FUNCTIONAL SERVICING AND PRELIMINARY STORMWATER MANAGEMENT REPORT

10249 HUNSDEN SIDEROAD
ESTATE RESIDENTIAL DEVELOPMENT

TOWN OF CALEDON

PREPARED FOR:

CARRINGWOOD HOMES

PREPARED BY:

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CROZIER
CONSULTING ENGINEERS

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Carringwood Homes (Owner) to prepare a Functional Servicing and Preliminary Stormwater Management Report in support of the Zoning By-Law Amendment Application for the estate residential development located at 10249 Hunsden Sideroad (the site) in the Town of Caledon. The purpose of this report is to demonstrate that the proposed development is feasible from a functional servicing and stormwater management perspective and conforms with the requirements of the Town of Caledon (Town), Region of Peel (Region), and the Nottawasaga Valley Conservation Authority (Conservation Authority).

This report has been completed in accordance with the guidelines and Development Application Review Team meeting notes dated October 21, 2021. The relevant background studies and reports include:

- Region of Peel 2020 Water Master Plan
- Region of Peel Public Works Design Criteria Manual – Sanitary Sewer (March 2017)
- Region of Peel Watermain Design Criteria (June 2010)
- Town of Caledon As-Constructed Drawings (Drawing No. 402 & 403) (August 2017)
- Geotechnical Investigation prepared by Soil Engineers Ltd. (April 2022)
- Ministry of Environment Stormwater Management Planning and Design Manual (March 2003)
- Ministry of Transportation Drainage Management Manual (1997)
- Town of Caledon Development Application Review Team Meeting Notes (October 21, 2021)

This report has been prepared to support the first submission of the Zoning By-Law Amendment Application for the proposed estate residential development.

2.0 Site Description

The property encompasses an area of 21.60 ha with a developable area of approximately 9.63 ha. The site currently consists of an existing detached residential building and accessory buildings, vacant grassed agricultural fields, and forested areas. The site, located in an agricultural area within the Oak Ridges Moraine in the Town of Caledon, is bounded by Hunsden Sideroad to the north, natural heritage woodlot to the south, agricultural lands to the east, and detached residential dwellings to the west.

According to the Draft Plan of Subdivision prepared by Glen Schnarr & Associates Inc. dated September 16, 2021, it is understood that the proposed estate residential development will consist of the following elements:

- Nineteen (19) single detached residential lots with associated on-site sewage systems (8.14 ha).

- Internal 18.0 m municipal right-of-way with access to Hunsden Sideroad and the proposed residential development (Stinson Street) west of the site (1.04 ha).

- Designated Natural Heritage System Lands and 20.0 m Natural Heritage System buffer (11.97 ha).

- Site access from Hunsden Sideroad and Stinson Street.

The existing residential dwelling located at 10249 Hunsden Sideroad is to remain unchanged upon final buildout of the development.

3.0 Water Servicing

The Region of Peel is responsible for the operation and maintenance of the public watermain system surrounding the property. The existing and proposed water servicing are discussed in the following sections.

3.1 Existing Water Servicing

The existing water servicing infrastructure close to the site include:

- A 300 mm diameter polyvinyl chloride (PVC) watermain located on the east side of Mount Pleasant Road (Region of Peel As-Constructed Drawing (61334-D), October 2016).

- A 300 mm diameter PVC watermain located on the west side of Stinson Street (Flato Palgrave Mansions Inc. As-Constructed Drawing (Sheet 70321-D), August 2017).

- One (1) municipal hydrant located west of the site at the northern extent of Stinson Street (Flato Palgrave Mansions Inc. As-Constructed Drawing (Sheet 70321-D), August 2017).

The existing residential dwelling at 10249 Hunsden Sideroad is assumed to be serviced by a private well based on the Ministry of Environment, Conservation, and Parks Well Mapping Records. The existing well will remain in commission to service 10249 Hunsden Sideroad. The as-constructed drawings for Stinson Street can be referenced in Appendix A.

3.2 Water Demand Calculations

The water demand for the proposed residential development was calculated with reference to the Region of Peel 2020 Water Master Plan and the Region of Peel Public Works Design Criteria Manual – Sanitary Sewer (dated March 2017). The Region of Peel design criteria requires an average daily water demand of 270 L/capita/day for residential uses. A unit-based population density of 6.0 persons per unit based on similar developments in the Town of Caledon, was used along with the peaking factors outlined in the Region of Peel design criteria to obtain the estimated maximum daily demand and peak hourly demand for the proposed development.

Table 1 summarizes the overall water demand for the site. Appendix B contains the detailed water demand calculations.

Table 1: Proposed Water Demand

Standard	Type	Average Daily Water Demand (L/s)	Maximum Daily Water Demand (L/s)	Peak Hourly Water Demand (L/s)
Region of Peel	Residential	0.36	0.64	1.07

Note: References to design guidelines are provided in Appendix B

Using the Region of Peel design criteria for domestic water demand, the estimated average daily demand and peak hourly demand for the proposed development are 0.36 L/s and 1.07 L/s, respectively.

3.3 Fire Flow Calculations

The Fire Underwriters Survey (FUS) method was used to estimate the preliminary fire flow requirements for the proposed residential development. This calculation is based on the building type assumption of wood frame construction. The estimated fire flow requirements are used to estimate the preliminary watermain size required to service the development. The building architect and Mechanical Engineer will confirm the required fire flow demand during the Site Plan Approval and Building Permit stage.

Table 2 summarizes the estimated fire flow demand and duration necessary to meet fire protection for the proposed development. Appendix B contains the Fire Underwriters Survey calculations.

Table 2: Proposed Fire Flow Demand

Method	GFA (m^2)	Fire Flow (L/s)	Duration (hrs.)
Fire Underwriters Survey	347.6	133.3	2.0

Based on the fire flow calculations and a gross floor area of 347.6 m^2 (Lot 11), the required fire flow for the development was calculated to be 133.3 L/s for a duration of 2.0 hours.

It should be noted that the fire flows determined from the FUS method is a conservative estimate for comparison purposes only. The Mechanical Engineer for the development will complete the required analysis for fire protection and the Architect will design fire separation methods per the determined fire flow rate to meet municipally available flows and pressures. Based on the estimated peak hourly water demand (1.07 L/s) and fire flow demand (133.3 L/s) summarized in Table 1 and Table 2, the total design flow for the internal water distribution system is approximately 134.4 L/s.

Hydrant flow tests may need to be completed as part of the design process to determine the existing available pressures and flows within the Stinson Street watermain. These results will be used to confirm that the existing system has capacity to service the proposed development.

3.4 Proposed Water Servicing

A 150 mm diameter looped watermain is proposed to service the development. The looped watermain is located within the municipal road right-of-way and will connect to the existing 300 mm PVC watermain along Stinson Street, southwest of the site. All residential lots will be serviced with domestic water services connecting to the proposed internal watermain. The Preliminary Grading and Servicing Plan (Drawing C102) illustrates the location and design of the proposed watermain and water services.

As shown on the Preliminary Site Grading and Servicing Plan (Drawing C102) the proposed 150 mm PVC watermain will be extended along Hunsden Sideroad to provide municipal water to Lot 19. A flushing hydrant is proposed at Lot 19 to ensure water does not become stagnant in the watermain.

Private hydrants are proposed throughout the development with a maximum spacing of 150 m in accordance with Region of Peel Watermain Design Criteria (June 2010). A hydrant flow test may be required to confirm the available water flow and pressure within the Stinson Street watermain to service the proposed development.

4.0 Sanitary Servicing

The Site is in a rural area that does not currently have sanitary services available, and the surrounding properties are serviced via private septic systems. The Town of Caledon does not have plans to provide sanitary servicing in this area soon.

4.1 Sanitary Design Calculations

The Ontario Building Code (OBC) was referenced to estimate the sanitary design flows generated by the proposed estate residential development. The proposed development will consist of 19 residential dwellings per the Draft Plan of Subdivision prepared by Glen Schnarr & Associates Inc. (September 2021). A daily unit flow rate of 2,000 L/d day was utilized to determine the total daily design sanitary sewage flows from the proposed development.

Table 3 summarizes the design parameters and estimated design flows for the site.

Table 3: Sanitary Design Parameters and Daily Design Sewage Flow

Zoning/Use	Classification (per OBC 8.2.1.3.B.)	Units	Daily Unit Flow (L/d)
Residential Dwellings	Table 8.2.1.3.A "OBC 2016, Four-bedroom Dwelling"	19	2,000

The daily sanitary design flow for each unit was determined to be 2,000 L/d, per the Ontario Building Code. Details of the design calculations and on-site sewage systems will be confirmed during the building permit stage and complete by others.

4.2 Proposed Sanitary Servicing

All 19 lots located within the development will be serviced with private on-site sewage systems. The details, size, and location of the on-site sewage systems will be determined once individual house designs and building permits are prepared.

The individual lot design and site grading have conservatively allowed an on-site sewage footprint area of 400 m^2 for a conventional on-site sewage absorption bed and minimum setback requirements, as shown on the Preliminary Site Grading and Servicing Plan (Drawing C102). The size and layout of each on-site sewage system will be completed using actual design criteria during the building permit application phase for each lot to demonstrate that the proper separations are met.

5.0 Drainage Conditions

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

5.1 Existing Drainage Conditions

According to the topographic survey (J.D. Barnes Limited, April 4, 2022), the site currently consists of an existing detached residential dwelling and accessory buildings, vacant grassed agricultural fields, and forested areas. The site generally slopes from east to west and drains from back to front.

Most of the stormwater runoff from the site drains towards the Hunsden Sideroad ditch where it is directed to the 1000 mm diameter culvert flowing north below the roadway (Catchment 101 & Catchment 102). Under existing conditions, the catchment areas that are directed towards the Hunsden Sideroad culvert consist of primarily woodlot and cultivated lands. The southwestern portion of the site consists of primarily woodlot and cultivated lands and drains uncontrolled to the neighbouring residential properties to the southwest (Catchment 103) via sheet flow. The ultimate receiver of most of the stormwater from the site is the tributary located approximately 150 meters north of Hunsden Sideroad.

There are two outlets for the major overland flow route based on the existing site topographic survey (J.D. Barnes Limited, April 4, 2022). The main overland flow outlet discharges through the existing 1000 mm diameter corrugated steel culvert which crosses Hunsden Sideroad along the northwestern extent of the property and ultimately outlet to the tributary of Beeton Creek. The secondary overland flow outlet is along the southwestern property limits where water flows uncontrolled towards the existing residential properties. These overland flow outlets are proposed to remain under the post-development conditions.

Table 4 summarizes the pre-development catchment areas and Figure 1 illustrates the Pre-Development Drainage Plan.

Table 4: Pre-Development Catchment Areas and Percent Impervious

Catchment ID	Land-Use Description	Impervious Area (ha)	Pervious Area (ha)	Percent Impervious (%)	Outlet
101	Existing residential dwelling, woodlot, and cultivated lands	0.04	10.93	0.3	Hunsden Sideroad Culvert (Beeton Creek Tributary)
102	Existing cultivated lands and woodlot	-	4.84	0	
103	Existing cultivated lands and woodlot	-	4.57	0	Southwestern residential properties

5.2 Proposed Drainage Conditions

Based on the Draft Plan of Subdivision (Glen Schnarr & Associates Inc., September 16, 2021), the proposed development will consist of nineteen (19) single detached residential lots, associated paved internal roadway, and landscaped and natural heritage areas. The existing residential dwelling located at 10249 Hunsden Sideroad is to remain unchanged upon final buildout of the development. Access to the site will be provided from the proposed entrances on Hunsden Sideroad and Stinson Street.

The proposed site grading divides the site into six (6) post-development drainage catchment areas with two outlets, as shown on the Post-Development Drainage Plan (Figure 2):

- Catchment 201 (A = 12.4 ha) consists of uncontrolled drainage from the proposed building footprints, rear yards, and natural heritage wood lands. All storm events from this catchment are conveyed overland via sheet flow to the 1000 mm CSP culvert on Hunsden Road, mimicking the pre-development drainage conditions.

- Catchment 202 (A = 3.50 ha) consists of drainage from the internal roadway (Street 'A') and proposed residential lots. All storm events from this catchment are conveyed to roadside bioswales prior to being directed to the Hunsden Sideroad ditch and ultimately outletting at the Hunsden Sideroad 1000 mm CSP culvert.

