77 | 1.833   17.80 | 2.833    8.32 |  3.83    5.82
             0.917   16.19 | 1.917   14.61 | 2.917    7.73 |  3.92    5.56
             1.000   16.19 | 2.000   14.61 | 3.000    7.73 |  4.00    5.56

     Max.Eff.Inten.(mm/hr)=     185.45       108.19
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.45 (ii)    6.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.56         0.81          1.258 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      75.91        41.29          48.46
     TOTAL RAINFALL   (mm)=      77.41        77.41          77.41
     RUNOFF COEFFICIENT   =       0.98         0.53           0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
         V V    I       SS  U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\10e3ea0a-16
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\10e3ea0a-16


DATE: 11-08-2024                          TIME: 09:08:43

USER:


COMMENTS: _____________________________________________________


----------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : Hurricane Hazel (Regional)    **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\cmartin\AppD
|                  |              ata\Local\Temp\
|                  |              8c6e7f0c-3162-4f43-9add-4f8818604794\eeae85f6
| Ptotal=212.00 mm |    Comments: Hazel
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    6.00 |  3.00   13.00 |'  6.00   23.00 |  9.00   53.00
               1.00    4.00 |  4.00   17.00 |'  7.00   13.00 | 10.00   38.00
               2.00    6.00 |  5.00   13.00 |'  8.00   13.00 | 11.00   13.00

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--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.03         1.47
     Dep. Storage     (mm)=      1.70         5.00
     Average Slope     (%)=      4.00         4.00
     Length            (m)=    152.75        20.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        97.88
           over (min)            5.00        10.00
     Storage Coeff.  (min)=      2.80 (ii)    6.62 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.28         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.10         0.40      0.501 (iii)
     TIME TO PEAK    (hrs)=      9.75        10.00        10.00
     RUNOFF VOLUME    (mm)=    210.30       180.65       186.55
     TOTAL RAINFALL   (mm)=    212.00       212.00       212.00
     RUNOFF COEFFICIENT   =      0.99         0.85         0.88

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0027)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  42.00   Dir. Conn.(%)=  30.50
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.11         0.15
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      6.00         6.00
     Length            (m)=     41.63        20.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        59.28
           over (min)            5.00        10.00
     Storage Coeff.  (min)=      1.14 (ii)    5.27 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.34         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.01         0.02      0.036 (iii)
     TIME TO PEAK    (hrs)=      9.33        10.00        10.00
     RUNOFF VOLUME    (mm)=    210.50       165.60       179.29
     TOTAL RAINFALL   (mm)=    212.00       212.00       212.00
     RUNOFF COEFFICIENT   =      0.99         0.78         0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.08         0.18
     Dep. Storage     (mm)=      1.50         5.00
     Average Slope     (%)=      4.00        10.00
     Length            (m)=     41.63        30.00
     Mannings n            =     0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        60.61
           over (min)            5.00        10.00
     Storage Coeff.  (min)=      1.28 (ii)    5.76 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.33         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.01         0.03      0.036 (iii)
     TIME TO PEAK    (hrs)=      9.33        10.00        10.00
     RUNOFF VOLUME    (mm)=    210.50       166.35       173.14
     TOTAL RAINFALL   (mm)=    212.00       212.00       212.00
     RUNOFF COEFFICIENT   =      0.99         0.78         0.82

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
             THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0026)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):      0.26    0.036    10.00   173.14
     + ID2= 2 (  0201):      3.50    0.501    10.00   186.55
       ================================================
       ID = 3 (  0026):      3.76    0.538    10.00   185.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0026)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0026):      3.76    0.538    10.00   185.62
     + ID2= 2 (  0027):      0.26    0.036    10.00   179.29
       ================================================
       ID = 1 (  0026):      4.02    0.574    10.00   185.21

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
|  IN= 2---> OUT= 1 |
|  DT=  5.0 min    |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  0.0130     0.0540
                         0.0030     0.0020    |  0.1100     0.0720
                         0.0090     0.0160    |  0.4340     0.0980
                         0.0090     0.0210    |  0.5160     0.1030
                         0.0100     0.0260    |  0.6920     0.1140
                         0.0120     0.0390    |  1.8600     0.1540

                              AREA     QPEAK     TPEAK      R.V.
                              (ha)     (cms)     (hrs)      (mm)
   INFLOW : ID= 2 (  0026)    4.020     0.574     10.00    185.21
   OUTFLOW: ID= 1 (  0022)    4.020     0.567     10.00    185.17
   OVERFLOW:ID= 3 (  0003)    0.000     0.000      0.00      0.00

                TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 98.77
                TIME SHIFT OF PEAK FLOW          (min)=  0.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.1149
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  | Junction Command(0024) |
  -------------------------

                          AREA     QPEAK   TPEAK     R.V.
                          (ha)     (cms)    (hrs)    (mm)
  INFLOW : ID= 3(  0022)    0.00      0.00    0.00     0.00
  OUTFLOW: ID= 2(  0024)    0.00      0.00    0.00     0.00

  ------------------------------------------------------------------------------------------
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| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.91          1.57
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.00          4.00
     Length            (m)=     128.58         30.00
     Mannings n             =     0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00         79.69
           over (min)            5.00         10.00
     Storage Coeff.  (min)=       3.11 (ii)    8.39 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.27          0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00          0.35          0.348 (iii)
     TIME TO PEAK    (hrs)=       9.58         10.00          10.00
     RUNOFF VOLUME    (mm)=     211.00        174.97         175.15
     TOTAL RAINFALL   (mm)=     212.00        212.00         212.00
     RUNOFF COEFFICIENT   =       1.00          0.83           0.83

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57          3.65
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=      10.00         10.00
     Length            (m)=     186.55         30.00
     Mannings n             =     0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00         55.26
           over (min)            5.00         10.00
     Storage Coeff.  (min)=       1.88 (ii)    6.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.32          0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01          0.05          0.064 (iii)
     TIME TO PEAK    (hrs)=       9.50         10.00          10.00
     RUNOFF VOLUME    (mm)=     210.50        163.18         173.44
     TOTAL RAINFALL   (mm)=     212.00        212.00         212.00
     RUNOFF COEFFICIENT   =       0.99          0.77           0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57          3.65
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=      10.00         10.00
     Length            (m)=     186.55         30.00
     Mannings n             =     0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00         55.69
           over (min)            5.00         10.00
     Storage Coeff.  (min)=       2.40 (ii)    7.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.30          0.14
```

```
             CN*  =  80.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0202):     2.48    0.348    10.00   175.15
      + ID2= 2 (  0022):     4.02    0.567    10.00   185.17
        ==========================================
        ID = 3 (  0003):     6.50    0.915    10.00   181.35