- Catchment 203 (A = 0.07 ha) consists of uncontrolled drainage from landscaped areas along Hunsden Sideroad. All storm events from this catchment are conveyed to the Hunsden Sideroad ditch via sheet flow and ultimately outlet towards the Hunsden Sideroad 1000 mm CSP culvert.

- Catchment 204 (A = 1.39 ha) consists of drainage from the internal roadway (Street 'A' cul-de-sac) and proposed residential front yards. All storm events from this catchment are conveyed to roadside bioswales prior to being directed to the existing drainage swale within the Natural Heritage Block and ultimately outletting at the Hunsden Sideroad 1000 mm CSP culvert.

- Catchment 205 (A = 0.83 ha) consists of drainage from the internal roadway (Street 'B') and proposed residential lots. All storm events from this catchment are conveyed to roadside bioswales prior to being directed to the existing residential development and Stinson Street to the southwest.

- Catchment 206 (A = 2.15 ha) consists of uncontrolled drainage from natural heritage wood lands and landscaped areas. All storm events from this catchment are conveyed via sheet flow to the existing residential development and Stinson Street, southwest of the development, mimicking the pre-development drainage conditions.

Upon development, all storm events from the developable portion of the site (Catchment 202, 204 and 205) will be conveyed to proposed roadside bioswales for quantity and quality control. Following quantity and quality control, all stormwater will either infiltrate or be conveyed to the proposed drainage outlets which include the Hunsden Sideroad 1000 mm CSP culvert and the existing residential development and Stinson Street to the southwest. Details of the quantity, quality, and bioswale design will be further outlined in Section 6.0 of the report.

Table 5 provides details of the catchment areas and runoff coefficients for the post-development conditions.

Table 5: Post-Development Catchment Areas and Percent Impervious

Catchment ID	Description	Impervious Area (ha)	Pervious Area (ha)	Percent Impervious (%)	Outlet
201	Building footprints, rear yards, woodlot	0.29	12.15	2.3	Hunsden Sideroad Culvert (Beeton Creek Tributary)
202	Internal roadway and residential lots	0.46	3.04	13.1	
203	Landscaped area	-	0.07	0	
204	Internal roadway and front yards	0.28	1.11	20.0	
205	Internal roadway and residential lots	0.11	0.72	13.3	Neighbouring Residential Properties (Southwest)
206	Woodlot and landscaped areas	-	2.15	0	

Refer to the Post-Development Drainage Plan (Figure 2) for proposed drainage conditions and the Preliminary Site Grading and Servicing Plan (Drawing C102) that illustrates the proposed site drainage and servicing.

6.0 Stormwater Management

Stormwater management and site drainage for the proposed development must adhere to the policies and standards of the Town of Caledon, Nottawasaga Valley Conservation Authority, and Ministry of Environment, Conservation and Parks (MECP). It is important to note that efforts have been made to preserve and maintain the rural character of the property and passive stormwater management practices have been incorporated throughout the design.

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

Water Quantity Control

According to the Town of Caledon Development Standards Manual (2019), water quantity controls are required for the site. The water quantity requirements include controlling the post-development peak flow event to the pre-development peak flow event for storms up to and including the 100-year event.

Water Quality Control

Provide at least 80% removal of Total Suspended Solids in accordance with "Enhanced Protection" (Ministry of the Environment, Planning, and Stormwater Management Manual, 2003)

6.1 Stormwater Quantity Control

The Nottawasaga Valley Conservation Authority, Town of Caledon, and Ministry of Transportation guidelines were referenced to determine the hydrologic parameters for the various catchment areas within the site. The topographic survey (J.D. Barnes Limited, April 4, 2022) for the site was referenced to confirm the land cover and drainage patterns under the existing site conditions. The Geotechnical Investigation prepared by Soil Engineers Ltd. (April 2022) was reviewed to determine the on-site soil conditions.

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

Table 6: Pre-Development Hydrologic Parameters

Catchment Description	101	102	103
Drainage Area (ha)	10.97	4.84	4.57
Total Imperviousness (%)	0.23	0	0
Curve Number (CN)[1]	56.1	57.8	57.0
Initial Abstraction (mm)	8.99	7.25	8.00
Time to peak (hrs)	0.38	0.27	0.32

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.

Table 7: Post-Development Hydrologic Parameters

Catchment Description	201	202	203	204	205	206
Drainage Area (ha)	12.44	3.50	0.07	1.39	0.83	2.15
Total Imperviousness (%)	2.34	13.08	0	20.00	13.28	0
Curve Number (CN)[1]	58.1	65.8	61.0	61.0	65.9	58.4
Initial Abstraction (mm)	8.04	4.61	5.00	5.00	4.60	7.15
Time to peak (hrs)	0.39	0.18	0.10	-	0.14	0.12

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.

As discussed in Section 6.0, stormwater quantity control requirements for the site include controlling the post-development peak flow to the pre-development peak flow event for storms up to and including the 100-year event.

Hunsden Sideroad Culvert Drainage Outlet (Beeton Creek Tributary)

Visual OTTHYMO (VO) was used to create pre-development, post-development, and post-development with mitigation model scenarios for the hydrology of the existing and proposed site drainage based on the Town of Caledon intensity-duration-frequency (IDF) data and hydrologic parameters outlined in Table 6 and 7. The pre-development and post-development flow rates for the outflows directed to the Hunsden Sideroad Culvert (Catchment 201, 202, 203 & 204) and the storage requirements are summarized below in Table 8. The VO model schematics, full modelling results, and output files are included in Appendix C.

Table 8: Peak Flows and Target Flows Summary (Discharge towards Hunsden Sideroad Culvert)

Storm	Pre-Dev. Peak Flow Rate[1] (L/s)	Post-Dev. Uncontrolled Peak Flow Rate[2] (L/s)	Post-Dev. Controlled Peak Flow Rate[2] (L/s)	Storage Volume Required (m^3)	Storage Volume Provided (m^3)
2-yr	66	103	57	225	727
5-yr	148	216	123	432	
10-yr	218	302	178	596	
25-yr	321	432	258	701	
50-yr	411	542	334	727	
100-yr	506	658	484	727	

1. Includes runoff from Catchment 101 and 102.
2. Includes runoff from Catchment 201, 202, 203, and 204.

The Visual OTTHYMO results summarized in Table 8 indicate that water quantity controls are required to control the post-development peak flows to the pre-development peak flows for storm events up to and including the 100-year event. A total storage volume of 727 m^3 is provided using bioswales along the internal roadways to meet the required storage volume.

The proposed bioswales have been sized to provide stormwater quantity controls for events up to and including the 100-year event for Catchment 202 and 204. The bioswales will be comprised of a 0.3 m deep filter media layer and 1.2 m deep gravel storage layer. Details of the bioswale design and sizing can be referenced on the Preliminary Site Grading and Servicing Plan (Drawing C102) and Appendix C.

Catchments 201 and 203 are to remain relatively unchanged under post development conditions and will continue to drain uncontrolled to the Hunsden Sideroad culvert; therefore, quantity controls have not been provided for these catchments.

Southwest Property Drainage Outlet

The catchments that are directed towards the southwest drainage outlet include Catchment 205 and 206 which consist of residential lots, internal roadway, and landscape runoff from the southwestern extents of the development. Stormwater runoff from Catchment 206 will continue to drain uncontrolled to the neighbouring residential properties consistent with the pre-development runoff conditions. Visual OTTHYMO was used to determine the pre-development and post-development flows directed to the neighbouring property to determine the required stormwater management controls for Catchment 205.

The pre-development and post-development flow rates for the outflows directed to the neighbouring residential properties (Catchments 205 & 206) and the storage requirements are summarized below in Table 9. The VO model schematics, full modelling results, and output files are included in Appendix C.

Table 9: Peak Flows and Target Flows Summary (Discharge towards Southwest Properties)

Storm	Pre-Dev. Peak Flow Rate[1] (L/s)	Post-Dev. Uncontrolled Peak Flow Rate[2] (L/s)	Post-Dev. Controlled Peak Flow Rate[2] (L/s)	Storage Volume Required (m^3)	Storage Volume Provided (m^3)
2-yr	21	32	20	34	156
5-yr	47	68	45	68	
10-yr	69	97	63	96	
25-yr	102	139	91	133	
50-yr	130	175	115	156	
100-yr	160	212	141	156	

1. Includes runoff from Catchment 103.
2. Includes runoff from Catchment 205 and 206.

As per the Visual OTTHYMO results summarized in Table 9, water quantity controls are required to control the post-development peak flows to the pre-development peak flows for storm events up to and including the 100-year event. A total storage volume of 156 m^3 of is provided using bioswales along the internal roadways to meet the required storage volume.

The proposed bioswales have been sized to provide stormwater quantity controls for events up to and including the 100-year event. The bioswales will be comprised of a 0.3 m deep filter media layer and 1.2 m deep gravel storage layer. Details of the bioswale design and sizing can be referenced on the Preliminary Site Grading and Servicing Plan (Drawing 102) and Appendix C.

Catchment 206 will remain relatively unchanged under post development conditions and will continue to drain uncontrolled to the neighbouring residential properties; therefore, quantity controls have not been provided for this catchment.

6.2 Stormwater Quality Control

Stormwater quality controls for the site must incorporate measures to provide "enhanced protection" as outlined by the Nottawasaga Valley Conservation Authority. 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 controls for Catchment 202, 204, and 205 will be provided using a combination of grassed swales and roadside bioswales complete with filter media. Stormwater runoff from the developable portion of the site will be directed to proposed side yard swales prior to the runoff being directed to the roadside bioswales. The bioswales and grassed swales will act in a treatment train approach to remove the total suspended solids from the stormwater runoff.

Catchments 201, 203, and 206 will remain relatively unchanged between pre-development and post-development conditions with no hard surfaces, producing only clean runoff (i.e., landscaped and woodlot areas). Therefore, quality controls have not been provided for these catchments.

7.0 Erosion and Sediment Controls During Construction

Erosion and sediment controls will be implemented prior to the commencement of any site servicing works for the development and will be maintained throughout construction until the site is stabilized or as directed by the Site Engineer and/or Town of Caledon.

Controls will be inspected after each significant rainfall event and maintained in proper working condition. A Preliminary Erosion and Sediment Control Plan (Drawing C101) has been prepared for the development outlining the site-specific erosion and sediment controls. This plan includes silt fencing, a mud mat, and more robust measures, such as check dames, in areas of concentrated flow.

Further details on the erosion and control measures 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.

Mud Mat

A rock mud mat will be installed at the entrance to the site off Hunsden Sideroad. The rock mud mat will help to prevent mud tracking. All construction traffic will be restricted to the construction entrance as indicated on the Preliminary Erosion and Sediment Control Plan (Drawing C101).

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.

8.0 Conclusions & Recommendations

This report was prepared in support of the Zoning By-Law Amendment Application for the property located at 10249 Hunsden Sideroad in the Town of Caledon. The proposed development can be serviced for water, sanitary, and stormwater management in accordance with the Town of Caledon Region of Peel, and Nottawasaga Valley Conservation Authority requirements and standards. Our conclusions and recommendations include:

Proposed Water Services

1. The domestic peak hourly water demand for the proposed development is 1.07 L/s. The design fire flow is 133.3 L/s for 2.0 hours.

2. Water servicing for the proposed development will be met by connecting a 150 mm diameter PVC watermain to the existing 300 mm diameter watermain on Stinson Street. The proposed 150 mm diameter PVC watermain will be looped throughout the development and provide municipal water servicing to each residential lot.

Proposed Sanitary Services

1. Total peak sanitary flow for the proposed development is 38,000 L/d.

2. Sanitary servicing for the proposed development will consist of private individual lot on-site sewage systems.

Stormwater Management

1. A passive stormwater management approach is proposed to preserve and maintain the rural character of the property.

2. The site's stormwater runoff from the developable area (Catchment 202, 204, and 205) will be collected in the proposed roadside bioswales for events up to and including the 100-year storm event. The proposed bioswales will control the post-development runoff event to the pre-development runoff event prior to infiltrating or outletting to their respective outlet. Stormwater runoff the undeveloped catchments (Catchment 201, 203, and 206) of the site will flow uncontrolled towards to their respective outlet.