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

--------------------
| ADD HYD  (  0003)|
|  3 +  2 =  1     |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0024 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
        ID1= 3 (  0003):     6.50    0.915    10.00   181.35
      + ID2= 2 (  0024):     0.00    0.000     0.00     0.00
        ==========================================
        ID = 1 (  0003):     6.50    0.915    10.00   181.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14          0.32
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          4.00
     Length            (m)=      55.38         20.00
     Mannings n             =     0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
```

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                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.16          0.56          0.722 (iii)
     TIME TO PEAK    (hrs)=       9.67         10.00          10.00
     RUNOFF VOLUME    (mm)=     210.50        163.45         173.19
     TOTAL RAINFALL   (mm)=     212.00        212.00         212.00
     RUNOFF COEFFICIENT   =       0.99          0.77           0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  80.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 FINISH
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       V    V   I    SSSSS  U   U    A    L                (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I      SS   U   U  AAAAA  L
         V V    I       SS  U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\99c626c3-7e
  Summary filename: C:\Users\cmartin\AppData\Local\Civica\VH5\db2b9d01-d7f6-4e0b-8e9d-a57b449df036\99c626c3-7e


DATE: 11-08-2024                          TIME: 09:08:43

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 25mm 4hr 10min Chicago        **
  ************************************************


--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 475.610
| Ptotal= 33.31 mm |                          B=   0.000
--------------------                          C=   0.738
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    2.45 |  1.00   12.69 |  2.00    5.04 |  3.00    2.85
               0.17    2.76 |  1.17   86.95 |  2.17    4.42 |  3.17    2.67
               0.33    3.17 |  1.33   15.73 |  2.33    3.95 |  3.33    2.52
               0.50    3.77 |  1.50    9.66 |  2.50    3.59 |  3.50    2.39
               0.67    4.72 |  1.67    7.25 |  2.67    3.30 |  3.67    2.27
               0.83    6.58 |  1.83    5.91 |  2.83    3.05 |  3.83    2.17


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--------------------
| MODIFY STORM     |    MODIFYING PARAMETERS
--------------------    Time shift  (min)    =  0.00

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

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--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   3.50
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  19.90
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      2.03          1.47
     Dep. Storage     (mm)=      1.70          5.00
     Average Slope     (%)=      4.00          4.00
     Length            (m)=    152.75         20.00
     Mannings n            =     0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25         14.09
               over (min)        5.00         10.00
     Storage Coeff.  (min)=      1.05 (ii)     8.38 (ii)
     Unit Hyd. Tpeak (min)=      5.00         10.00
     Unit Hyd. peak  (cms)=      0.34          0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.01          0.00          0.017 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.42          1.33
     RUNOFF VOLUME    (mm)=     23.50          5.88         11.23
     TOTAL RAINFALL   (mm)=     25.00         25.00         25.00
     RUNOFF COEFFICIENT   =      0.94          0.24          0.45

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.80   Dir. Conn.(%)=  15.40
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.08          0.18
     Dep. Storage     (mm)=      1.50          5.00
     Average Slope     (%)=      4.00         10.00
     Length            (m)=     41.63         30.00
     Mannings n            =     0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25         14.80
               over (min)        5.00         10.00
     Storage Coeff.  (min)=      1.18 (ii)     9.05 (ii)
     Unit Hyd. Tpeak (min)=      5.00         10.00
     Unit Hyd. peak  (cms)=      0.33          0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.01          0.00          0.011 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.42          1.33
     RUNOFF VOLUME    (mm)=     23.50          6.00          8.67
     TOTAL RAINFALL   (mm)=     25.00         25.00         25.00
     RUNOFF COEFFICIENT   =      0.94          0.24          0.35

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  80.0     Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0026)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
       ID1= 1 (  0017):     0.26   0.011     1.33      8.67
     + ID2= 2 (  0201):     3.50   0.207     1.33     11.84
       ==========================================================
       ID = 3 (  0026):     3.76   0.218     1.33     11.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD  (  0026)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
       ID1= 3 (  0026):     3.76   0.218     1.33     11.62
     + ID2= 2 (  0027):     0.26   0.017     1.33     11.23
       ==========================================================
       ID = 1 (  0026):     4.02   0.235     1.33     11.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0022)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  0.0130     0.0540
                         0.0030     0.0020    |  0.1100     0.0720
                         0.0090     0.0160    |  0.4340     0.0980
                         0.0090     0.0210    |  0.5160     0.1030
                         0.0100     0.0260    |  0.6920     0.1140
                         0.0120     0.0390    |  1.8600     0.1540

                              AREA     QPEAK     TPEAK      R.V.
                               (ha)     (cms)     (hrs)      (mm)
     INFLOW : ID= 2 (  0026)     4.020     0.235      1.33      11.59
     OUTFLOW: ID= 1 (  0022)     4.020     0.011      4.00      11.56
     OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00       0.00

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.86
                    TIME SHIFT OF PEAK FLOW          (min)=160.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0352

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  --------------------------
  | Junction Command(0024) |
  --------------------------

                              AREA     QPEAK    TPEAK     R.V.
                               (ha)     (cms)    (hrs)     (mm)
     INFLOW : ID= 3(  0022)     0.00     0.00     0.00      0.00
     OUTFLOW: ID= 2(  0024)     0.00     0.00     0.00      0.00

  --------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   2.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.70   Dir. Conn.(%)=   0.50
--------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.91          1.57
     Dep. Storage     (mm)=      1.00          5.00
     Average Slope     (%)=      2.00          4.00
     Length            (m)=    128.58         30.00
     Mannings n            =     0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
               0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
               0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
               0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
               0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
               0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
               0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
               0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
               0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
               0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
               0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
               1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25         26.34
               over (min)        5.00         15.00
     Storage Coeff.  (min)=      2.86 (ii)    11.09 (ii)
     Unit Hyd. Tpeak (min)=      5.00         15.00
     Unit Hyd. peak  (cms)=      0.28          0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.00          0.06          0.064 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.50          1.50
     RUNOFF VOLUME    (mm)=     24.00          7.65          7.73
```

```
     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =       0.96         0.31           0.31

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0     Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0202):     2.48   0.064     1.50     7.73
     + ID2= 2 (  0022):     4.02   0.011     4.00    11.56
       ==========================================================
       ID = 3 (  0003):     6.50   0.073     1.50    10.10

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

--------------------
| ADD HYD  (  0003)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0024 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
       ID1= 3 (  0003):     6.50   0.073     1.50    10.10
     + ID2= 2 (  0024):     0.00   0.000     0.00     0.00
       ==========================================================
       ID = 1 (  0003):     6.50   0.073     1.50    10.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.46
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.40   Dir. Conn.(%)=  21.70
--------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.14          0.32
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=       2.00          4.00
     Length            (m)=      55.38         20.00
     Mannings n            =      0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
             0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
             0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
             0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
             0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
             0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
             0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
             0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
             0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
             0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
             0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
             1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25         12.01
               over (min)        5.00         15.00
     Storage Coeff.  (min)=      1.73 (ii)    10.56 (ii)
     Unit Hyd. Tpeak (min)=      5.00         15.00
     Unit Hyd. peak  (cms)=      0.32          0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.02          0.01          0.021 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.50          1.33
     RUNOFF VOLUME    (mm)=     23.50          5.49          9.38
     TOTAL RAINFALL   (mm)=     25.00         25.00         25.00
     RUNOFF COEFFICIENT   =      0.94          0.22          0.38

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0     Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   5.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  20.70
--------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.57          3.65
     Dep. Storage     (mm)=       1.50          5.00
     Average Slope     (%)=      10.00         10.00
     Length            (m)=     186.55         30.00
     Mannings n            =      0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    1.84 | 1.083    9.52 | 2.083    3.78 |  3.08    2.14
             0.167    1.84 | 1.167    9.52 | 2.167    3.78 |  3.17    2.14
             0.250    2.07 | 1.250   65.25 | 2.250    3.32 |  3.25    2.01
             0.333    2.07 | 1.333   65.25 | 2.333    3.32 |  3.33    2.01
             0.417    2.38 | 1.417   11.81 | 2.417    2.97 |  3.42    1.89
             0.500    2.38 | 1.500   11.81 | 2.500    2.97 |  3.50    1.89
             0.583    2.83 | 1.583    7.25 | 2.583    2.69 |  3.58    1.79