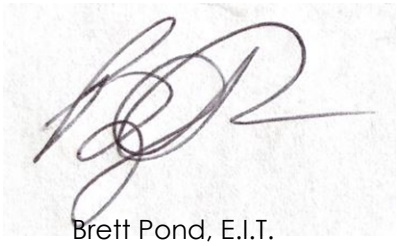
3. Stormwater quantity controls are required to control the post-development peak flow to the pre-development peak flow event for storms up to and including the 100-year event. Roadside bioswales are proposed to provide the required stormwater quantity controls. Storm events larger than the 100-year event will flow uncontrolled to the Hunsden Sideroad culvert and the residential properties to the southwest.

4. Stormwater quality controls for the site will be provided by the proposed side yard swales and roadside bioswales through a treatment train approach.

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.



Brett Pond, E.I.T.
Land Development

C.F. CROZIER & ASSOCIATES INC.

Tony Elias, P.Eng.
Senior Project Manager

BP/cj

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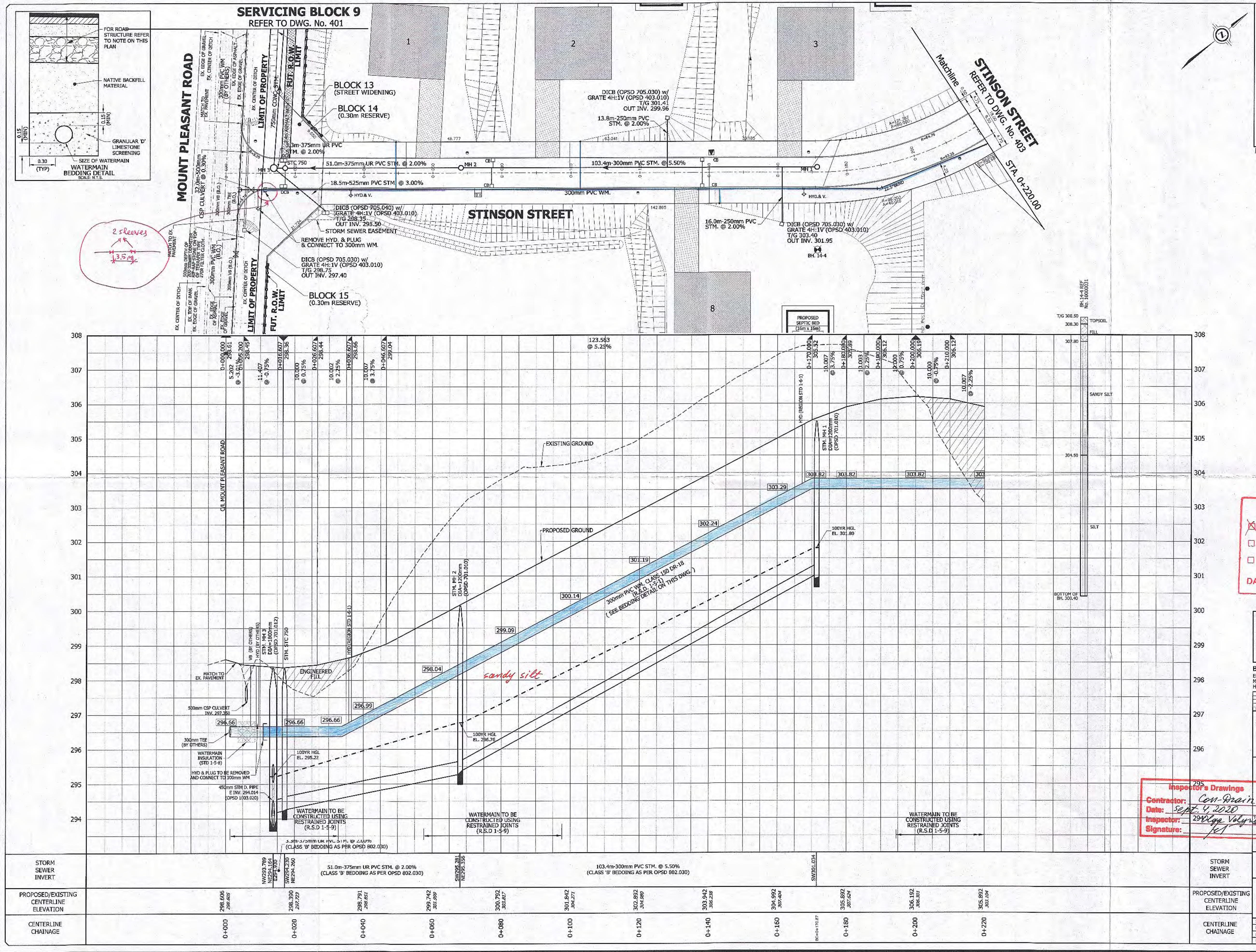
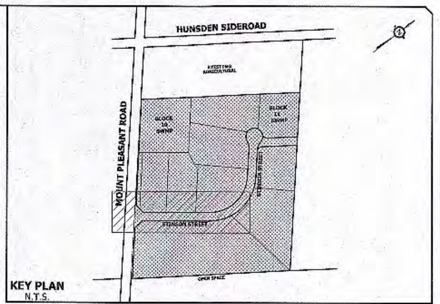
APPENDIX A

As-Constructed Drawings & Background Material





LEGEND

- STORM SEWER AND MANHOLE
- SANITARY SEWER AND MANHOLE
- WATERMAIN
- WATER SERVICE CONNECTION
- SINGLE STORM SERVICE CONNECTION
- SINGLE/REARLOT CATCHBASIN
- DOUBLE CATCHBASIN
- HYDRANT & VALVE
- VALVE AND BOX
- COMMUNITY MAIL BOX
- STREET LIGHT
- TRANSFORMER
- DRIVEWAY
- [255.42] MINIMUM USF ELEVATION
- 100 YEAR HGL (SHOWN WHEN ABOVE PIPE OBVERT)
- 4:1 SLOPE (MAXIMUM)
- 1.8m SOLID WOOD PRIVACY FENCE (REFER TO LANDSCAPE PLAN FOR DETAILS)
- POST AND RAIL WOOD FENCE (REFER TO LANDSCAPE PLAN FOR DETAILS)
- 1.5m CHAIN LINK FENCE (REFER TO LANDSCAPE PLAN FOR DETAILS)
- MASONRY COLUMN (REFER TO LANDSCAPE PLANS FOR DETAILS)
- [294.73] WATERMAIN OBVERT

INSPECTION

☒ WATERMAINS ☐ ROADWORK
☐ SHOP DRAWINGS ☐ STORM SEWERS
☐ SANITARY SEWERS ☐ TRAFFIC
DATE: JUN 05 2020 OJ
TECHNICAL ANALYST

PAVEMENT STRUCTURES
20.0m URBAN/RURAL
40mm HL3 ASPHALT SURFACE COURSE
65mm HL8 ASPHALT BINDER COURSE
150mm GRANULAR 'A' OR 19mm CRUSHER RUN LIMESTONE BASE
300mm GRANULAR 'B' TYPE 1 OR 50mm CRUSHER RUN LIMESTONE TYPE 2 SUB-BASE

BENCHMARK
ELEVATIONS SHOWN ON THIS PLAN ARE GEODETIC AND ARE REFERRED TO M.T.O. STATION No. 00819758063 HAVING A PUBLISHED ELEVATION OF 272.961 METRES.

No.	REVISION	DATE	BY
4			
3			
2			
1	ISSUED FOR CONSTRUCTION	2020/01/16	JD

Inspector's Drawings
Contractor: Con-Drain
Date: Sept. 4, 2020
Inspector: Olga Valyners
Signature:

TOWN OF CALEDON

Town of Caledon
APPROVED AS NOTED
This approval constitutes a general review and does not certify dimensional accuracy.
This approval is subject to further certification of the "as recorded" works by a Professional Engineer of the Province of Ontario.
Date:
Approved By:
Print Name:

REGISTERED PROFESSIONAL ENGINEER D. ORMONDE 100089999 MAR. 2020 PROVINCE OF ONTARIO

TOWN FILE No. 21T-90034C PROJECT 13-399

urbantech

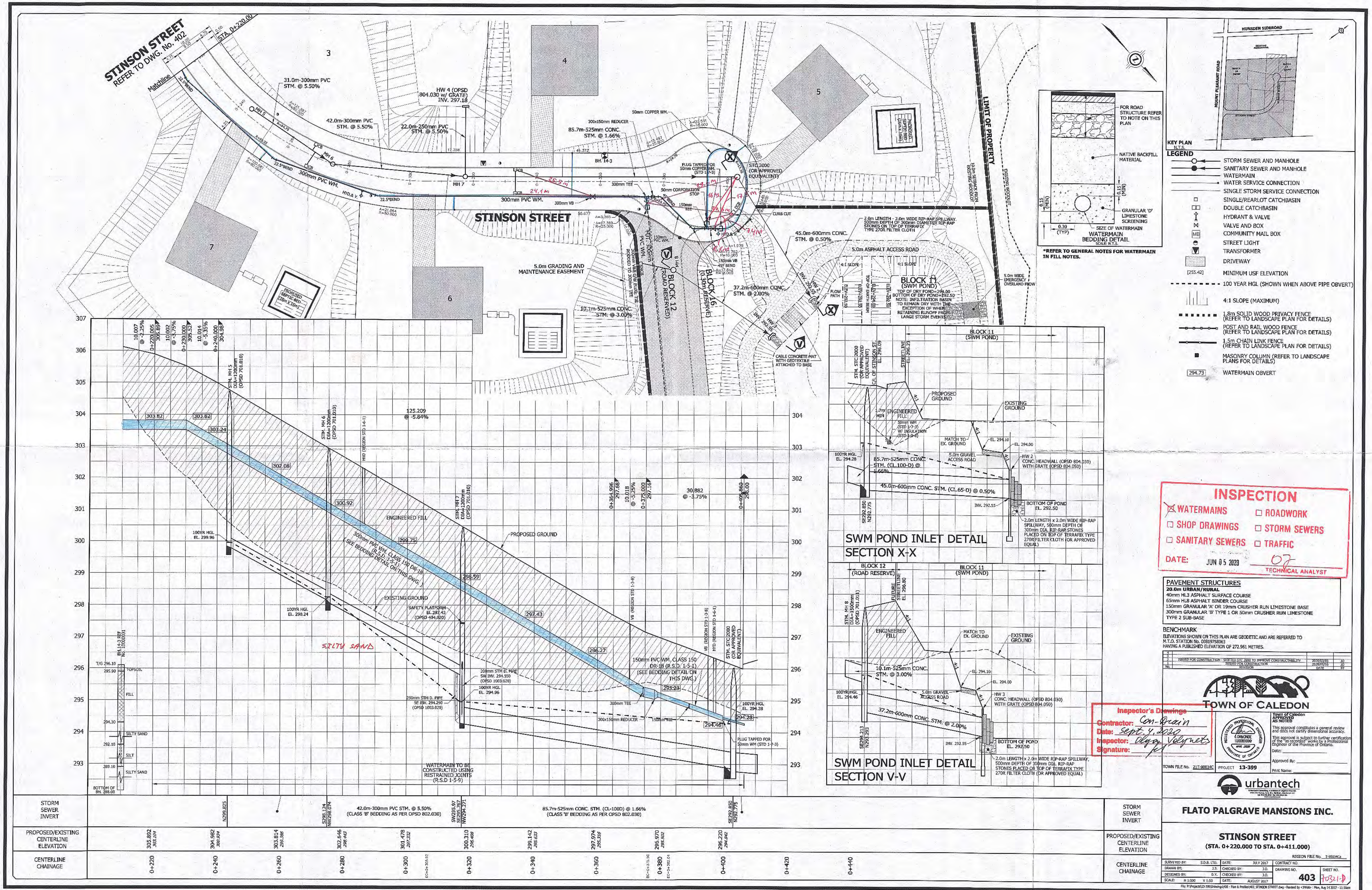
FLATO PALGRAVE MANSIONS INC.