             0.667    2.83 | 1.667    7.25 | 2.667    2.69 |  3.67    1.79
             0.750    3.55 | 1.750    5.44 | 2.750    2.47 |  3.75    1.70
             0.833    3.55 | 1.833    5.44 | 2.833    2.47 |  3.83    1.70
             0.917    4.94 | 1.917    4.44 | 2.917    2.29 |  3.92    1.63
             1.000    4.94 | 2.000    4.44 | 3.000    2.29 |  4.00    1.63

     Max.Eff.Inten.(mm/hr)=      65.25         12.23
               over (min)        5.00         15.00
     Storage Coeff.  (min)=      2.21 (ii)    10.70 (ii)
     Unit Hyd. Tpeak (min)=      5.00         15.00
     Unit Hyd. peak  (cms)=      0.30          0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.19          0.07          0.223 (iii)
     TIME TO PEAK    (hrs)=      1.33          1.50          1.33
     RUNOFF VOLUME    (mm)=     23.50          5.53          9.25
     TOTAL RAINFALL   (mm)=     25.00         25.00         25.00
     RUNOFF COEFFICIENT   =      0.94          0.22          0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0     Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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APPENDIX F

Water Treatment Train Calculations

CROZIER
CONSULTING ENGINEERS

Project: 11 Main Street
Project No.: 2366-6537
Prepared By: BP
Date: 20234.03.08

WATER QUALITY CALCULATIONS (TREATMENT TRAIN)			
Catchment ID	LID	TSS removal	Combined TSS Removal
1	EF08 SYSTEM	50.0	80.0
	Dry Pond	60.0	

Note: The TSS removal values were calculated using the New Jersey Treatment train equation. Although the EF08 system is designed to provide higher treatment rates than those shown above the rates shown above are representative of the long term treatment provided by these systems.

Treatment Train Approach:

$$R = A + B - [(A \times B) / 100] \qquad \text{(Equation 4-1)}$$

Where:

R = Total TSS Removal Rate

A = TSS Removal Rate of the First or Upstream BMP

B = TSS Removal Rate of the Second or Downstream BMP

*Per 'New Jersey Stormwater Best Management Practices Manual' Equation 4-1 (February 2004)

TSS Removal:

EF08 (Rate 1) = 50 %

Dry Pond (Rate 2) = 60 %

Removal at end of treatment train:

R_3 = Rate 1 + Rate 2 - [(Rate 1 x Rate 2)/100]

R_{total} = 80.0 %

*It should be noted that following treatment from the OGS and Dry Pond the runoff will outlet through a level spreader and then travel 30 meters overland which will provide additional TSS removal.

Stormceptor®

Rinker MATERIALS™

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

11/15/2024

Province:	Ontario
City:	Puslinch
Nearest Rainfall Station:	WATERLOO WELLINGTON AP
Climate Station Id:	6149387
Years of Rainfall Data:	34

Site Name:	11 Main Street

Drainage Area (ha):	4.02
% Imperviousness:	55.20

Runoff Coefficient 'c': 0.63

Particle Size Distribution:	CA ETV
Target TSS Removal (%):	50.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	96.14
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	439.70
Influent TSS Concentration (mg/L):	
Estimated Average Annual Sediment Volume (L/yr):	1262

Project Name:	11 Main Street
Project Number:	66114
Designer Name:	Cole Martin
Designer Company:	C.F. Crozier & Associates Inc.
Designer Email:	cmartin@cfcrozier.ca
Designer Phone:	289-204-8239
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	33
EFO6	43
EFO8	50
EFO10	55
EFO12	58

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 50

Water Quality Runoff Volume Capture (%): > 90

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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 patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity 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 waterways.

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.

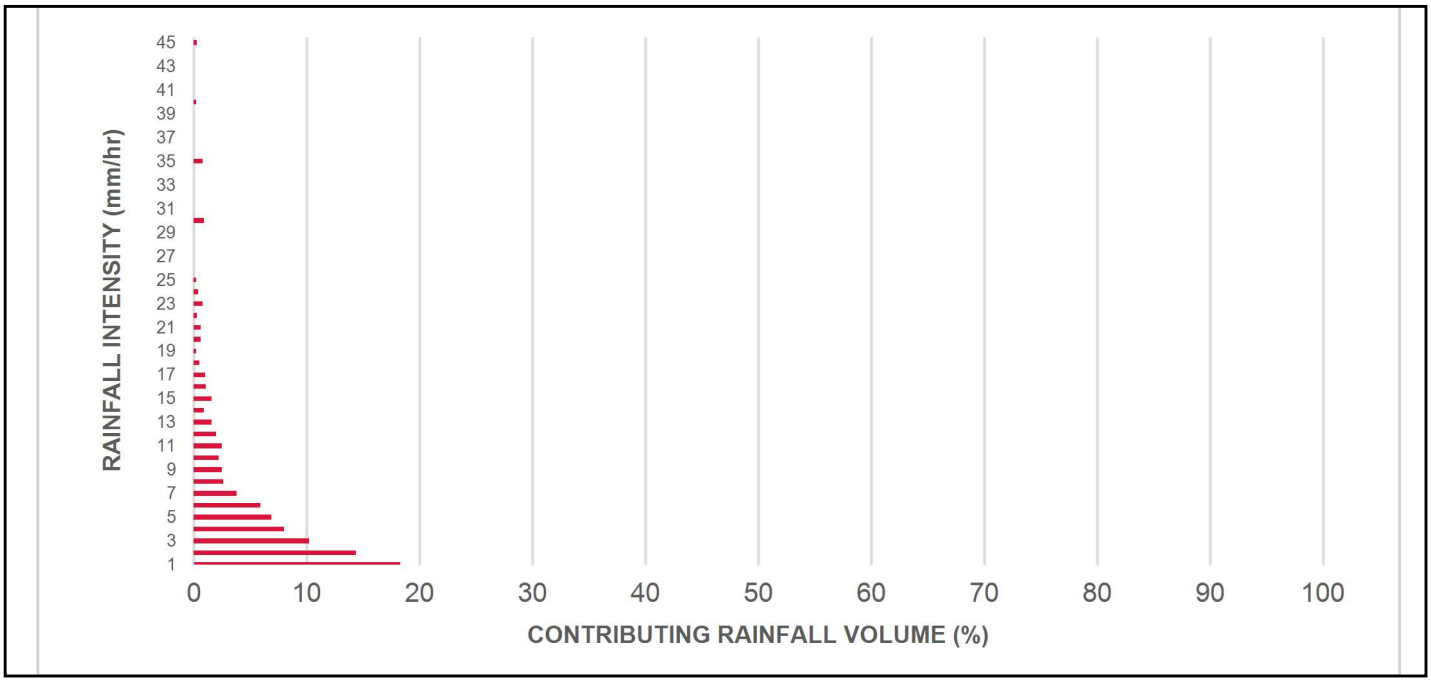
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

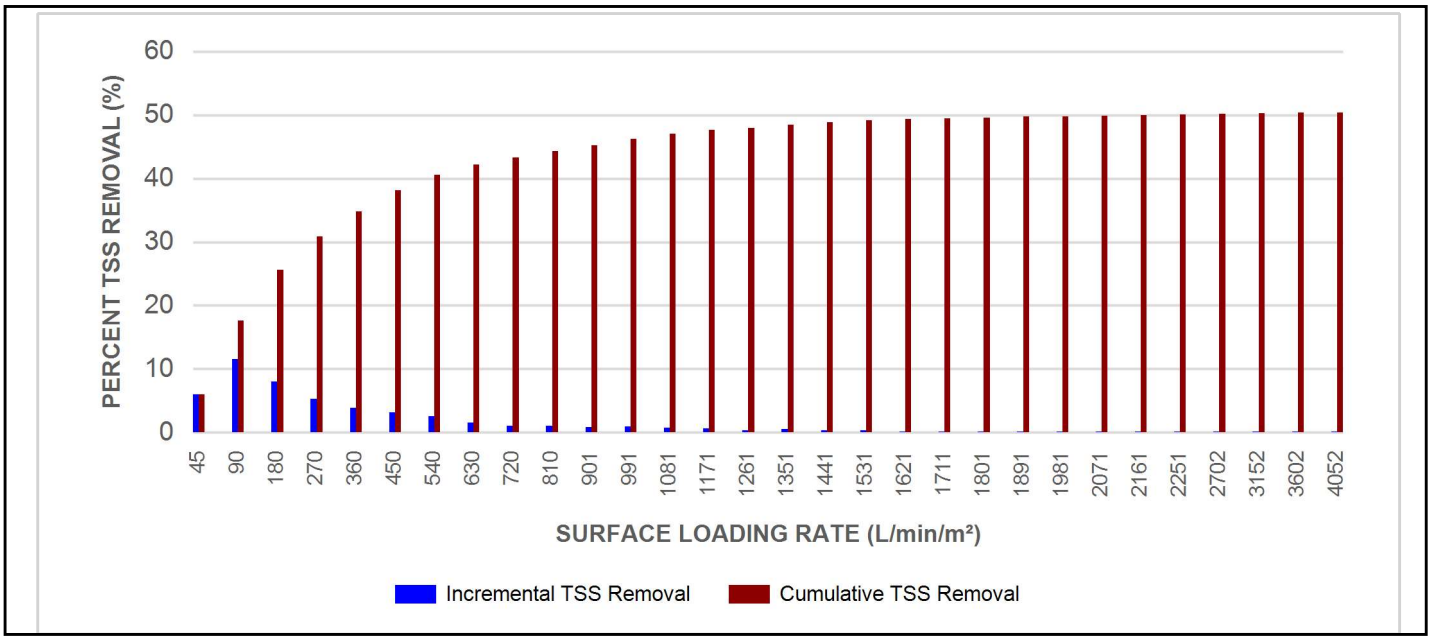
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.5	8.5	3.53	212.0	45.0	70	6.0	6.0
1.00	18.3	26.8	7.05	423.0	90.0	63	11.6	17.6
2.00	14.4	41.3	14.11	846.0	180.0	56	8.0	25.6
3.00	10.2	51.5	21.16	1270.0	270.0	52	5.3	30.9
4.00	8.0	59.5	28.22	1693.0	360.0	49	3.9	34.8
5.00	6.9	66.4	35.27	2116.0	450.0	47	3.2	38.1
6.00	5.9	72.3	42.32	2539.0	540.0	44	2.6	40.6
7.00	3.8	76.1	49.38	2963.0	630.0	42	1.6	42.2
8.00	2.6	78.7	56.43	3386.0	720.0	41	1.1	43.3
9.00	2.5	81.1	63.49	3809.0	810.0	41	1.0	44.3
10.00	2.2	83.3	70.54	4232.0	901.0	41	0.9	45.2
11.00	2.5	85.8	77.59	4656.0	991.0	40	1.0	46.2
12.00	2.0	87.8	84.65	5079.0	1081.0	39	0.8	47.0
13.00	1.6	89.4	91.70	5502.0	1171.0	37	0.6	47.6
14.00	0.9	90.4	98.76	5925.0	1261.0	36	0.3	47.9
15.00	1.6	91.9	105.81	6349.0	1351.0	35	0.5	48.4
16.00	1.1	93.0	112.86	6772.0	1441.0	33	0.4	48.8
17.00	1.0	94.0	119.92	7195.0	1531.0	31	0.3	49.1
18.00	0.5	94.6	126.97	7618.0	1621.0	29	0.2	49.3
19.00	0.2	94.8	134.03	8042.0	1711.0	28	0.1	49.4
20.00	0.6	95.4	141.08	8465.0	1801.0	26	0.2	49.5
21.00	0.6	96.1	148.13	8888.0	1891.0	25	0.2	49.7
22.00	0.3	96.4	155.19	9311.0	1981.0	24	0.1	49.7
23.00	0.8	97.2	162.24	9735.0	2071.0	23	0.2	49.9
24.00	0.4	97.6	169.30	10158.0	2161.0	22	0.1	50.0
25.00	0.2	97.8	176.35	10581.0	2251.0	21	0.0	50.1
30.00	0.9	98.7	211.62	12697.0	2702.0	18	0.2	50.2
35.00	0.8	99.5	246.89	14813.0	3152.0	15	0.1	50.3
40.00	0.2	99.7	282.16	16930.0	3602.0	13	0.0	50.4
45.00	0.3	100.0	317.43	19046.0	4052.0	12	0.0	50.4
Estimated Net Annual Sediment (TSS) Load Reduction =								**50 %**

Climate Station ID: 6149387 *Years of Rainfall Data*: 34

RAINFALL DATA FROM WATERLOO WELLINGTON AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

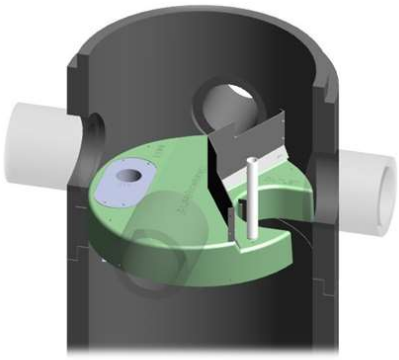
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test 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.

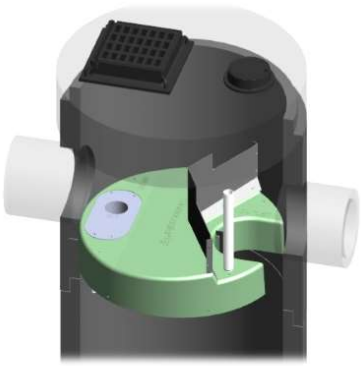
DESIGN FLEXIBILITY

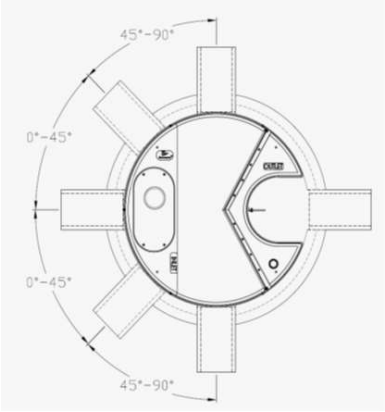
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend 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 re-entrainment 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.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, 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 and maintenance	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

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24	2600	26

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:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

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

3.2 SIZING METHODOLOGY

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

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

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

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

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

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

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

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 re-entrainment 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/m^2 to 2600 L/min/m^2) 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.

APPENDIX G

Conservation Halton Email Excerpts

Daniel Caberlin

From: Ola Panczyk <opanczyk@hrca.on.ca>
Sent: August 1, 2023 2:57 PM
To: Brendan Walton; Janet Engel
Cc: Kayly Robbins; Brett Pond
Subject: RE: [EXTERNAL]11 Main Street, Morriston | Floodplain Study Follow-up (CFCA 2366-6537)

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Filed to Sharepoint

Hi Brendan,

Thank you for your patience while we reviewed the overlay in relation to CH's hydraulic model.

For this specific site, based on the quality of the existing model and the location of the proposed development, CH has no objection to the use of CH's HEC-RAS model for the purposes of delineating the flood hazard limit. Please ensure a topographic survey is included in the future submission, which delineates the flood hazard based on the elevations from the HEC-RAS model.

Please note that any changes to the location of the proposed development may require updated flood hazard modelling.

If you have any questions, please let me know.

Thank you,
Ola

Ola Panczyk
Environmental Planner

2596 Britannia Road West, Burlington, ON L7P 0G3
905.336.1158 ext.2279 | opanczyk@hrca.on.ca
conservationhalton.ca

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From: Brendan Walton <bwalton@cfcrozier.ca>
Sent: Tuesday, July 18, 2023 1:31 PM
To: Ola Panczyk <opanczyk@hrca.on.ca>; Janet Engel <jengel@hrca.on.ca>
Cc: Kayly Robbins <krobbins@westonconsulting.com>; Brett Pond <bpond@cfcrozier.ca>
Subject: RE: [EXTERNAL]11 Main Street, Morriston | Floodplain Study Follow-up (CFCA 2366-6537)

Hi Ola,

Thank you for confirming. We look forward to CH's feedback next week.

Kind regards,

Brendan

Brendan Walton, P.Eng.
Project Manager, Land Development
Office: 548.708.0022
Collingwood | Milton | Toronto | Bradford | Guelph

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LINKEDIN | INSTAGRAM | FACEBOOK | TWITTER

From: Ola Panczyk <opanczyk@hrca.on.ca>
Sent: Monday, July 17, 2023 10:37 AM
To: Brendan Walton <bwalton@cfcrozier.ca>; Janet Engel <jengel@hrca.on.ca>
Cc: Kayly Robbins <krobbins@westonconsulting.com>; Brett Pond <bpond@cfcrozier.ca>
Subject: RE: [EXTERNAL]11 Main Street, Morriston | Floodplain Study Follow-up (CFCA 2366-6537)

Hi Brendan,

Confirming receipt of your email. Thanks for providing the overlay. We will take a look and discuss internally. We will aim to get back to you next week.

Kind regards,
Ola

Ola Panczyk
Environmental Planner

2596 Britannia Road West, Burlington, ON L7P 0G3
905.336.1158 ext.2279 | opanczyk@hrca.on.ca
conservationhalton.ca

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From: Brendan Walton <bwalton@cfcrozier.ca>
Sent: Wednesday, July 12, 2023 1:13 PM
To: Ola Panczyk <opanczyk@hrca.on.ca>; Janet Engel <jengel@hrca.on.ca>
Cc: Kayly Robbins <krobbins@westonconsulting.com>; Brett Pond <bpond@cfcrozier.ca>
Subject: [EXTERNAL]11 Main Street, Morriston | Floodplain Study Follow-up (CFCA 2366-6537)

Good afternoon Ola, Janet,

Thank you again for meeting with us last week regarding this project. It was nice catching up with each of you!

As requested, please see attached overlay figure that outlines the Regional floodplain and 15.0 m set-back near Highway 6 on a satellite image. As discussed on the call, we believe a detailed hydrologic/hydraulic floodplain assessment for the proposed development is not required considering the floodplain (dark blue solid line) and associated set-back (red solid line) are sufficiently far enough away from the proposed dwellings and building envelopes (black dashed lines). There are also environmental features (i.e., wetland, woodlot) located outside of the floodplain that further increase the separation distance from the Regional floodplain.

Upon your review, please let us know if you have any questions or would like to discuss. We are happy to have a follow up discussion too if helpful.

Kind regards,

Brendan

Brendan Walton, P.Eng.
Project Manager, Land Development
Office: 548.708.0022
Collingwood | Milton | Toronto | Bradford | Guelph

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APPENDIX H

Site Photos

2024/11/01 - Site Photo of Earth Berm located at southern limits of Old Morriston Baseball Diamond (EX1)

2024/11/01 - Site Photo of general slope of Old Morriston Baseball Diamond (EX1) - Photo taken looking west

FIGURES

Figure 1: Preliminary Site Servicing Plan (East)
Figure 2: Preliminary Site Servicing Plan (West)
Figure 3: Preliminary Site Grading Plan (East)
Figure 4: Preliminary Site Grading Plan (West)
Figure 5: External Grading Plan (Ochs Street)
Figure 6: Pre-Development Drainage Plan
Figure 7: Post-Development Drainage Plan
Figure 8: Storm Design Sheet Drainage Plan

SEE DWG. FIG. 2

STREET A

STM MH 9
T/G 323.66
NW INV 320.60
NE INV 320.23

STM CB 24
T/G 323.51
SE INV 321.15

STM CB 26
T/G 322.70
SW INV 321.40

STM DCBMH 10
T/G 323.99
SE INV 320.97
SW INV 321.47

STM CBMH 8
T/G 323.49
SW INV 319.92
NW INV 321.00
NE INV 319.32

STM CBMH 7
T/G 321.41
NE INV 317.52
NW INV 318.02
SW INV 317.62

STM CB 23
T/G 321.69
SE INV 318.17

STM CBMH 6
T/G 318.05
NE INV 315.90
SW INV 316.40
NW INV 315.90

STM CBMH 22
T/G 318.34
SE INV 316.05
W INV 316.10

STM MH 5
T/G 317.47
SE INV 314.99
SW INV 315.60

STM CB 27
T/G 316.89
E INV 316.17

STM CBMH 4
T/G 315.34
SE INV 313.46
NW INV 313.81
NE INV 313.51

STM CB 21
T/G 315.34
SW INV 313.66