STINSON STREET
(STA. 0+000.000 TO STA. 0+220.000)

REGION FILE No. T-90034Ca

SURVEYED BY:	S.D.B. LTD.	DATE:	JULY 2017	CONTRACT NO.	
DRAWN BY:	J.S.	CHECKED BY:	J.O.	DRAWING NO.	SHEET NO.
DESIGNED BY:	D.Y.	CHECKED BY:	J.O.	402	70320-D
SCALE:	H 1:500 V 1:50	DATE:	AUGUST 2017		

File: P:\Projects\13-399\Drawings\400 - Plan & Profiles\402_STINSON STREET.dwg - Revised by <JMAN> : Mon, Aug 14 2017 - 3:22pm


STINSON STREET
REFER TO DWG. No. 402
STINSON STREET
LIMIT OF PROPERTY
BLOCK 12 (ROAD RESERVED)
BLOCK 16 (0.30m RESERVE)
BLOCK 11 (SWM POND)
5.0m GRADING AND MAINTENANCE EASEMENT
5.0m ASPHALT ACCESS ROAD
SWM POND INLET DETAIL SECTION X-X
SWM POND INLET DETAIL SECTION V-V
WATERMAIN BEDDING DETAIL
*REFER TO GENERAL NOTES FOR WATERMAIN IN FILL NOTES.
KEY PLAN
LEGEND
STORM SEWER AND MANHOLE
SANITARY SEWER AND MANHOLE
WATERMAIN
WATER SERVICE CONNECTION
SINGLE STORM SERVICE CONNECTION
SINGLE/REARLOT CATCHBASIN
DOUBLE CATCHBASIN
HYDRANT & VALVE
VALVE AND BOX
COMMUNITY MAIL BOX
STREET LIGHT
TRANSFORMER
DRIVEWAY
MINIMUM USF ELEVATION
100 YEAR HGL (SHOWN WHEN ABOVE PIPE OBVERT)
4:1 SLOPE (MAXIMUM)
WATERMAIN OBVERT
INSPECTION
WATERMAINS
ROADWORK
SHOP DRAWINGS
STORM SEWERS
SANITARY SEWERS
TRAFFIC
DATE: JUN 05 2020
TECHNICAL ANALYST
PAVEMENT STRUCTURES
20.0m URBAN/RURAL
40mm HL3 ASPHALT SURFACE COURSE
65mm HL8 ASPHALT BINDER COURSE
150mm GRANULAR 'A' OR 19mm CRUSHER RUN LIMESTONE BASE
300mm GRANULAR 'B' TYPE 1 OR 50mm CRUSHER RUN LIMESTONE
TYPE 2 SUB-BASE
BENCHMARK
ELEVATIONS SHOWN ON THIS PLAN ARE GEODETIC AND ARE REFERRED TO M.T.O. STATION No. 00819758063 HAVING A PUBLISHED ELEVATION OF 272.961 METRES.
TOWN OF CALEDON
Inspector's Drawings
Contractor: Con-Drain
Date: Sept 4, 2020
Inspector:
Signature:
TOWN FILE No. 21T-90034C
PROJECT 13-399
Approved By:
Print Name:
urbantech
FLATO PALGRAVE MANSIONS INC.
STINSON STREET
(STA. 0+220.000 TO STA. 0+411.000)
REGION FILE No. T-90034Ca
SURVEYED BY: S.D.B. LTD.
DATE: JULY 2017
CONTRACT NO.
DRAWN BY: J.S.
CHECKED BY: J.O.
DRAWING NO. 403
SHEET NO. 70321-D
DESIGNED BY: D.Y.
CHECKED BY: J.O.
SCALE: H 1:500 V 1:50
DATE: AUGUST 2017
File: P:\Projects\13-399\Drawings\400 - Plan & Profiles\403_STINSON STREET.dwg - Revised by <JWAN> : Mon, Aug 14 2017 - 11:30am
STORM SEWER INVERT
PROPOSED/EXISTING CENTERLINE ELEVATION
CENTERLINE CHAINAGE
42.0m-300mm PVC STM. @ 5.50% (CLASS 'B' BEDDING AS PER OPSD 802.030)
85.7m-525mm CONC. STM. (CL-100D) @ 1.66% (CLASS 'B' BEDDING AS PER OPSD 802.030)
WATERMAIN TO BE CONSTRUCTED USING RESTRAINED JOINTS (R.S.D 1-5-9)
SILTY SAND

APPENDIX B

Water Servicing Calculations

CROZIER CONSULTING ENGINEERS

Project: 10249 Hunsden Sideroad | **Created By:** CM | **Date:** 2022-06-23
Project No.: 952-6305 | **Checked By:** BP/TE | **Updated:** 2022-06-28

Domestic Water Demand

				Notes & References
Total Site Area:	21.6	ha		
Developable Site Area:	9.63	ha		
Population Density:	50	persons/ha		Population Density from Section 2.1, Region of Peel Public Works Design Criteria Manual - Sanitary Sewer (dated March 2017)
Number of units:	19			Unit counts per concept plan prepared by Glen Schnarr & Associates Inc. dated September 16, 2021
Unit Population Density:	6	persons/unit		Population Density per unit assumed based on size of houses and past jobs of similar subdivision design.
Population	114	persons	(unit based)	

Design Parameters

Average Demand (L/capita/d)
270

Region of Peel 2020 Water Master Plan, Section 2.2 - Design Criteria – Demands Projections

Water Demand:

Average Daily Demand =	30,780	L/day
	0.36	**L/s**

Peaking Factors

Max Day =	1.8
Peak Hour =	3.0

Region of Peel 2020 Water Master Plan, Section 2.2 - Design Criteria – Demands Projections

Average Day =	0.36	L/s
Max Day =	**0.64**	L/s
Peak Hour =	**1.07**	L/s

Max Day = Average Day Demand * Max Day
Peak Hour = Average Day Demand * Peak Hour

Municipality	Average Daily Water Demand (L/s)	Max Day Demand (L/s)	Peak Hourly Demand (L/s)
Region of Peel	0.36	0.64	1.07

10249 Hunsden Sideroad (Hillwood Estates)
Fire Protection Volume Calculation
CFCA File: 952-6305

Date: 2022-06-28
Designed By: CM
Checked By: BP/TE

Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

$$F = 220 * C * \sqrt{A}$$

where

F = the required fire flow in litres per minute
C = coefficient related to the type of construction
= 1.5 for wood frame construction (structure essentially all combustible)
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
= 0.8 for non-combustible construction (unprotected metal structural components)
= 0.6 for fire-resistive construction (fully protected frame, floors, roof)
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building considered.

Proposed Building

1.5 C
347.6 sq.m. total floor area

Total Floor Area for the largest unit based on Site Plan prepared by Glen Schnarr & Associates Inc., dated September 16, 2021.

Therefore F= 6,200 L/min (rounded to nearest 1000 L/min)
Used F based on criteria below= 6,200 L/min

Fire flow determined above shall not exceed:
30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Buring	25%
Combustible	No Charge		

0% reduction

0 L/min reduction

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above maybe reduce by up to 50% for complete automatic sprinkler protection.

0 L/min reduction

66 Thomas Street
Fire Protection Volume Calculation
CFCA File: 1419-4679

Date: 2022-06-28
Designed By: CM
Checked By: BP/TE

Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 45 metres by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) esposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation	Charge	Separation	Charge
0 to 3 m	25%	20.1 to 30 m	10%
3.1 to 10 m	20%	30.1 to 45 m	5%
10.1 to 20 m	15%		

Exposed buildings relative to Lot 11 dwelling

Name		**Distance (m)**		
North	No Buildings within 45 m	0	0%	0
South	Lot 10 proposed residential building	16	15%	930
East	No Buildings within 45 m	0	0%	0
West	Lot 12 proposed residential building	16	15%	930
				1,860 L/min Surcharge

Determine Required Fire Flow

No.1	6,200		
No. 2	0	reduction	
No. 3	0	reduction	
No. 4	1,860	surcharge	
Required Flow:	**8,060 L/min**		
Rounded to nearest 1000l/min:	**8,000 L/min**	or	133.3 L/s
			2,113 USGPM

Determine Required Fire Storage Volume

Flow from above 8,000 L/min

Required duration 2.00 hours

Therefore: 960,000 Litres or
960 cu.m. is the required fire storage volume.

Required Duration of Fire Flow

Flow Required L/min	Duration (hours)
2,000 or less	1.0
3,000	1.25
4,000	1.5
5,000	1.75
6,000	2.0
8,000	**2.0**
10,000	2.0
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

APPENDIX C

Stormwater Servicing Calculations

Project Name: 10249 Hunsden Sideroad
Project Number: 0952-6305
Created By: AG/BP
Reviewed By: TE

D.A. NAME 101
D.A. AREA 10.97

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

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Sandy Silt	B	B	100	10.97
				0
				0
				0
Total Area				10.97

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B					0.01	98	0.02	98			0.04	3.49
Subtotal					0.01		0.02					

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B	7.35	55							3.59	58	10.93	612.16
Subtotal	7.35								3.59			

Composite Area Calculations		
	Total Pervious Area	10.93
	Total Impervious Area	0.04
	% Impervious	0.32%
	Composite Curve Number	56.1
	Total Area Check	10.97

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Sandy Silt		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	7.35	73.47	0.21	7.35		0		0		0	1.54
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0	0		0		0		0		0	0
Cultivated	7	3.59	25.11	0.25	3.59		0		0		0	0.90
Impervious	2	0.04	0.07	0.90	0.04		0		0		0	0.03
Composite		10.97	8.99	Composite Runoff Coefficient								0.23

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)
Overland	356.3	14.5	4.07%	2.3	0.46	0.21	0.14	0.14	0.20	0.13	0.56	0.38

Appropriate calculated time to peak:	0.38	Appropriate Method:	Airport

Project Name: 10249 Hunsden Sideroad
Project Number: 0952-6305
Created By: AG/BP
Reviewed By: TE

D.A. NAME 102
D.A. AREA 4.84

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

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Sandy Silt	B	B	100	4.84
				0
				0
				0
Total Area				4.84

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

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B	0.40	55							4.44	58	4.84	279.51
Subtotal	0.40								4.44			

Composite Area Calculations	Total Pervious Area	4.84	
	Total Impervious Area	0	
	% Impervious	0.00%	
	Composite Curve Number	57.8	
	Total Area Check	4.84	

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Sandy Silt		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.40	4.02	0.21	0.40		0		0		0	0.08
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0	0		0		0		0		0	0
Cultivated	7	4.44	31.07	0.25	4.44		0		0		0	1.11
Impervious	2	0	0		0		0		0		0	0
Composite		4.84	7.25	Composite Runoff Coefficient								0.25

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)
Overland	184.1	7.5	4.07%	2.3	0.46	0.11	0.07	0.07	0.11	0.08	0.40	0.27

Appropriate calculated time to peak:	0.27	Appropriate Method:	Airport

Project Name: 10249 Hunsden Sideroad
Project Number: 0952-6305
Created By: AG/BP
Reviewed By: TE

D.A. NAME 103
D.A. AREA 4.57

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 103

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Sandy Silt	B	B	100	4.57
				0
				0
				0
Total Area				4.57

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

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B	1.52	55							3.05	58	4.57	260.49
Subtotal	1.52								3.05			

	Composite Area Calculations	Total Pervious Area	4.57
		Total Impervious Area	0
		% Impervious	0.00%
		Composite Curve Number	57.0
		Total Area Check	4.57

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Sandy Silt		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	1.52	15.23	0.21	1.52		0		0		0	0.32
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0	0		0		0		0		0	0
Cultivated	7	3.05	21.33	0.25	3.05		0		0		0	0.76
Impervious	2	0	0		0		0		0		0	0
Composite		4.57	8.00	Composite Runoff Coefficient								0.24

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)
Overland	242.9	8.75	3.60%	2.3	0.44	0.15	0.10	0.10	0.15	0.10	0.48	0.32

Appropriate calculated time to peak:	0.32	Appropriate Method:	Airport

Project Name: 10249 Hunsden Sideroad
Project Number: 0952-6305
Created By: AG/BP
Reviewed By: TE

D.A. NAME 201
D.A. AREA 12.44

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 201

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Sandy Silt	B	B	100	12.44
				0
				0
				0
Total Area				12.44

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		House		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B					0.01	98	0.28	98			0.29	28.47
Subtotal					0.01		0.28					

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B	7.74	55					4.41	61			12.15	694.70
Subtotal	7.74						4.41					