STM MH 3
T/G 314.93
S INV 312.98
NW INV 313.03

STM DCB 17
T/G 314.47
E INV 312.90

STM DCBMH 2
T/G 314.48
E INV 312.71
W INV 312.86
S INV 312.86
N INV 312.76

STM HW 1
T/G 314.25
NW INV 312.62

STM HW 2
T/G 313.50
NE INV 312.35

STM MH 1
T/G 314.31
SW INV 312.24
NE INV 312.00

STM OGS
T/G 314.71
E INV 312.65
W INV 312.68

STM MH 11
T/G 315.06
S INV 313.06
N INV 313.01

STM HW 3
T/G 312.15
SW INV 311.00

STM CB 20
T/G 317.76
SE INV 316.40

STM CBMH 19
T/G 318.39
SE INV 316.31
NW INV 316.36

STM CB 18
T/G 316.20
E INV 314.57

STM CBMH 13
T/G 318.39
SW INV 315.69
NW INV 316.16
NE INV 315.65

STM CBMH 12
T/G 316.08
SW INV 314.02
N INV 313.79
W INV 314.29

PROPOSED FIRE WATER RESERVOIR. DESIGN OF SYSTEM TO BE FINALIZED DURING DETAILED DESIGN.

FIRE WATER RESERVOIR TO HOLD A VOLUME OF 89.4m3

7.4m–300mmø STM @ 2.0%
3.7m–300mmø STM @ 3.4%
17.4m–300mmø STM @ 2.1%
11.1m–300mmø STM @ 2.8%
7.4m–300mmø STM @ 2.0%
56.0m–300mmø STM @ 3.0%
55.9m–300mmø STM @ 2.0%
14.6m–300mmø STM @ 0.5%
7.4m–375mmø STM @ 2.0%
9.9m–450mmø STM @ 3.0%
39.3m–450mmø STM @ 3.0%
7.5m–300mmø STM @ 2.0%
14.2m–525mmø STM @ 3.0%
7.3m–300mmø STM @ 0.5%
39.6m–675mmø STM @ 0.4%
4.7m–750mmø STM @ 0.6%
34.6m–600mmø STM @ 0.6%
11.5m–750mmø STM @ 1.0%
5.6m–750mmø STM @ 0.5%
9.2m–300mmø STM @ 3.0%
42.0m–525mmø STM @ 1.7%
90.7m–450mmø STM @ 1.8%
4.2m–300mmø STM @ 1.0%
7.4m–300mmø STM @ 2.0%
49.4m–450mmø STM @ 2.0%
TWIN

368m² x 1m DEEP UNDERGROUND GRAVEL DIAPHRAGM L.I.D.

PROPOSED RIP–RAP SPILLWAY C/W FILTER CLOTH; TERRAFIX 270R OR APPROVED EQUIVALENT

PROPOSED LEVEL SPREADER AT STORM SEWER OUTLET

PROPOSED RIP–RAP SPILLWAY C/W FILTER CLOTH; TERRAFIX 270R OR APPROVED EQUIVALENT

PROPOSED DRILLED WELL WITH 15.0m OBC SETBACK

PROPOSED 360m² (TYP.) DWELLING ENVELOPE

PROPOSED TYPE A DISPERSAL BED 368 m² (TYP.)

STAKED WOODLOT SURVEYED SEPT 20, 2022 BY COLVILLE CONSULTING INC.

EDGE OF TREES

OHP005 OHP020 OHP025 OVERHANG

125.45S

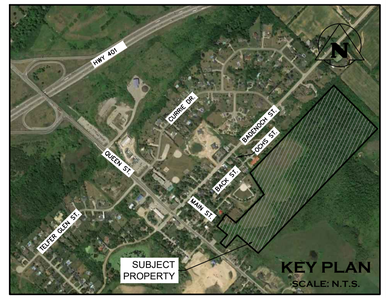
N32°52'30"W

10.0

SCALE: 1:500

N

CONST. ENT.



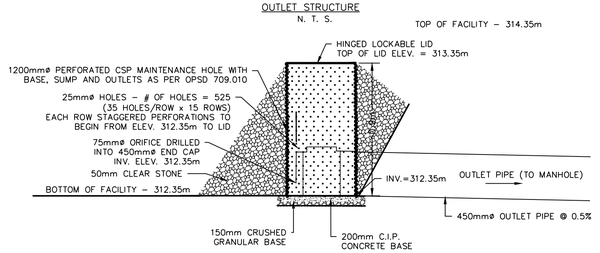
LEGEND

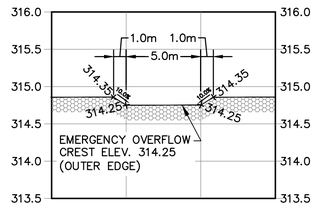
- PROPERTY LINE
- EXISTING CONTOUR (1.0m)
- x215.00 EXISTING GRADE
- STAKED WOODLOT BY COLVILLE CONSULTING INC. (SEPT 20, 2022)
- CONCEPTUAL 360 m² BUILDING ENVELOPE
- PROPOSED TYPE A DISPERSAL BED 368 m²
- (W) CONCEPTUAL PROPOSED DRILLED WELL LOCATION C/W 15.0m OBC SETBACK
- PROPOSED STORM MANHOLE
- PROPOSED MANHOLE CATCHBASIN
- PROPOSED CATCHBASIN / DOUBLE CATCHBASIN

NOTES:

1. PROPOSED DRIVEWAY LOCATIONS AND APRONS TO BE CONFIRMED DURING DESIGN PROCESS.

DETAIL 3
OUTLET STRUCTURE
N. T. S.





No.	ISSUE / REVISION	YYYY/MMM/DD
3	ISSUED FOR FOURTH SUBMISSION (ZBA/OPA)	2024/NOV/15
2	ISSUED FOR THIRD SUBMISSION (ZBA/OPA)	2024/AUG/29
1	ISSUED FOR SECOND SUBMISSION (ZBA)	2023/DEC/20
0	ISSUED ZBA AND DPS APPLICATIONS	2023/FEB/17

ELEVATION NOTE:

ELEVATIONS HEREON ARE GEODETIC (CGVD–1928:78) AND ARE DERIVED FROM GNSS OBSERVATIONS USING NATURAL RESOURCES CANADA'S GEOID MODEL HT_2.0 ON.

SURVEY NOTES:

SURVEY COMPLETED BY J.D. BARNES LTD. (2023/JAN/31)
DRAWING FILE No.: 22–14–718–00–TOPO

BEARINGS ARE UTM GRID, DERIVED FROM RTN OBSERVATIONS
UTM ZONE 17, NAD83 (CSRS) (2010.0)

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9996781

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY WESTON CONSULTING INC.
DRAWING No. 10779 CONCEPTS/C2_2022–03–16
DATE RECEIVED 2023/FEB/06

DRAWING NOTES:

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THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT. DO NOT SCALE THIS DRAWING.

ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

PRELIMINARY SITE SERVICING PLAN (EAST)

Engineer

Engineer

LICENSED PROFESSIONAL ENGINEER
T. A. H. FRASER
100176040
2024.11.15
PROVINCE OF ONTARIO

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON. L9T 6P4
905 875 0026 T
905 875 4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn	M.I.M.	Design	M.I.M.	Project No.	2366–6537
Check	B.W.	Check	B.W.	Scale	1:500
				Dwg.	FIG. 1

J:\2300\2366 - WDD Main Street\6537 - 11 Main Street\CAD\Civil_Sheets\6537_FIG 1.dwg, FIG 1, 2024-11-15 4:46:34 PM, hwilkinson

SEWAGE SYSTEM NOTES

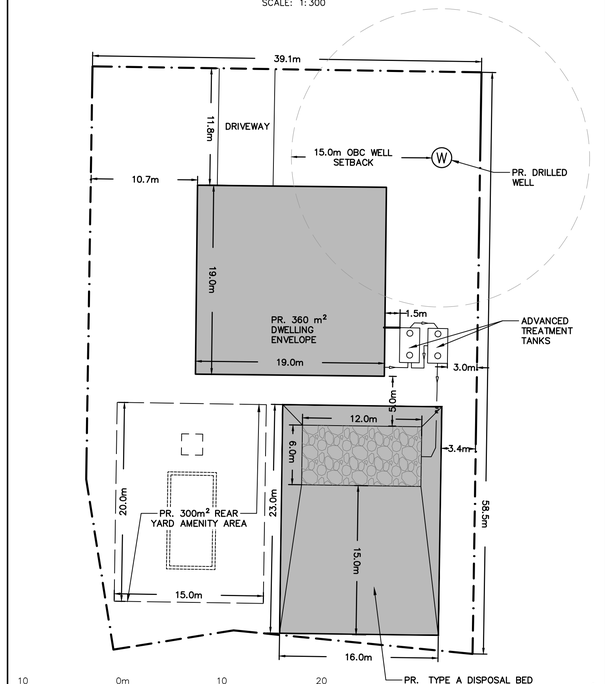
1. PROPOSED SEWAGE SYSTEM CONSTRUCTION TO BE UNDERTAKEN IN ACCORDANCE WITH THE ONTARIO BUILDING CODE, ONTARIO MINISTRY OF ENVIRONMENT, AND THE MANUFACTURER'S RECOMMENDATIONS.
2. INSTALLATION OF ALL COMPONENTS OF THE SEWAGE SYSTEM TO BE COMPLETED BY A LICENSED AND REGISTERED ONSITE SEWAGE SYSTEM INSTALLER IN THE PROVINCE OF ONTARIO.
3. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL NECESSARY INSPECTIONS WITH THE TOWN AND OTHER AUTHORITIES PERTAINING TO THE INSTALLATION OF THEIR WORK.
4. CONTRACTOR TO LOCATE ALL UNDERGROUND UTILITIES AND EXISTING SEWAGE WORKS PRIOR TO CONSTRUCTION.
5. ALL COMPONENT LOCATIONS SHALL BE FIELD VERIFIED WITH THE ENGINEER PRIOR TO INSTALLATION.
6. ALL EARTHWORKS, INCLUDING PLACEMENT OF FILL ARE TO BE UNDERTAKEN WITH TRACK MOUNTED EQUIPMENT TO KEEP COMPACTION TO A MINIMUM. KEEP ALL TRAFFIC IN THE AREA OF THE PROPOSED LEACHING BED TO A MINIMUM.
7. ALL TOPSOIL AND ORGANICS TO BE REMOVED FROM LEACHING BED AREA.
8. IF HIGH GROUNDWATER CONDITIONS ARE EVIDENT AT THE TIME OF CONSTRUCTION, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY. ALL VERTICAL CLEARANCE DISTANCES AS REQUIRED BY THE ONTARIO BUILDING CODE MUST BE MAINTAINED.
9. GRAVITY SEWERS TO HAVE MINIMUM 0.6 M COVER AND SHALL BE INSULATED WHERE LESS THAN 1.0M COVER IS PROVIDED. FORCEMAIN SHALL BE INSULATED WHERE LESS THAN 1.5 M COVER IS PROVIDED. BEDDING, COVER AND BACKFILL TO BE IN ACCORDANCE WITH OPSS.
10. UNLESS OTHERWISE NOTED PE FORCEMAIN TO BE HDPE SERIES 100 OR DR 13.5 PE AND PVC FORCEMAIN TO BE SCHEDULE 40. GRAVITY SEWERS TO BE SDR-35. FORCE MAIN TO BE PROVIDED WITH TRACER WIRE, SECURED TO THE TOP OF THE PIPE WITH WATER PROOF TAPE OR ZIP TIES.
11. ALL PIPES SUBJECT TO VEHICULAR TRAFFIC SHALL BE ADEQUATELY PROTECTED.
12. ALL METAL IN TANKS OR PUMP CHAMBERS TO BE GLAVANIZED OR STAINLESS STEEL
13. ALL JOINTS BELOW THE HIGH WATER LEVEL IN PRECAST TANKS TO BE SEALED WITH MASTIC SEALANT IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS FOR WATERTIGHT SEAL. ALL TANK INLETS AND OUTLETS TO BE EQUIPPED WITH CAST IN RUBBER BOOT FOR WATER TIGHT SEAL. UNLESS OTHERWISE NOTED ALL TANK INLETS AND OUTLETS TO BE EQUIPPED WITH TEES.
14. ALL TANKS TO BE PROVIDED WITH PRECAST CONCRETE OR PVC ACCESS RISERS TO GRADE. HATCHES TO BE BOLTED AND GASKETED AND ACCESSIBLE AT GRADE. ALL CIRCULAR HATCHES TO BE 600 MM DIAMETER POLYLOK RISER WITH CAST IN ADAPTOR. ALL SQUARE ACCESS OPENINGS TO BE EQUIPPED WITH CONCRETE RISERS. VENTED HATCHES TO BE PROVIDED ON TANKS CONTAINING PUMPS.
15. EXISTING SOILS SHALL BE SCARIFIED AT A RIGHT ANGLE TO THE DIRECTION OF LATERAL SEWAGE FLOW IN THE LEACHING BED PRIOR TO IMPORTING FILL OR INSTALLING DISTRIBUTION PIPE STONE LAYER.
16. WHEN THE IMPORTATION OF FILL IS REQUIRED, FILL SHOULD BE END-DUMPED AND GRADED PROGRESSIVELY OVER THE PREPARED SITE AREA WITH TRACK MOUNTED EQUIPMENT.
17. ALL ELEVATIONS TO BE VERIFIED PRIOR TO BACKFILL
18. ALL FILL MATERIAL PLACED BENEATH TANKS TO BE COMPACTED TO 95%.
19. ALL DISTURBED AREAS TO BE TOPSOILED (100MM MINIMUM) AND SEEDED COMPLETE WITH FERTILIZER AND MULCH IN ACCORDANCE WITH OPSS
20. THE INSTALLING CONTRACTOR SHALL INSTALL THE SEWAGE SYSTEM USING A TRANSIT/LEVEL AND SHALL PROVIDE SAME FOR INSPECTION OF ANY COMPONENT.
21. MAXIMUM BURIAL DEPTH OF TANKS NOT TO EXCEED TO MANUFACTURERS RECOMMENDATIONS
22. CLEARANCE DISTANCES FROM PROPERTY LINES, STRUCTURES, WELLS, AND SURFACE WATER WILL ADHERE TO THE REQUIREMENTS OF OBC 8.2.1.6.A
23. A LEACHING BED SHALL NOT BE LOCATED ON AN AREA WITH A SLOPE OF GREATER THAN 4 UNITS HORIZONTALLY TO 1 UNIT VERTICALLY.
24. THE HEADER LINE, DISTRIBUTION PIPES AND LEACHING BED SHALL BE EQUIPPED WITH MEANS OF DETECTION AS REQUIRED BY OBC 8.7.2.2. (2). LIGHT COLOURED PLASTIC COATED 14 GAUGE TRACER WIRE OR EPOXY COATED, 10m REBAR LAID HORIZONTALLY AT EACH CORNER OF THE BED IS ACCEPTABLE.
25. STONE TRENCH OR LAYER TO BE COVERED WITH PERMEABLE GEOTEXTILE PRIOR TO BACKFILL.
26. STONE TO CONFORM WITH OBC 8.7.3.3.
27. ALL IMPORTED SAND FILL TO HAVE A T-TIME OF 6 TO 10 MIN/CM AND A SILT/CLAY CONTENT OF NO MORE THAN 5% AND SHALL BE VERIFIED IN WRITING BY A SOIL TESTING FIRM AND APPROVED BY THE ENGINEER PRIOR TO PLACEMENT.
28. ANAEROBIC DIGESTER AND BIOFILTER BASKET PUMPS AS DESIGNED AND SUPPLIED BY WATERLOO BIOFILTER.
29. PUMP CHAMBER TO BE VENTED AND EQUIPPED WITH AUDIBLE AND VISUAL HIGH LEVEL ALARM
30. ALL VALVES TO PROVIDE NO OBSTRUCTION TO FLOW WHEN FULLY OPENED. ALL VALVES AND COUPLINGS TO BE ACCESSIBLE AT GRADE.
31. ALL PUMP FLOATS TO BE SECURED TO A REMOVABLE PVC FLOAT TREE
32. ALL PUMP CONTROL PANELS TO BE EQUIPPED WITH SEPARATE CIRCUIT BREAKERS FOR PUMP CIRCUIT
33. NO JUNCTION BOXES IN RISERS
34. ALL BURIED ELECTRICAL WIRING TO BE IN PVC CONDUIT
35. PRIOR TO ACCEPTANCE CONTRACTOR TO PROVIDE DOCUMENTATION THAT ALL ELECTRICAL WORK HAS BEEN INPSECTED AND APPROVED BY THE ELECTRICAL AUTHORITY HAVING JURISDICTION

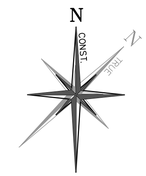
ONSITE SEWAGE SYSTEM DESIGN TYPICAL LOT NOTES

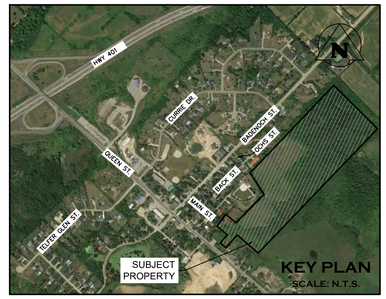
PROPOSED 4 BEDROOM, 360 m² HOME WITH FORTY-FIVE (45) FIXTURE UNITS	BASE FLOW (4 BEDROOMS)= 2,000 L/DAY ADDITIONAL FLOOR AREA (160 m2)= 1,600 L/DAY ADDITIONAL FIXTURE UNITS (25)= 1,250 L/DAY Q TOTAL (2,000+1,600)= 3,600 L/DAY
SOIL PERCOLATION RATE	T = 30 min/cm (ESTIMATED BY C.F. CROZIER)
PROPOSED TREATMENT UNIT	WATERLOO BIOFILTER AD-BA40
TYPE A DISPERSAL BED STONE AREA	MINIMUM SIZE=Q/50=3,600/50 = 72 m² PROVIDED = 72 m²
TYPE A DISPERSAL BED SAND AREA	MINIMUM SIZE=QT/400= 3,600*30/400= 270 m² PROVIDED = 270m – 368m²
SHALLOW BURIED TRENCH (LOT 1)	MINIMUM LENGTH=QT/50= 3,600/50= 72 m² PROVIDED 3 RUNS x 25m = 75 m²

TYPICAL LOT SCHEMATIC (LOT 8)

SCALE: 1:300







LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (1.0m)
- x215.00 EXISTING GRADE
- REGIONAL FLOODPLAIN (CONSERVATION HALTON)
- REGIONAL FLOODPLAIN 15.0m BUFFER
- CONSERVATION HALTON REGULATION LIMIT
- STAKED WOODLOT BY COLVILLE CONSULTING INC. (SEPT 20, 2022)
- LIMIT OF WETLAND AS CONFIRMED BY CONSERVATION HALTON STAFF (AUGUST 18, 2023)
- 30.0m SETBACK FROM LIMIT OF WETLAND AS CONFIRMED BY CONSERVATION HALTON STAFF AUGUST 18, 2023
- MEANDER BELT 38m BUFFER (19m EACH SIDE)
- CONCEPTUAL 360 m² BUILDING ENVELOPE
- PROPOSED TYPE A DISPERSAL BED 368 m²
- W CONCEPTUAL PROPOSED DRILLED WELL LOCATION C/W 15.0m OBC SETBACK
- PROPOSED STORM MANHOLE
- PROPOSED MANHOLE CATCHBASIN
- PROPOSED CATCHBASIN / DOUBLE CATCHBASIN

NOTES:

1. PROPOSED DRIVEWAY LOCATIONS AND APRONS TO BE CONFIRMED DURING DESIGN PROCESS.

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DRAWING FILE No.: 22-14-718-00-TOPO

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DRAWING No. 10779 CONCEPTS/C2_2022-03-16
DATE RECEIVED 2023/FEB/06

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Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

PRELIMINARY SITE SERVICING PLAN (WEST)

Engineer

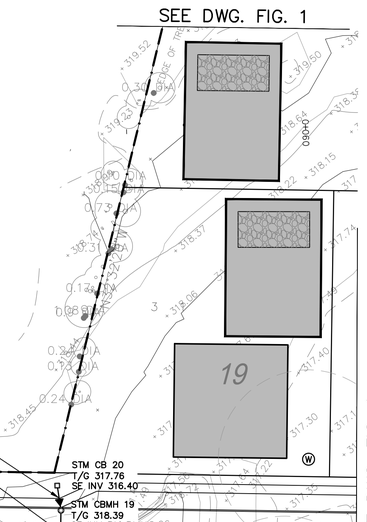
Engineer

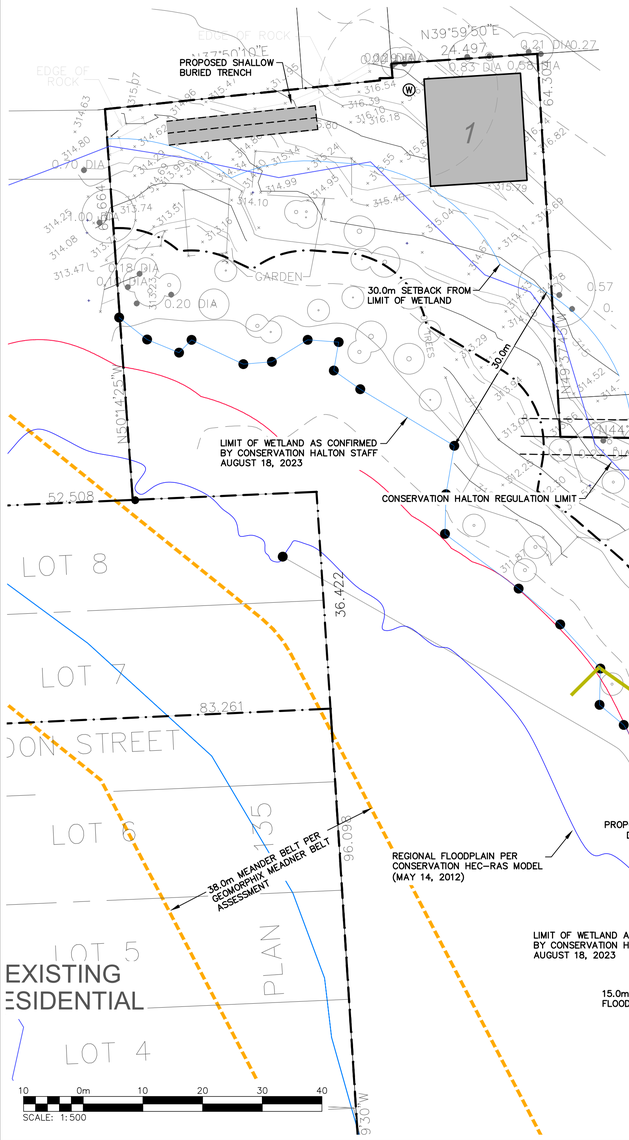
LICENSED PROFESSIONAL ENGINEER
T. A. H. FRASER
100176040
2024.11.15
PROVINCE OF ONTARIO

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905 875 0026 T
905 875 4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn	M.I.M	Design	M.I.M.	Project No.	2366-6537
Check	B.W.	Check	B.W.	Scale	1:500
				Dwg.	FIG. 2

SEE DWG. FIG. 1





J:\2300\2366 - WDD Main Street\6537 - 11 Main Street\CAD\Civil_Sheets\6537_FIG 2.dwg, FIG. 2, 2024-11-15 4:56:13 PM, hwilkinson

SEE DWG. FIG. 5

SEE DWG. FIG. 4

MATCH EXISTING GRADE AT PROPERTY LINE (TYP)

STM DCB 25 T/G 323.99

STM CB 26 T/G 322.70

STM CB 27 T/G 316.89

EX. LOCALIZED LOW AREA TO BE ADDRESSED DURING DETAILED DESIGN

STM DCBMH 10 T/G 323.99

STM CB 23 T/G 321.69

STM CBMH 22 T/G 318.34

STREET A

STM MH 9 T/G 323.66

STM CB 24 T/G 323.51

STM CBMH 8 T/G 323.49

STM CBMH 7 T/G 321.41

STM MH 5 T/G 317.47

STM CBMH 6 T/G 318.05

MATCH EXISTING GRADE AT PROPERTY LINE (TYP)

MATCH EXISTING GRADE AT PROPERTY LINE (TYP)

STM CBMH 4 T/G 315.34

STM CB 21 T/G 315.34

STM MH 3 T/G 314.93

STM DCB 17 T/G 314.47

STM DCBMH 2 T/G 314.48

STM OGS T/G 314.71

STM HW 1 T/G 314.25

STM MH 1 T/G 314.31

STM HW 2 T/G 313.50

STM HW 3 T/G 312.15

STM MH 11 T/G 315.06

PR. RIP-RAP SPILLWAY