Composite Area Calculations	Total Pervious Area	12.15	
	Total Impervious Area	0.29	
	% Impervious	2.34%	
	Composite Curve Number	58.1	
	Total Area Check	12.44	

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Sandy Silt		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	7.74	77.36	0.21	7.74		0		0		0	1.62
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	4.41	22.07	0.12	4.41		0		0		0	0.53
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.29	0.58	0.90	0.29		0		0		0	0.26
Composite		12.44	8.04	Composite Runoff Coefficient								0.19

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)
Overland	356.3	14.5	4.07%	2.3	0.46	0.21	0.14	0.14	0.20	0.13	0.58	0.39

Appropriate calculated time to peak:	0.39	Appropriate Method:	Airport

Project Name: 10249 Hunsden Sideroad
Project Number: 0952-6305
Created By: AG/BP
Reviewed By: TE

D.A. NAME 202
D.A. AREA 3.50

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 202

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Sandy Silt	B	B	100	3.50
				0
				0
				0
Total Area				3.50

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		House		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B	0.19	98			0.13	98	0.14	98			0.46	44.85
Subtotal	0.19				0.13		0.14					

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B							3.04	61			3.04	185.58
Subtotal							3.04					

Composite Area Calculations	Total Pervious Area	3.04	
	Total Impervious Area	0.46	
	% Impervious	13.08%	
	Composite Curve Number	65.8	
	Total Area Check	3.50	

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Sandy Silt		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	3.04	15.21	0.12	3.04		0		0		0	0.37
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.46	0.92	0.90	0.46		0		0		0	0.41
Composite		3.50	4.61	Composite Runoff Coefficient								0.22

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)
Overland	47.5	0.94	1.98%	2.3	0.32	0.04	0.03	0.03	0.03	0.02	0.26	0.18

Appropriate calculated time to peak:	0.18	Appropriate Method:	Airport

Project Name: 10249 Hunsden Sideroad
Project Number: 0952-6305
Created By: AG/BP
Reviewed By: TE

D.A. NAME 203
D.A. AREA 0.07

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 203

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Sandy Silt	B	B	100	0.07
				0
				0
				0
Total Area				0.07

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		House		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B											0.00	0.00
Subtotal												

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B							0.07	61			0.07	4.27
Subtotal							0.07					

	Composite Area Calculations	Total Pervious Area	0.07
		Total Impervious Area	0.00
		% Impervious	0.00%
		Composite Curve Number	61.0
		Total Area Check	0.07

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Sandy Silt		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0.07	0.35	0.12	0.07		0		0		0	0.01
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0	0		0		0		0		0	0
Composite		0.07	5.00	Composite Runoff Coefficient								0.12

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)
Overland	12.5	0.25	2.00%	2.3	0.33	0.01	0.01	0.01	0.01	0.01	0.15	0.10

Appropriate calculated time to peak:	0.10	Appropriate Method:	Airport

Project Name: 10249 Hunsden Sideroad **D.A. NAME** **204**
Project Number: 0952-6305 **D.A. AREA (ha)** **1.39**
Created By: AG/BP
Reviewed By: TE

Hydrologic Parameters: CALIB STANDHYD Command
Pre-Development Drainage Area: Catchment 204

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Sandy Silt	B	B	100	1.39
				0
				0
				0
Total Area Check				1.39

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
B	0.19	98			0.07	98	0.01	98			0.28	27.24
Subtotal Area	0.19				0.07		0.01					

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
B							1.11	61			1.11	67.83
Subtotal Area							1.11					

Pervious Area Calculations	Total Pervious Area	1.11
	Composite Pervious Curve Numbe	61
Impervious Area Calculations	Total Directly Connected Area	0.27
	Total Indirectly Connected Area	0.01
	Total Impervious Area	0.28
	% X imp	0.00
	% T imp	20.00
	Total Area Check	1.39

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	1.11	5.56
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2.00	25	0.25
Impervious	2.0	1.50	20	0.013

Project Name: 10249 Hunsden Sideroad
Project Number: 0952-6305
Created By: AG/BP
Reviewed By: TE

D.A. NAME 205
D.A. AREA 0.83

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 205

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Sandy Silt	B	B	100	0.83
				0
				0
				0
Total Area				0.83

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		House		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B	0.06	98			0.01	98	0.03	98			0.11	10.80
Subtotal	0.06				0.01		0.03					

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B							0.72	61			0.72	43.91
Subtotal							0.72					

	Composite Area Calculations	Total Pervious Area	0.72
		Total Impervious Area	0.11
		% Impervious	13.28%
		Composite Curve Number	65.9
		Total Area Check	0.83

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Sandy Silt		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0	0		0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0.72	3.60	0.12	0.72		0		0		0	0.09
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.11	0.22	0.90	0.11		0		0		0	0.10
Composite		0.83	4.60	Composite Runoff Coefficient								0.22

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)
Overland	30	0.63	2.10%	2.3	0.33	0.03	0.02	0.02	0.03	0.02	0.20	0.14

Appropriate calculated time to peak:	0.14	Appropriate Method:	Airport

Project Name: 10249 Hunsden Sideroad
Project Number: 0952-6305
Created By: AG/BP
Reviewed By: TE

D.A. NAME 206
D.A. AREA 2.15

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment 206

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Sandy Silt	B	B	100	2.15
				0
				0
				0
Total Area				2.15

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		House		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B											0.00	0.00
Subtotal												

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
B	0.92	55					1.23	61			2.15	125.61
Subtotal	0.92						1.23					

Composite Area Calculations	Total Pervious Area	2.15	
	Total Impervious Area	0.00	
	% Impervious	0.00%	
	Composite Curve Number	58.4	
	Total Area Check	2.15	

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Sandy Silt		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.92	9.24	0.21	0.92		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	1.23	6.13	0.12	1.23		0		0		0	0.15
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0	0		0		0		0		0	0
Composite		2.15	7.15	Composite Runoff Coefficient								0.16

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)
Overland	50	4	8.00%	2.3	0.65	0.02	0.01	0.01	0.03	0.02	0.18	0.12

Appropriate calculated time to peak:	0.12	Appropriate Method:	Airport

Project:	10249 Hunsden Sideroad	**Date:**	6/23/2022
Project No.:	0952-6305	**Revised:**	6/29/2022
Description:	Bioswale Sizing	**Designed By:**	BP
		Checked By:	TE

Roadside Bioswale Sizing - Street 'A'

Parameter	Value	Units	Comment
Provided Bioswale Design Parameters			
Design Storm	100	year event	
Percolation Rate =	36.0	mm/hr	per Geotechnical Investigation (Soil Engineers Ltd., April 2022
Safety Correction Factor =	2.50		
Design Percolation Rate =	15.00	mm/hr	
Bioswale Depth =	**1.50**	**m**	0.3 m filter media layer and 1.2 m gravel storage layer
Maximum Footprint Available =	**1,144.0**	**m^2**	
LID Length =	**520.0**	**m**	
LID Width =	**1.8**	**m**	
Provided footprint =	**936.0**	**m^2**	Length x width
Percolation Rate (Design) =	15.0	mm/hr	
Provided Ponding Depth =	0.00	m	assumed no surface ponding to be conservative
Gravel Storage Depth =	1.20	m	
Void Space Ratio =	0.40		
Surface storage (ponding) =	0.0	m^3	
Gravel storage =	449.3	m^3	
Total Bioswale Volume Provided =	**449.3**	m^3	
Infiltration Rate =	**0.00156**	m^3/s	used in VO model

NOTES:

1. Surface storage and filter media storage not included in volume calculation to be conservative.

Project:	10249 Hunsden Sideroad	**Date:**	6/23/2022
Project No.:	0952-6305	**Revised:**	6/29/2022
Description:	Bioswale Sizing	**Designed By:**	BP
		Checked By:	TE

Roadside Bioswale Sizing - Street 'A' Cul-de-sac

Parameter	Value	Units	Comment
Provided Bioswale Design Parameters			
Design Storm	100	year event	
Percolation Rate =	36.0	mm/hr	per Geotechnical Investigation (Soil Engineers Ltd., April 2022
Safety Correction Factor =	2.50		
Design Percolation Rate =	15.00	mm/hr	
Bioswale Depth =	**1.50**	**m**	0.3 m filter media layer and 1.2 m gravel storage layer
Maximum Footprint Available =	**1,144.0**	**m^2**	
LID Length =	**320.0**	**m**	
LID Width =	**1.8**	**m**	
Provided footprint =	**576.0**	**m^2**	Length x width
Percolation Rate (Design) =	15.0	mm/hr	
Provided Ponding Depth =	0.00	m	assumed no surface ponding to be conservative
Gravel Storage Depth =	1.20	m	
Void Space Ratio =	0.40		
Surface storage (ponding) =	0.0	m^3	
Gravel storage =	276.5	m^3	
Total Bioswale Volume Provided =	**276.5**	m^3	
Infiltration Rate =	**0.00096**	m^3/s	used in VO model

NOTES:

1. Surface storage and filter media storage not included in volume calculation to be conservative.

Project:	10249 Hunsden Sideroad	**Date:**	6/23/2022
Project No.:	0952-6305	**Revised:**	6/29/2022
Description:	Bioswale Sizing	**Designed By:**	BP
		Checked By:	TE

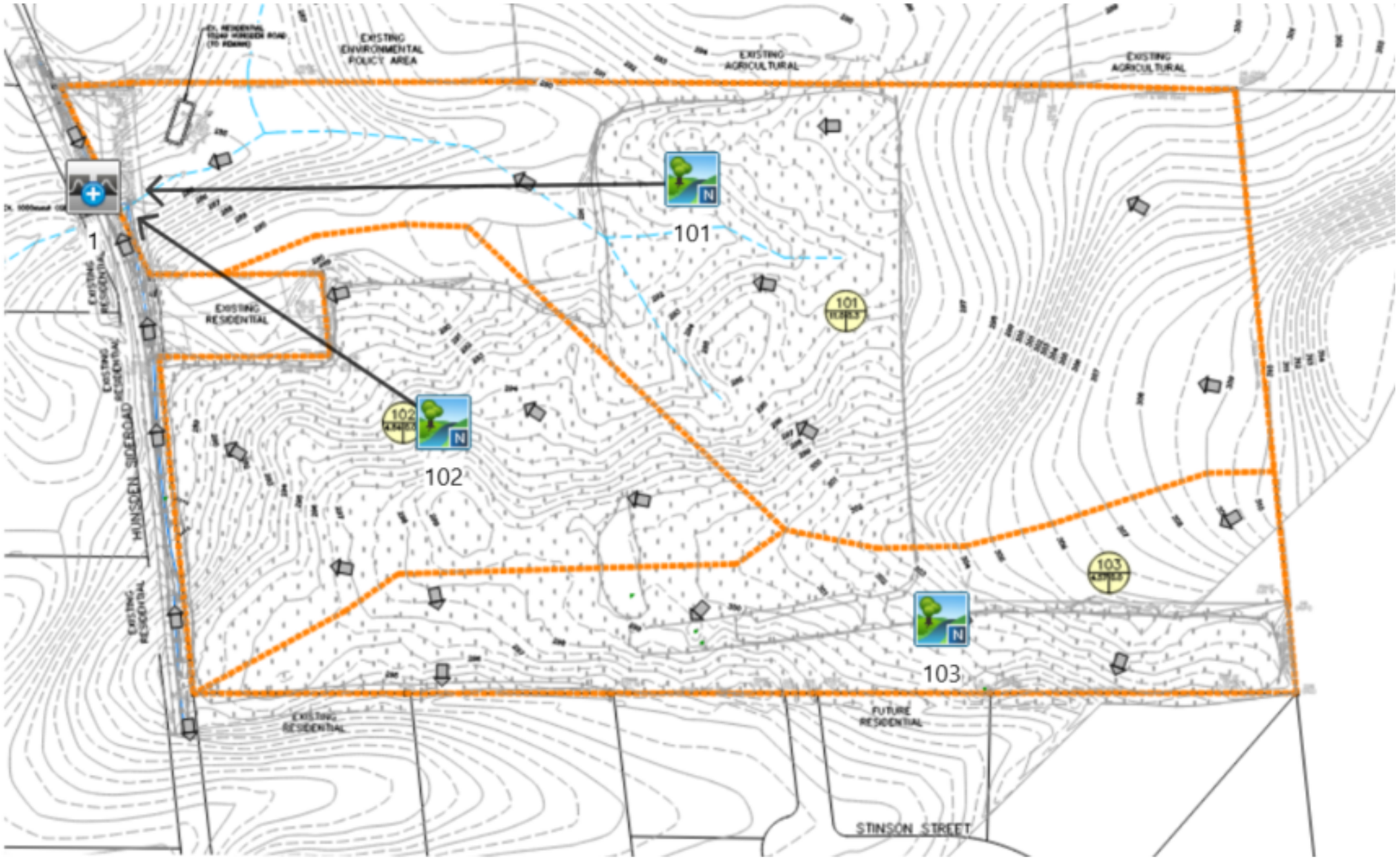
Roadside Bioswale Sizing - Street 'B'