MATCH EXISTING GRADE AT PROPERTY LINE (TYP)

PR. RIP-RAP SPILLWAY AND LEVEL SPREADER

EXTENDED DETENTION WATER LEVEL ELEVATION=313.35

REGIONAL WATER LEVEL ELEVATION=314.05

STM CB 20 T/G 317.76

STM CBMH 19 T/G 318.39

STM CBMH 13 T/G 318.39

STM CB 18 T/G 316.20

STM CBMH 12 T/G 316.08

30.0m SETBACK FROM LIMIT OF WETLAND AS CONFIRMED BY CONSERVATION HALTON STAFF AUGUST 18, 2023

MATCH EXISTING GRADE AT PROPERTY LINE (TYP)

LIMIT OF WETLAND AS CONFIRMED BY CONSERVATION HALTON STAFF AUGUST 18, 2023

4:1 MAX.

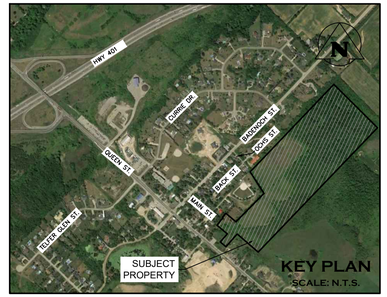
3:1 MAX.

5:1 MAX.

EDGE OF TREES

10 0m 10 20 30 40

SCALE: 1:500



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- ×215.00 PROPOSED GRADE
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- 2.0% PROPOSED MINOR FLOW DIRECTION
- PROPOSED SLOPE (3:1 MAX.)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- STAKED WOODLOT BY COLVILLE CONSULTING INC.
- PROPOSED STORM MANHOLE
- PROPOSED MANHOLE CATCHBASIN
- PROPOSED CATCHBASIN / DOUBLE CATCHBASIN

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Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

SITE GRADING PLAN (EAST)

Engineer

Engineer

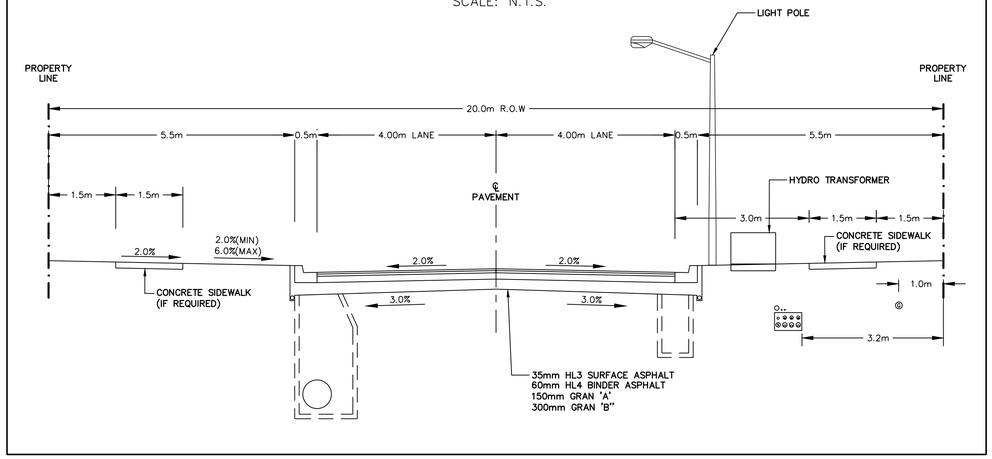
LICENSED PROFESSIONAL ENGINEER
T. A. H. FRASER
100176040
2024.11.15
PROVINCE OF ONTARIO

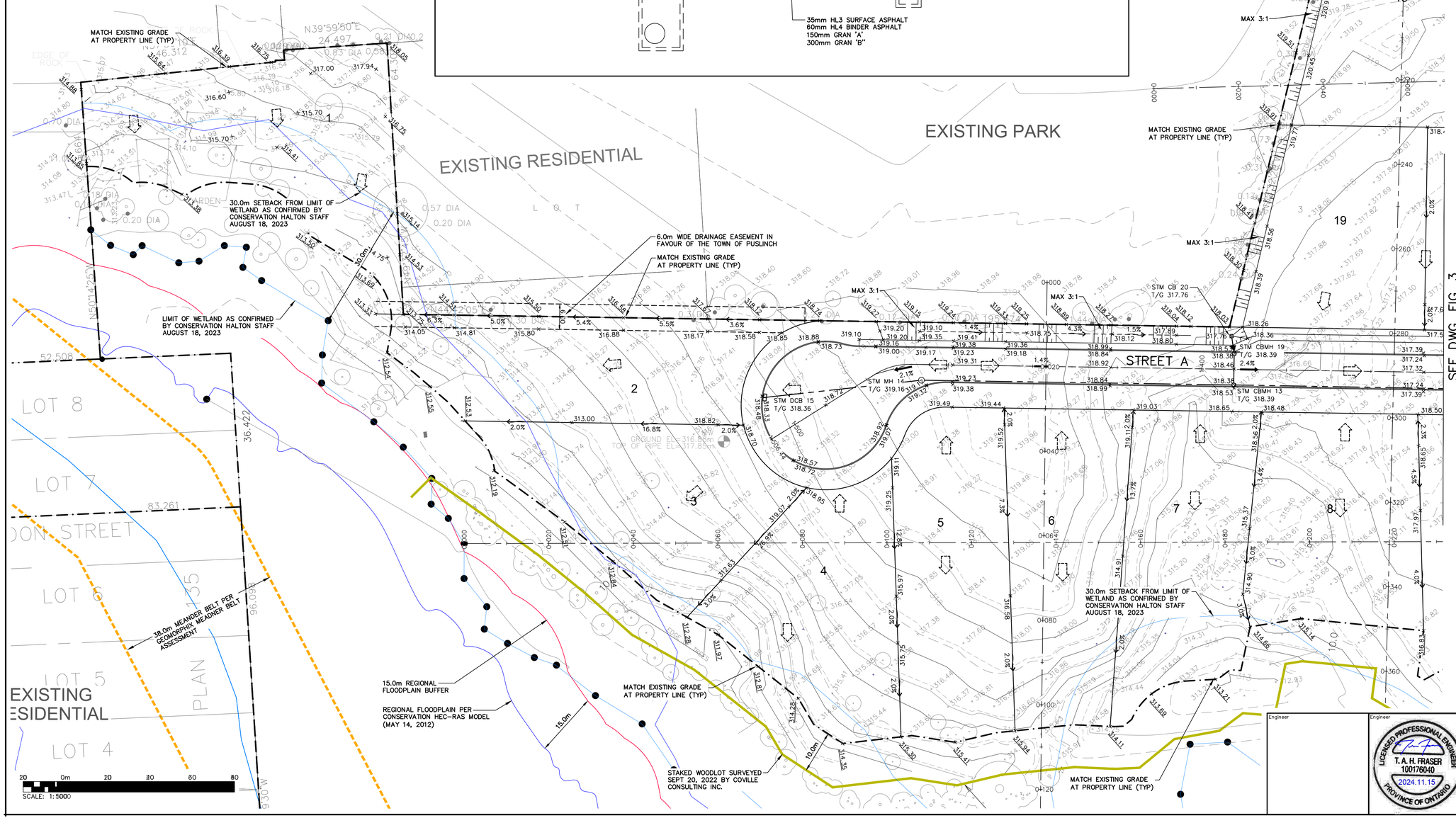
CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

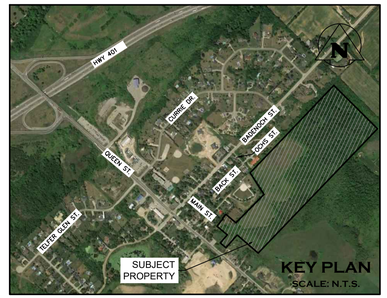
Drawn	Design	Project No.	
M.I.M	M.I.M.		2366-6537
Check	Check	Scale	Dwg.
B.W.	B.W.	1:500	FIG. 3

TYPICAL ROAD SECTION

SCALE: N.T.S.







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Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

SITE GRADING PLAN (WEST)

Engineer

Engineer

LICENSED PROFESSIONAL ENGINEER
T. A. H. FRASER
100176040
2024.11.15
PROVINCE OF ONTARIO

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905.875.0026 T
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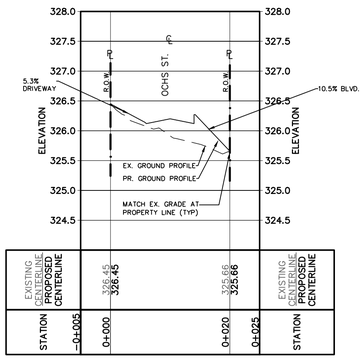
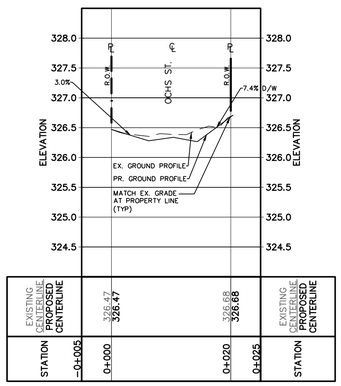
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn	M.I.M	Design	M.I.M.	Project No.	2366-6537
Check	B.W.	Check	B.W.	Scale	1:500
				Dwg.	FIG. 4

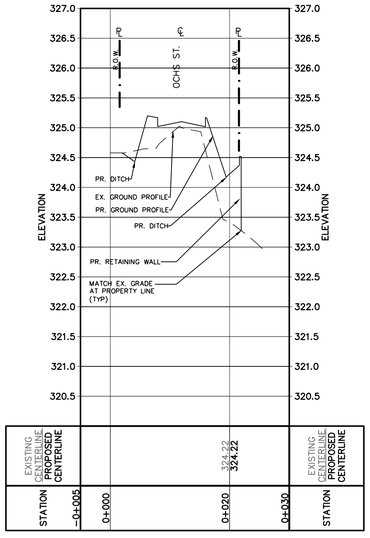
SECTION A

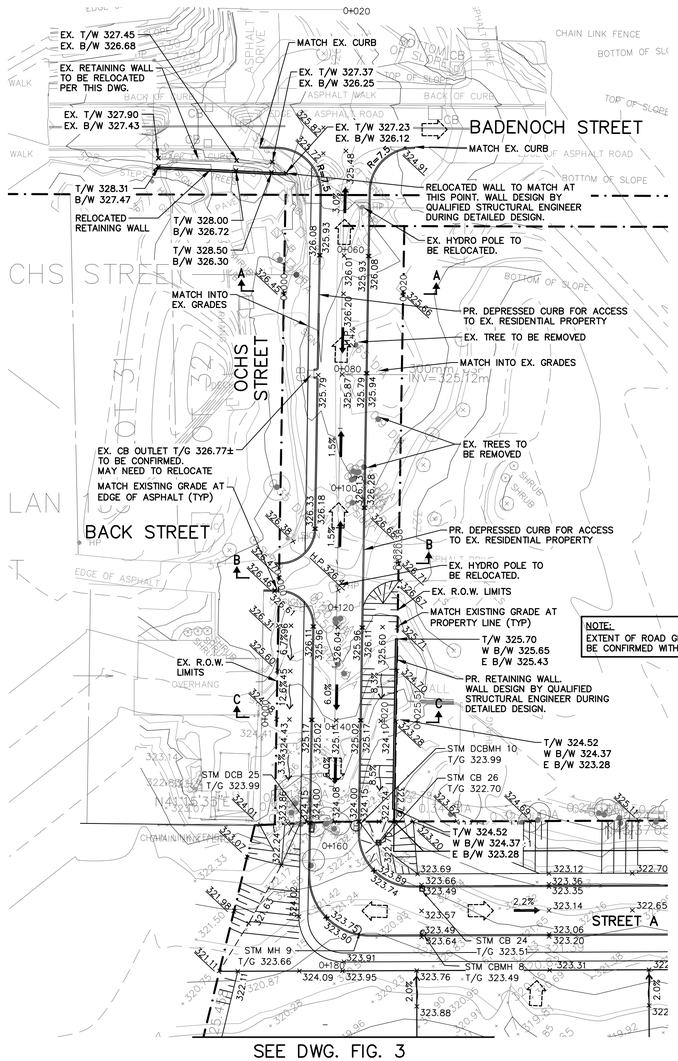


SECTION B

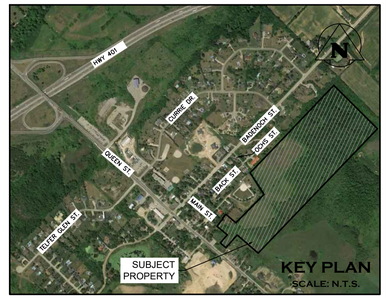


SECTION C





SEE DWG. FIG. 3



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- 2.0% PROPOSED MINOR FLOW DIRECTION
- PROPOSED SLOPE (3:1 MAX.)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION

NOTE:

EXTERNAL OF OCHS STREET IS FOR SCHEMATIC PURPOSES ONLY. DETAILED DESIGN OF OCHS STREET TO BE COMPLETED THROUGH CONSULTATION WITH THE TOWNSHIP DURING SUBSEQUENT PLANNING APPLICATION.

EXTERNAL DRAINAGE FROM PRIVATE LOTS TO BE CONVEYED AS PART OF THESE ROAD IMPROVEMENTS.

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Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

EXTERNAL GRADING PLAN (OCHS STREET)

10 0m 10 20 30 40
SCALE: 1:500

Engineer

Engineer

LICENSED PROFESSIONAL ENGINEER
T. A. H. FRASER
100176040
2024.11.15
PROVINCE OF ONTARIO

CROZIER CONSULTING ENGINEERS
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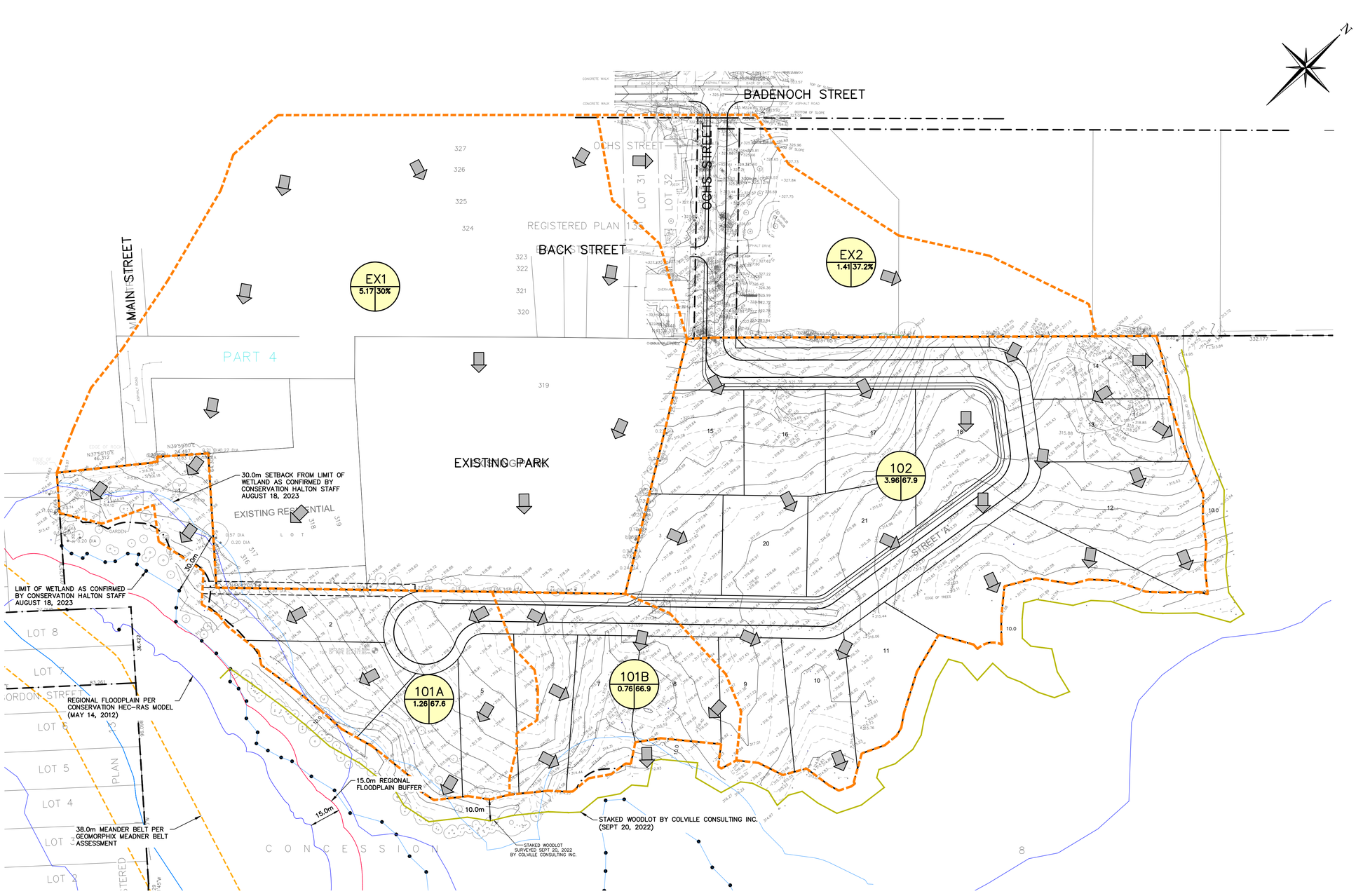
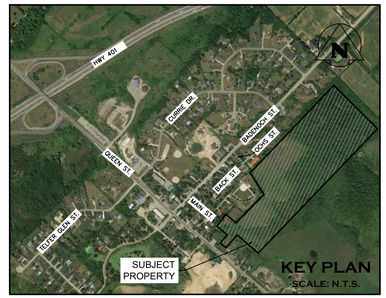
Drawn	M.I.M	Design	M.I.M.	Project No.	2366-6537
Check	B.W.	Check	B.W.	Scale	1:500
				Dwg.	FIG. 5

J:\2300\2366 - WDD Main Street\6537 - 11 Main Street\CAD\Civil_Sheets\6537_FIG 5.dwg, FIG. 5, 2024-11-15 4:51:47 PM, hwilkinson





LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING OVERLAND FLOW DIRECTION
- PRE-DEVELOPMENT STORM DRAINAGE CATCHMENT
- REGIONAL FLOODPLAIN (CONSERVATION HALTON)
- REGIONAL FLOODPLAIN 15.0m BUFFER
- CONSERVATION HALTON REGULATION LIMIT
- STAKED WOODLOT BY COLVILLE CONSULTING INC. (SEPT 20, 2022)
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- MEANDER BELT 38m BUFFER (19m EACH SIDE)
- ID / AREA (ha) | PERCENT IMPERVIOUS — CATCHMENT I.D.
- ID / AREA (ha) | RUNOFF CO-EFFICIENT — CATCHMENT I.D.

No.	ISSUE / REVISION	YYYY/MMM/DD
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0	ISSUED ZBA AND DPS APPLICATIONS	2023/FEB/17

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SURVEY NOTES:

SURVEY COMPLETED BY J.D. BARNES LTD. (2023/JAN/31)
DRAWING FILE No.: 22-14-718-00-TOPO

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UTM ZONE 17, NAD83 (CSRS) (2010.0)

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DRAWING No. 10779 CONCEPTS/C2_2022-03-16
DATE RECEIVED 2023/FEB/06

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Project

11 MAIN STREET
TOWN OF PUSLINCH

Drawing

PRE-DEVELOPMENT DRAINAGE PLAN

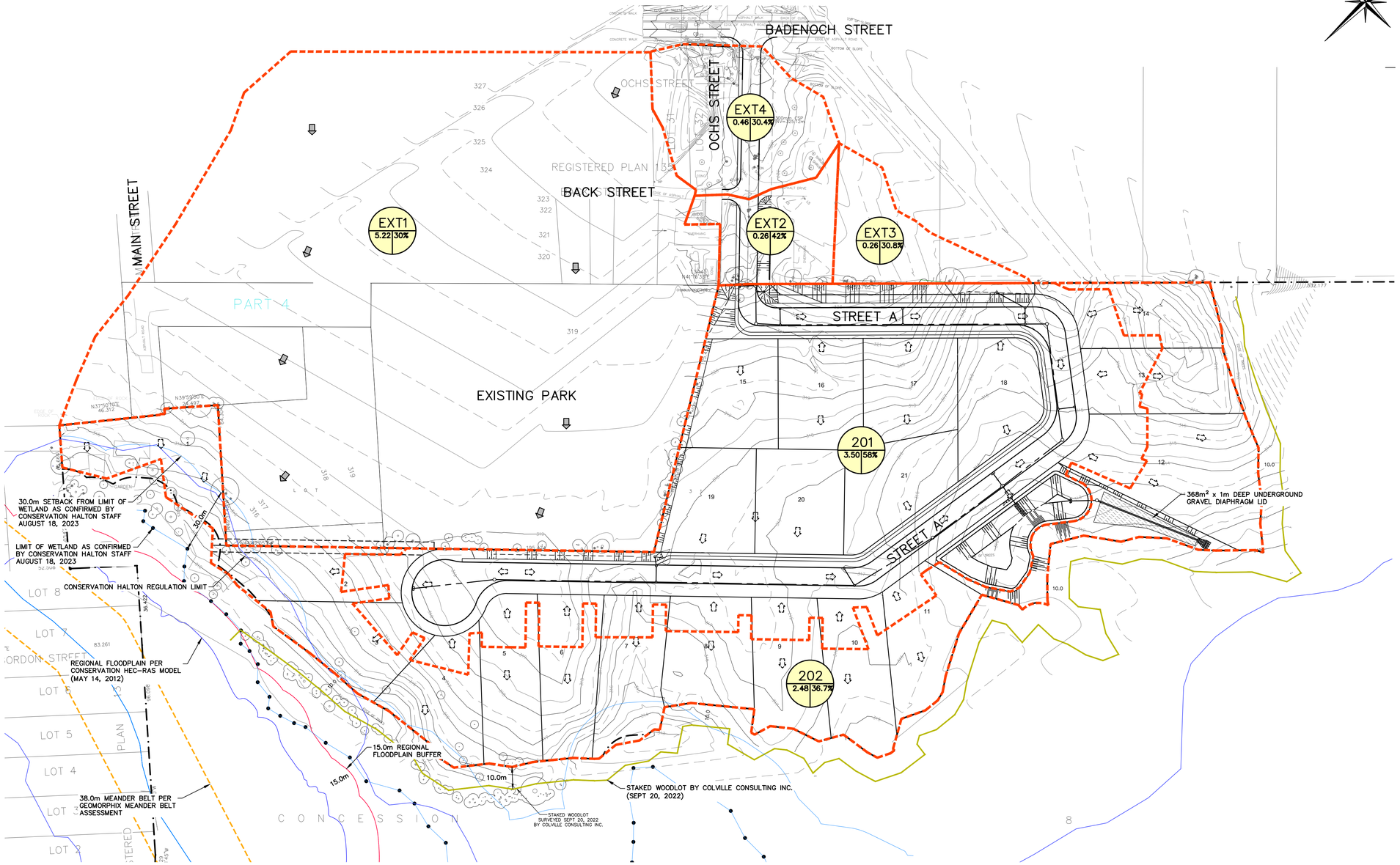
Engineer

Engineer

LICENSED PROFESSIONAL ENGINEER
T. A. H. FRASER
100176040
2024.11.15
PROVINCE OF ONTARIO

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905 875 0026 T
905 875 4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn	Design	Project No.	
M.I.M	M.I.M.		2366-6537
Check	Check	Scale	Dwg.
B.W.	B.W.	1:1000	FIG. 6



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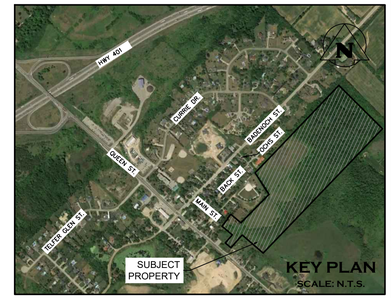

LEGEND

- PROPERTY LINE
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Project

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TOWN OF PUSLINCH

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POST-DEVELOPMENT DRAINAGE PLAN

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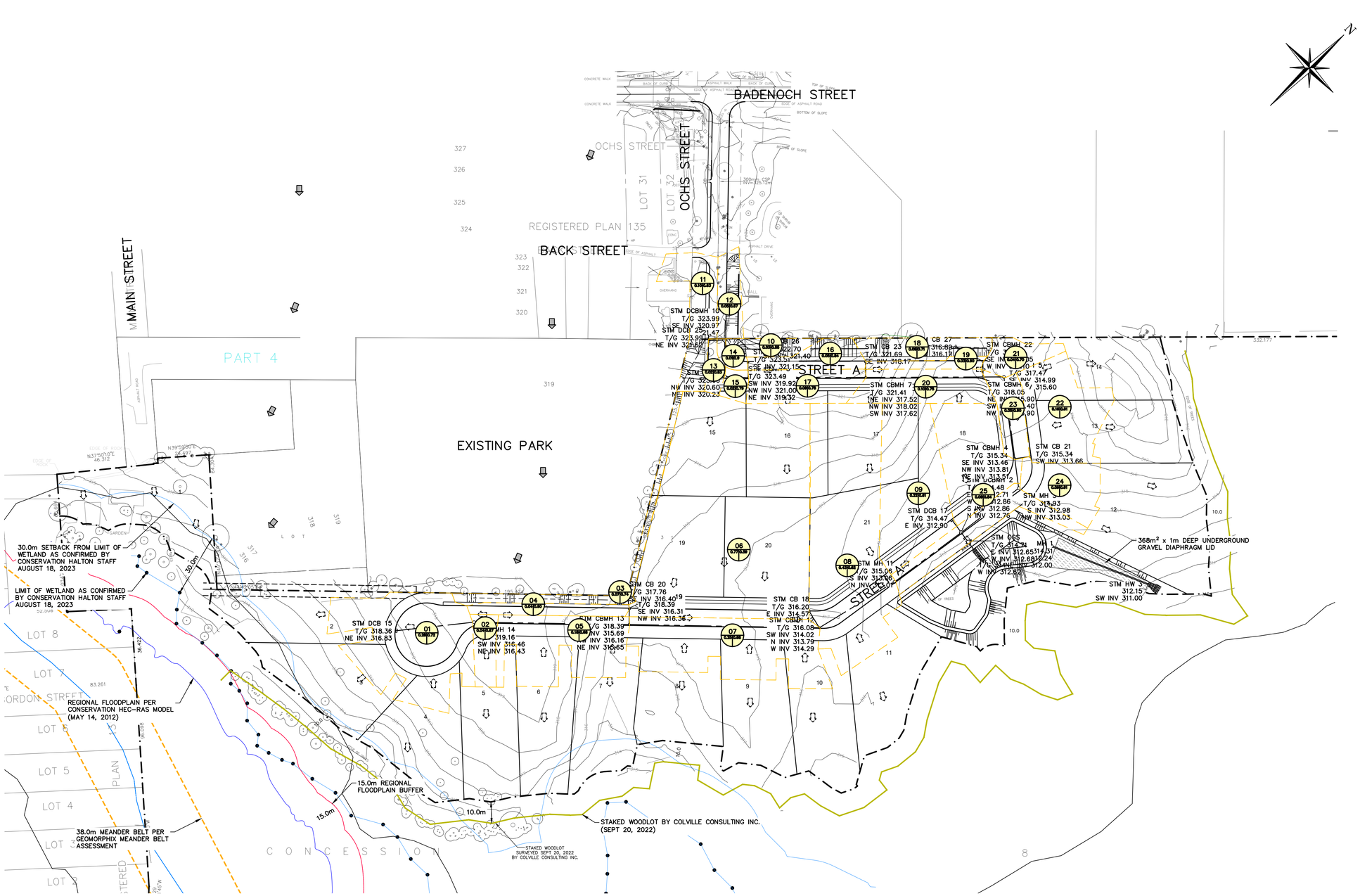
Drawn	Design	Project No.	
M.I.M	M.I.M.		2366-6537
Check	Check	Scale	Dwg.
B.W.	B.W.	1:1000	FIG. 7

J:\2300\2366 - WDO Main Street\6537 - 11 Main Street\CAD\Civil_Sheets\6537_FIG 7.dwg, FIG7, 2024-11-15 4:54:55 PM, hwilkinson



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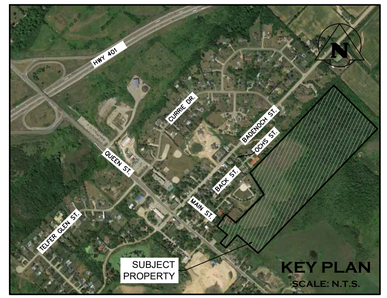

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TOWN OF PUSLINCH

Drawing

STORM DESIGN SHEET
DRAINAGE PLAN

Engineer

Engineer

LICENSED PROFESSIONAL ENGINEER
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Drawn	M.I.M	Design	M.I.M.	Project No.	2366-6537
Check	B.W.	Check	B.W.	Scale	1:1000
				Dwg.	FIG. 8

J:\2300\2366 - WDD Main Street\6537 - 11 Main Street\CAD\Civil_Sheets\6537_FIG 8.dwg, FIG8, 2024-11-15 4:48:18 PM, hwilkinson