Parameter	Value	Units	Comment
Provided Bioswale Design Parameters			
Design Storm	100	year event	
Percolation Rate =	36.0	mm/hr	per Geotechnical Investigation (Soil Engineers Ltd., April 2022
Safety Correction Factor =	2.50		
Design Percolation Rate =	15.00	mm/hr	
Bioswale Depth =	**1.50**	**m**	0.3 m filter media layer and 1.2 m gravel storage layer
Maximum Footprint Available =	**1,144.0**	**m^2**	
LID Length =	**180.0**	**m**	
LID Width =	**1.8**	**m**	
Provided footprint =	**324.0**	**m^2**	Length x width
Percolation Rate (Design) =	15.0	mm/hr	
Provided Ponding Depth =	0.00	m	assumed no surface ponding to be conservative
Gravel Storage Depth =	1.20	m	
Void Space Ratio =	0.40		
Surface storage (ponding) =	0.0	m^3	
Gravel storage =	155.5	m^3	
Total Bioswale Volume Provided =	**155.5**	m^3	
Infiltration Rate =	**0.00054**	m^3/s	used in VO model

NOTES:

1. Surface storage and filter media storage not included in volume calculation to be conservative.

PRE-DEVELOPMENT – VO SCHEMATIC



```
================================================================================
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       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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c4-6a04-460e-8585-94b568fcfefa\scenar


DATE: 06/29/2022                          TIME: 12:14:22

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
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  **********************************************
  ** SIMULATION : 01 - 2yr Chicago              **
  **********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 425.932
| Ptotal= 32.60 mm |                          B=   1.500
--------------------                          C=   0.721
```

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
0.17	2.60	1.17	14.29	2.17	5.35	3.17	3.01
0.33	2.92	1.33	73.21	2.33	4.68	3.33	2.83
0.50	3.35	1.50	18.03	2.50	4.19	3.50	2.67
0.67	3.99	1.67	10.56	2.67	3.80	3.67	2.53
0.83	5.01	1.83	7.80	2.83	3.49	3.83	2.40
1.00	7.05	2.00	6.31	3.00	3.23	4.00	2.29

CALIB			
NASHYD (0103)	Area (ha)=	4.57	Curve Number (CN)= 57.0
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.32	

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	2.60	1.083	14.29	2.083	5.35	3.08	3.01
0.167	2.60	1.167	14.29	2.167	5.35	3.17	3.01
0.250	2.92	1.250	73.21	2.250	4.68	3.25	2.83
0.333	2.92	1.333	73.21	2.333	4.68	3.33	2.83
0.417	3.35	1.417	18.03	2.417	4.19	3.42	2.67
0.500	3.35	1.500	18.03	2.500	4.19	3.50	2.67
0.583	3.99	1.583	10.56	2.583	3.80	3.58	2.53
0.667	3.99	1.667	10.56	2.667	3.80	3.67	2.53
0.750	5.01	1.750	7.80	2.750	3.49	3.75	2.40
0.833	5.01	1.833	7.80	2.833	3.49	3.83	2.40
0.917	7.05	1.917	6.31	2.917	3.23	3.92	2.29
1.000	7.05	2.000	6.31	3.000	3.23	4.00	2.29

Unit Hyd Qpeak (cms)= 0.545

PEAK FLOW (cms)= 0.021 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 2.797
TOTAL RAINFALL (mm)= 32.596
RUNOFF COEFFICIENT = 0.086

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

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--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=  10.97   Curve Number   (CN)= 56.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.99   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.38

         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    2.60 | 1.083   14.29 | 2.083    5.35 |  3.08    3.01
              0.167    2.60 | 1.167   14.29 | 2.167    5.35 |  3.17    3.01
              0.250    2.92 | 1.250   73.21 | 2.250    4.68 |  3.25    2.83
              0.333    2.92 | 1.333   73.21 | 2.333    4.68 |  3.33    2.83
              0.417    3.35 | 1.417   18.03 | 2.417    4.19 |  3.42    2.67
              0.500    3.35 | 1.500   18.03 | 2.500    4.19 |  3.50    2.67
              0.583    3.99 | 1.583   10.56 | 2.583    3.80 |  3.58    2.53
              0.667    3.99 | 1.667   10.56 | 2.667    3.80 |  3.67    2.53
              0.750    5.01 | 1.750    7.80 | 2.750    3.49 |  3.75    2.40
              0.833    5.01 | 1.833    7.80 | 2.833    3.49 |  3.83    2.40
              0.917    7.05 | 1.917    6.31 | 2.917    3.23 |  3.92    2.29
              1.000    7.05 | 2.000    6.31 | 3.000    3.23 |  4.00    2.29

     Unit Hyd Qpeak  (cms)=   1.103

     PEAK FLOW       (cms)=   0.041 (i)
     TIME TO PEAK    (hrs)=   1.917
     RUNOFF VOLUME    (mm)=   2.505
     TOTAL RAINFALL   (mm)=  32.596
     RUNOFF COEFFICIENT   =   0.077

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   4.84   Curve Number   (CN)= 57.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.25   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.27

         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	2.60	1.083	14.29	2.083	5.35	3.08	3.01
0.167	2.60	1.167	14.29	2.167	5.35	3.17	3.01
0.250	2.92	1.250	73.21	2.250	4.68	3.25	2.83
0.333	2.92	1.333	73.21	2.333	4.68	3.33	2.83
0.417	3.35	1.417	18.03	2.417	4.19	3.42	2.67
0.500	3.35	1.500	18.03	2.500	4.19	3.50	2.67
0.583	3.99	1.583	10.56	2.583	3.80	3.58	2.53
0.667	3.99	1.667	10.56	2.667	3.80	3.67	2.53
0.750	5.01	1.750	7.80	2.750	3.49	3.75	2.40
0.833	5.01	1.833	7.80	2.833	3.49	3.83	2.40
0.917	7.05	1.917	6.31	2.917	3.23	3.92	2.29
1.000	7.05	2.000	6.31	3.000	3.23	4.00	2.29

Unit Hyd Qpeak (cms)= 0.685

PEAK FLOW (cms)= 0.028 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 3.046
TOTAL RAINFALL (mm)= 32.596
RUNOFF COEFFICIENT = 0.093

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

ADD HYD (0001)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0101):	10.97	0.041	1.92	2.51
+	ID2= 2 (0102):	4.84	0.028	1.67	3.05
	ID = 3 (0001):	15.81	0.066	1.75	2.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
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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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DATE: 06/29/2022 TIME: 12:14:22

USER:

COMMENTS: _____

****
** SIMULATION : 02 - 5yr Chicago **
****

| CHICAGO STORM |
| Ptotal= 44.01 mm |

IDF curve parameters: A= 575.144
B= 1.500
C= 0.721
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
0.17	3.50	1.17	19.29	2.17	7.23	3.17	4.07
0.33	3.94	1.33	98.86	2.33	6.33	3.33	3.82
0.50	4.53	1.50	24.35	2.50	5.65	3.50	3.60
0.67	5.38	1.67	14.25	2.67	5.13	3.67	3.41
0.83	6.77	1.83	10.53	2.83	4.71	3.83	3.25

1.00	9.52	2.00	8.52	3.00	4.36	4.00	3.10

CALIB					
NASHYD (0103)	Area (ha)=	4.57	Curve Number (CN)=	57.0	
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.32			

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	3.50	1.083	19.29	2.083	7.23	3.08	4.07
0.167	3.50	1.167	19.29	2.167	7.23	3.17	4.07
0.250	3.94	1.250	98.86	2.250	6.33	3.25	3.82
0.333	3.94	1.333	98.86	2.333	6.33	3.33	3.82
0.417	4.53	1.417	24.35	2.417	5.65	3.42	3.60
0.500	4.53	1.500	24.35	2.500	5.65	3.50	3.60
0.583	5.38	1.583	14.25	2.583	5.13	3.58	3.41
0.667	5.38	1.667	14.25	2.667	5.13	3.67	3.41
0.750	6.77	1.750	10.53	2.750	4.71	3.75	3.25
0.833	6.77	1.833	10.53	2.833	4.71	3.83	3.25
0.917	9.52	1.917	8.52	2.917	4.36	3.92	3.10
1.000	9.52	2.000	8.52	3.000	4.36	4.00	3.10

Unit Hyd Qpeak (cms)= 0.545

PEAK FLOW (cms)= 0.047 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 5.696
TOTAL RAINFALL (mm)= 44.015
RUNOFF COEFFICIENT = 0.129

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

CALIB					
NASHYD (0101)	Area (ha)=	10.97	Curve Number (CN)=	56.1	
ID= 1 DT= 5.0 min	Ia (mm)=	8.99	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.38			

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	3.50	1.083	19.29	2.083	7.23	3.08	4.07
0.167	3.50	1.167	19.29	2.167	7.23	3.17	4.07
0.250	3.94	1.250	98.86	2.250	6.33	3.25	3.82
0.333	3.94	1.333	98.86	2.333	6.33	3.33	3.82
0.417	4.53	1.417	24.35	2.417	5.65	3.42	3.60
0.500	4.53	1.500	24.35	2.500	5.65	3.50	3.60
0.583	5.38	1.583	14.25	2.583	5.13	3.58	3.41
0.667	5.38	1.667	14.25	2.667	5.13	3.67	3.41
0.750	6.77	1.750	10.53	2.750	4.71	3.75	3.25
0.833	6.77	1.833	10.53	2.833	4.71	3.83	3.25
0.917	9.52	1.917	8.52	2.917	4.36	3.92	3.10
1.000	9.52	2.000	8.52	3.000	4.36	4.00	3.10

Unit Hyd Qpeak (cms)= 1.103

PEAK FLOW (cms)= 0.093 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 5.246
TOTAL RAINFALL (mm)= 44.015
RUNOFF COEFFICIENT = 0.119

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

CALIB			
NASHYD (0102)	Area (ha)=	4.84	Curve Number (CN)= 57.8
ID= 1 DT= 5.0 min	Ia (mm)=	7.25	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.27	

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	3.50	1.083	19.29	2.083	7.23	3.08	4.07
0.167	3.50	1.167	19.29	2.167	7.23	3.17	4.07
0.250	3.94	1.250	98.86	2.250	6.33	3.25	3.82
0.333	3.94	1.333	98.86	2.333	6.33	3.33	3.82
0.417	4.53	1.417	24.35	2.417	5.65	3.42	3.60
0.500	4.53	1.500	24.35	2.500	5.65	3.50	3.60
0.583	5.38	1.583	14.25	2.583	5.13	3.58	3.41
0.667	5.38	1.667	14.25	2.667	5.13	3.67	3.41
0.750	6.77	1.750	10.53	2.750	4.71	3.75	3.25
0.833	6.77	1.833	10.53	2.833	4.71	3.83	3.25
0.917	9.52	1.917	8.52	2.917	4.36	3.92	3.10
1.000	9.52	2.000	8.52	3.000	4.36	4.00	3.10

```
     Unit Hyd Qpeak  (cms)=   0.685

     PEAK FLOW       (cms)=   0.060 (i)
     TIME TO PEAK    (hrs)=   1.667
     RUNOFF VOLUME    (mm)=   6.079
     TOTAL RAINFALL   (mm)=  44.015
     RUNOFF COEFFICIENT   =   0.138

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

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):    10.97   0.093     1.83     5.25
      + ID2= 2 (  0102):     4.84   0.060     1.67     6.08
        ================================================
        ID = 3 (  0001):    15.81   0.148     1.75     5.50

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       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: 06/29/2022 TIME: 12:14:22

USER:

COMMENTS: _____

****
** SIMULATION : 03 - 10yr Chicago **
****

CHICAGO STORM	Ptotal= 51.68 mm

IDF curve parameters: A= 667.963
B= 1.500
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
0.17	4.14	1.17	22.67	2.17	8.53	3.17	4.81
0.33	4.65	1.33	115.37	2.33	7.46	3.33	4.51
0.50	5.35	1.50	28.60	2.50	6.67	3.50	4.26
0.67	6.36	1.67	16.77	2.67	6.05	3.67	4.04
0.83	7.99	1.83	12.41	2.83	5.56	3.83	3.84
1.00	11.21	2.00	10.04	3.00	5.15	4.00	3.66

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

Area (ha)= 4.57 Curve Number (CN)= 57.0
Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.32

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	4.14	1.083	22.67	2.083	8.53	3.08	4.81
0.167	4.14	1.167	22.67	2.167	8.53	3.17	4.81
0.250	4.65	1.250	115.37	2.250	7.46	3.25	4.51
0.333	4.65	1.333	115.37	2.333	7.46	3.33	4.51
0.417	5.35	1.417	28.60	2.417	6.67	3.42	4.26
0.500	5.35	1.500	28.60	2.500	6.67	3.50	4.26
0.583	6.36	1.583	16.77	2.583	6.05	3.58	4.04
0.667	6.36	1.667	16.77	2.667	6.05	3.67	4.04
0.750	7.99	1.750	12.41	2.750	5.56	3.75	3.84
0.833	7.99	1.833	12.41	2.833	5.56	3.83	3.84
0.917	11.21	1.917	10.04	2.917	5.15	3.92	3.66
1.000	11.21	2.000	10.04	3.000	5.15	4.00	3.66

Unit Hyd Qpeak (cms)= 0.545

PEAK FLOW (cms)= 0.069 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 8.107
TOTAL RAINFALL (mm)= 51.682
RUNOFF COEFFICIENT = 0.157

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

CALIB NASHYD (0101)	ID= 1 DT= 5.0 min	Area (ha)= 10.97	Curve Number (CN)= 56.1	Ia (mm)= 8.99	# of Linear Res.(N)= 3.00	U.H. Tp(hrs)= 0.38

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	4.14	1.083	22.67	2.083	8.53	3.08	4.81
0.167	4.14	1.167	22.67	2.167	8.53	3.17	4.81
0.250	4.65	1.250	115.37	2.250	7.46	3.25	4.51
0.333	4.65	1.333	115.37	2.333	7.46	3.33	4.51
0.417	5.35	1.417	28.60	2.417	6.67	3.42	4.26
0.500	5.35	1.500	28.60	2.500	6.67	3.50	4.26
0.583	6.36	1.583	16.77	2.583	6.05	3.58	4.04
0.667	6.36	1.667	16.77	2.667	6.05	3.67	4.04
0.750	7.99	1.750	12.41	2.750	5.56	3.75	3.84
0.833	7.99	1.833	12.41	2.833	5.56	3.83	3.84
0.917	11.21	1.917	10.04	2.917	5.15	3.92	3.66

1.000	11.21	2.000	10.04	3.000	5.15	4.00	3.66

Unit Hyd Qpeak (cms)= 1.103

PEAK FLOW (cms)= 0.138 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 7.547
TOTAL RAINFALL (mm)= 51.682
RUNOFF COEFFICIENT = 0.146

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

CALIB			
NASHYD (0102)	Area (ha)=	4.84	Curve Number (CN)= 57.8
ID= 1 DT= 5.0 min	Ia (mm)=	7.25	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.27	

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	4.14	1.083	22.67	2.083	8.53	3.08	4.81
0.167	4.14	1.167	22.67	2.167	8.53	3.17	4.81
0.250	4.65	1.250	115.37	2.250	7.46	3.25	4.51
0.333	4.65	1.333	115.37	2.333	7.46	3.33	4.51
0.417	5.35	1.417	28.60	2.417	6.67	3.42	4.26
0.500	5.35	1.500	28.60	2.500	6.67	3.50	4.26
0.583	6.36	1.583	16.77	2.583	6.05	3.58	4.04
0.667	6.36	1.667	16.77	2.667	6.05	3.67	4.04
0.750	7.99	1.750	12.41	2.750	5.56	3.75	3.84
0.833	7.99	1.833	12.41	2.833	5.56	3.83	3.84
0.917	11.21	1.917	10.04	2.917	5.15	3.92	3.66
1.000	11.21	2.000	10.04	3.000	5.15	4.00	3.66

Unit Hyd Qpeak (cms)= 0.685

PEAK FLOW (cms)= 0.088 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 8.583
TOTAL RAINFALL (mm)= 51.682
RUNOFF COEFFICIENT = 0.166

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

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--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):    10.97   0.138     1.83     7.55
      + ID2= 2 (  0102):     4.84   0.088     1.58     8.58
        ====================================================
        ID = 3 (  0001):    15.81   0.218     1.75     7.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       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: 06/29/2022                          TIME: 12:14:22

USER:


COMMENTS: _____________________________________________________________
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  ********************************************
  ** SIMULATION : 04- 25yr Chicago           **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 786.108
| Ptotal= 61.16 mm |                          B=   1.500
--------------------                          C=   0.718
                       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
                0.17    4.92 |  1.17   26.84 |  2.17   10.11 |  3.17    5.70
                0.33    5.52 |  1.33  136.11 |  2.33    8.85 |  3.33    5.36
                0.50    6.35 |  1.50   33.84 |  2.50    7.91 |  3.50    5.05
                0.67    7.54 |  1.67   19.87 |  2.67    7.18 |  3.67    4.79
                0.83    9.47 |  1.83   14.70 |  2.83    6.60 |  3.83    4.56
                1.00   13.29 |  2.00   11.90 |  3.00    6.11 |  4.00    4.35


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--------------------
| CALIB            |
| NASHYD   (  0103)|   Area    (ha)=   4.57   Curve Number   (CN)= 57.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.32

         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    4.92 | 1.083   26.84 | 2.083   10.11 |  3.08    5.70
               0.167    4.92 | 1.167   26.84 | 2.167   10.11 |  3.17    5.70
               0.250    5.52 | 1.250  136.11 | 2.250    8.85 |  3.25    5.36
               0.333    5.52 | 1.333  136.11 | 2.333    8.85 |  3.33    5.36
               0.417    6.35 | 1.417   33.84 | 2.417    7.91 |  3.42    5.05
               0.500    6.35 | 1.500   33.84 | 2.500    7.91 |  3.50    5.05
               0.583    7.54 | 1.583   19.87 | 2.583    7.18 |  3.58    4.79
               0.667    7.54 | 1.667   19.87 | 2.667    7.18 |  3.67    4.79
               0.750    9.47 | 1.750   14.70 | 2.750    6.60 |  3.75    4.56
               0.833    9.47 | 1.833   14.70 | 2.833    6.60 |  3.83    4.56
```

0.917	13.29	1.917	11.90	2.917	6.11	3.92	4.35
1.000	13.29	2.000	11.90	3.000	6.11	4.00	4.35

Unit Hyd Qpeak (cms)= 0.545

PEAK FLOW (cms)= 0.102 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 11.541
TOTAL RAINFALL (mm)= 61.157
RUNOFF COEFFICIENT = 0.189

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

CALIB			
NASHYD (0101)	Area (ha)= 10.97	Curve Number (CN)= 56.1	
ID= 1 DT= 5.0 min	Ia (mm)= 8.99	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.38		

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	4.92	1.083	26.84	2.083	10.11	3.08	5.70
0.167	4.92	1.167	26.84	2.167	10.11	3.17	5.70
0.250	5.52	1.250	136.11	2.250	8.85	3.25	5.36
0.333	5.52	1.333	136.11	2.333	8.85	3.33	5.36
0.417	6.35	1.417	33.84	2.417	7.91	3.42	5.05
0.500	6.35	1.500	33.84	2.500	7.91	3.50	5.05
0.583	7.54	1.583	19.87	2.583	7.18	3.58	4.79
0.667	7.54	1.667	19.87	2.667	7.18	3.67	4.79
0.750	9.47	1.750	14.70	2.750	6.60	3.75	4.56
0.833	9.47	1.833	14.70	2.833	6.60	3.83	4.56
0.917	13.29	1.917	11.90	2.917	6.11	3.92	4.35
1.000	13.29	2.000	11.90	3.000	6.11	4.00	4.35

Unit Hyd Qpeak (cms)= 1.103

PEAK FLOW (cms)= 0.204 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 10.844
TOTAL RAINFALL (mm)= 61.157
RUNOFF COEFFICIENT = 0.177

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

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--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   4.84   Curve Number   (CN)= 57.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.25   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.27

        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	4.92	1.083	26.84	2.083	10.11	3.08	5.70
0.167	4.92	1.167	26.84	2.167	10.11	3.17	5.70
0.250	5.52	1.250	136.11	2.250	8.85	3.25	5.36
0.333	5.52	1.333	136.11	2.333	8.85	3.33	5.36
0.417	6.35	1.417	33.84	2.417	7.91	3.42	5.05
0.500	6.35	1.500	33.84	2.500	7.91	3.50	5.05
0.583	7.54	1.583	19.87	2.583	7.18	3.58	4.79
0.667	7.54	1.667	19.87	2.667	7.18	3.67	4.79
0.750	9.47	1.750	14.70	2.750	6.60	3.75	4.56
0.833	9.47	1.833	14.70	2.833	6.60	3.83	4.56
0.917	13.29	1.917	11.90	2.917	6.11	3.92	4.35
1.000	13.29	2.000	11.90	3.000	6.11	4.00	4.35

```
     Unit Hyd Qpeak  (cms)=   0.685

     PEAK FLOW       (cms)=   0.128 (i)
     TIME TO PEAK    (hrs)=   1.583
     RUNOFF VOLUME    (mm)=  12.134
     TOTAL RAINFALL   (mm)=  61.157
     RUNOFF COEFFICIENT   =   0.198

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

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):    10.97   0.204     1.75    10.84
      + ID2= 2 (  0102):     4.84   0.128     1.58    12.13
        ================================================
        ID = 3 (  0001):    15.81   0.321     1.67    11.24

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

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       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:
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a0-2f5c-483f-a91b-1afed2f0909a\scenar
  Summary filename:
C:\Users\bpond\AppData\Local\Civica\VH5\62082276-f617-4be2-807a-c20b5723c417\b1a44e
a0-2f5c-483f-a91b-1afed2f0909a\scenar


DATE: 06/29/2022                          TIME: 12:14:22

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : 05 - 50yr Chicago             **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 878.307
| Ptotal= 68.33 mm |                          B=   1.500
--------------------                          C=   0.718
                       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
0.17	5.49	1.17	29.99	2.17	11.30	3.17	6.37
0.33	6.17	1.33	152.08	2.33	9.89	3.33	5.98
0.50	7.09	1.50	37.81	2.50	8.84	3.50	5.65
0.67	8.43	1.67	22.20	2.67	8.03	3.67	5.35
0.83	10.58	1.83	16.43	2.83	7.37	3.83	5.09
1.00	14.85	2.00	13.30	3.00	6.83	4.00	4.86

CALIB			
NASHYD (0103)	Area (ha)=	4.57	Curve Number (CN)= 57.0
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.32	

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	5.49	1.083	29.99	2.083	11.30	3.08	6.37
0.167	5.49	1.167	29.99	2.167	11.30	3.17	6.37
0.250	6.17	1.250	152.08	2.250	9.89	3.25	5.98
0.333	6.17	1.333	152.08	2.333	9.89	3.33	5.98
0.417	7.09	1.417	37.81	2.417	8.84	3.42	5.65
0.500	7.09	1.500	37.81	2.500	8.84	3.50	5.65
0.583	8.43	1.583	22.20	2.583	8.03	3.58	5.35
0.667	8.43	1.667	22.20	2.667	8.03	3.67	5.35
0.750	10.58	1.750	16.43	2.750	7.37	3.75	5.09
0.833	10.58	1.833	16.43	2.833	7.37	3.83	5.09
0.917	14.85	1.917	13.30	2.917	6.83	3.92	4.86
1.000	14.85	2.000	13.30	3.000	6.83	4.00	4.86

Unit Hyd Qpeak (cms)= 0.545

PEAK FLOW (cms)= 0.130 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 14.442
TOTAL RAINFALL (mm)= 68.330
RUNOFF COEFFICIENT = 0.211

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

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=  10.97   Curve Number   (CN)= 56.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.99   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.38

         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    5.49 | 1.083   29.99 | 2.083   11.30 |  3.08    6.37
              0.167    5.49 | 1.167   29.99 | 2.167   11.30 |  3.17    6.37
              0.250    6.17 | 1.250  152.08 | 2.250    9.89 |  3.25    5.98
              0.333    6.17 | 1.333  152.08 | 2.333    9.89 |  3.33    5.98
              0.417    7.09 | 1.417   37.81 | 2.417    8.84 |  3.42    5.65
              0.500    7.09 | 1.500   37.81 | 2.500    8.84 |  3.50    5.65
              0.583    8.43 | 1.583   22.20 | 2.583    8.03 |  3.58    5.35
              0.667    8.43 | 1.667   22.20 | 2.667    8.03 |  3.67    5.35
              0.750   10.58 | 1.750   16.43 | 2.750    7.37 |  3.75    5.09
              0.833   10.58 | 1.833   16.43 | 2.833    7.37 |  3.83    5.09
              0.917   14.85 | 1.917   13.30 | 2.917    6.83 |  3.92    4.86
              1.000   14.85 | 2.000   13.30 | 3.000    6.83 |  4.00    4.86

     Unit Hyd Qpeak  (cms)=   1.103

     PEAK FLOW       (cms)=   0.261 (i)
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  13.641
     TOTAL RAINFALL   (mm)=  68.330
     RUNOFF COEFFICIENT   =   0.200

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0102)|   Area    (ha)=   4.84   Curve Number   (CN)= 57.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.25   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.27

         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    5.49 | 1.083   29.99 | 2.083   11.30 |  3.08    6.37
```

```
                0.167    5.49 | 1.167   29.99 | 2.167   11.30 |  3.17    6.37
                0.250    6.17 | 1.250  152.08 | 2.250    9.89 |  3.25    5.98
                0.333    6.17 | 1.333  152.08 | 2.333    9.89 |  3.33    5.98
                0.417    7.09 | 1.417   37.81 | 2.417    8.84 |  3.42    5.65
                0.500    7.09 | 1.500   37.81 | 2.500    8.84 |  3.50    5.65
                0.583    8.43 | 1.583   22.20 | 2.583    8.03 |  3.58    5.35
                0.667    8.43 | 1.667   22.20 | 2.667    8.03 |  3.67    5.35
                0.750   10.58 | 1.750   16.43 | 2.750    7.37 |  3.75    5.09
                0.833   10.58 | 1.833   16.43 | 2.833    7.37 |  3.83    5.09
                0.917   14.85 | 1.917   13.30 | 2.917    6.83 |  3.92    4.86
                1.000   14.85 | 2.000   13.30 | 3.000    6.83 |  4.00    4.86

     Unit Hyd Qpeak  (cms)=   0.685

     PEAK FLOW       (cms)=   0.162 (i)
     TIME TO PEAK    (hrs)=   1.583
     RUNOFF VOLUME    (mm)=  15.124
     TOTAL RAINFALL   (mm)=  68.330
     RUNOFF COEFFICIENT   =   0.221

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

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):    10.97   0.261     1.75    13.64
      + ID2= 2 (  0102):     4.84   0.162     1.58    15.12
        ================================================
        ID = 3 (  0001):    15.81   0.411     1.67    14.09

     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 6.2.2005)
       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:
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Summary filename:
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DATE: 06/29/2022 TIME: 12:14:22

USER:

COMMENTS: _____

****
** SIMULATION : 06 - 100yr Chicago **
****

| CHICAGO STORM |
| Ptotal= 75.17 mm |

IDF curve parameters: A= 971.524
B= 1.500
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
0.17	6.02	1.17	32.97	2.17	12.40	3.17	6.99
0.33	6.77	1.33	167.81	2.33	10.86	3.33	6.56
0.50	7.78	1.50	41.59	2.50	9.70	3.50	6.19
0.67	9.24	1.67	24.40	2.67	8.81	3.67	5.87
0.83	11.62	1.83	18.04	2.83	8.08	3.83	5.58
1.00	16.31	2.00	14.60	3.00	7.49	4.00	5.33

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0103)|   Area    (ha)=   4.57   Curve Number   (CN)= 57.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.32

         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    6.02 | 1.083   32.97 | 2.083   12.40 |  3.08    6.99
              0.167    6.02 | 1.167   32.97 | 2.167   12.40 |  3.17    6.99
              0.250    6.77 | 1.250  167.81 | 2.250   10.86 |  3.25    6.56
              0.333    6.77 | 1.333  167.81 | 2.333   10.86 |  3.33    6.56
              0.417    7.78 | 1.417   41.59 | 2.417    9.70 |  3.42    6.19
              0.500    7.78 | 1.500   41.59 | 2.500    9.70 |  3.50    6.19
              0.583    9.24 | 1.583   24.40 | 2.583    8.81 |  3.58    5.87
              0.667    9.24 | 1.667   24.40 | 2.667    8.81 |  3.67    5.87
              0.750   11.62 | 1.750   18.04 | 2.750    8.08 |  3.75    5.58
              0.833   11.62 | 1.833   18.04 | 2.833    8.08 |  3.83    5.58
              0.917   16.31 | 1.917   14.60 | 2.917    7.49 |  3.92    5.33
              1.000   16.31 | 2.000   14.60 | 3.000    7.49 |  4.00    5.33

     Unit Hyd Qpeak  (cms)=   0.545

     PEAK FLOW       (cms)=   0.160 (i)
     TIME TO PEAK    (hrs)=   1.667
     RUNOFF VOLUME    (mm)=  17.429
     TOTAL RAINFALL   (mm)=  75.169
     RUNOFF COEFFICIENT   =   0.232

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=  10.97   Curve Number   (CN)= 56.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.99   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.38

         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	6.02	1.083	32.97	2.083	12.40	3.08	6.99
0.167	6.02	1.167	32.97	2.167	12.40	3.17	6.99
0.250	6.77	1.250	167.81	2.250	10.86	3.25	6.56
0.333	6.77	1.333	167.81	2.333	10.86	3.33	6.56
0.417	7.78	1.417	41.59	2.417	9.70	3.42	6.19
0.500	7.78	1.500	41.59	2.500	9.70	3.50	6.19
0.583	9.24	1.583	24.40	2.583	8.81	3.58	5.87
0.667	9.24	1.667	24.40	2.667	8.81	3.67	5.87
0.750	11.62	1.750	18.04	2.750	8.08	3.75	5.58
0.833	11.62	1.833	18.04	2.833	8.08	3.83	5.58
0.917	16.31	1.917	14.60	2.917	7.49	3.92	5.33
1.000	16.31	2.000	14.60	3.000	7.49	4.00	5.33

Unit Hyd Qpeak (cms)= 1.103

PEAK FLOW (cms)= 0.323 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 16.528
TOTAL RAINFALL (mm)= 75.169
RUNOFF COEFFICIENT = 0.220

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

CALIB			
NASHYD (0102)	Area (ha)= 4.84	Curve Number (CN)= 57.8	
ID= 1 DT= 5.0 min	Ia (mm)= 7.25	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.27		

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	6.02	1.083	32.97	2.083	12.40	3.08	6.99
0.167	6.02	1.167	32.97	2.167	12.40	3.17	6.99
0.250	6.77	1.250	167.81	2.250	10.86	3.25	6.56
0.333	6.77	1.333	167.81	2.333	10.86	3.33	6.56
0.417	7.78	1.417	41.59	2.417	9.70	3.42	6.19
0.500	7.78	1.500	41.59	2.500	9.70	3.50	6.19
0.583	9.24	1.583	24.40	2.583	8.81	3.58	5.87
0.667	9.24	1.667	24.40	2.667	8.81	3.67	5.87
0.750	11.62	1.750	18.04	2.750	8.08	3.75	5.58
0.833	11.62	1.833	18.04	2.833	8.08	3.83	5.58
0.917	16.31	1.917	14.60	2.917	7.49	3.92	5.33
1.000	16.31	2.000	14.60	3.000	7.49	4.00	5.33

Unit Hyd Qpeak (cms)= 0.685

```
     PEAK FLOW       (cms)=   0.199 (i)
     TIME TO PEAK    (hrs)=   1.583
     RUNOFF VOLUME    (mm)=  18.196
     TOTAL RAINFALL   (mm)=  75.169
     RUNOFF COEFFICIENT   =   0.242

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

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0101):    10.97   0.323     1.75    16.53
      + ID2= 2 (  0102):     4.84   0.199     1.58    18.20
        ================================================
        ID = 3 (  0001):    15.81   0.506     1.67    17.04

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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 FINISH
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POST-DEVELOPMENT w/ MITIGATION – VO SCHEMATIC

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       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:
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4a-ba38-4a69-a6f9-b2ddbbcdeaf0\scenar


DATE: 06/29/2022                          TIME: 12:14:26

USER:



COMMENTS: _____________________________________________________________


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  **********************************************
  ** SIMULATION : 01 - 2yr Chicago             **
  **********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 425.932
| Ptotal= 32.60 mm |                          B=   1.500
--------------------                          C=   0.721
```

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
0.17	2.60	1.17	14.29	2.17	5.35	3.17	3.01
0.33	2.92	1.33	73.21	2.33	4.68	3.33	2.83
0.50	3.35	1.50	18.03	2.50	4.19	3.50	2.67
0.67	3.99	1.67	10.56	2.67	3.80	3.67	2.53
0.83	5.01	1.83	7.80	2.83	3.49	3.83	2.40
1.00	7.05	2.00	6.31	3.00	3.23	4.00	2.29

CALIB			
NASHYD (0201)	Area (ha)= 12.44	Curve Number (CN)= 58.1	
ID= 1 DT= 5.0 min	Ia (mm)= 8.04	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.39		

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	2.60	1.083	14.29	2.083	5.35	3.08	3.01
0.167	2.60	1.167	14.29	2.167	5.35	3.17	3.01
0.250	2.92	1.250	73.21	2.250	4.68	3.25	2.83
0.333	2.92	1.333	73.21	2.333	4.68	3.33	2.83
0.417	3.35	1.417	18.03	2.417	4.19	3.42	2.67
0.500	3.35	1.500	18.03	2.500	4.19	3.50	2.67
0.583	3.99	1.583	10.56	2.583	3.80	3.58	2.53
0.667	3.99	1.667	10.56	2.667	3.80	3.67	2.53
0.750	5.01	1.750	7.80	2.750	3.49	3.75	2.40
0.833	5.01	1.833	7.80	2.833	3.49	3.83	2.40
0.917	7.05	1.917	6.31	2.917	3.23	3.92	2.29
1.000	7.05	2.000	6.31	3.000	3.23	4.00	2.29

Unit Hyd Qpeak (cms)= 1.218

PEAK FLOW (cms)= 0.054 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 2.902
TOTAL RAINFALL (mm)= 32.596
RUNOFF COEFFICIENT = 0.089

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

CALIB			
NASHYD (0203)	Area (ha)=	0.07	Curve Number (CN)= 61.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.10	

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	2.60	1.083	14.29	2.083	5.35	3.08	3.01
0.167	2.60	1.167	14.29	2.167	5.35	3.17	3.01
0.250	2.92	1.250	73.21	2.250	4.68	3.25	2.83
0.333	2.92	1.333	73.21	2.333	4.68	3.33	2.83
0.417	3.35	1.417	18.03	2.417	4.19	3.42	2.67
0.500	3.35	1.500	18.03	2.500	4.19	3.50	2.67
0.583	3.99	1.583	10.56	2.583	3.80	3.58	2.53
0.667	3.99	1.667	10.56	2.667	3.80	3.67	2.53
0.750	5.01	1.750	7.80	2.750	3.49	3.75	2.40
0.833	5.01	1.833	7.80	2.833	3.49	3.83	2.40
0.917	7.05	1.917	6.31	2.917	3.23	3.92	2.29
1.000	7.05	2.000	6.31	3.000	3.23	4.00	2.29

Unit Hyd Qpeak (cms)= 0.027

PEAK FLOW (cms)= 0.001 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 3.899
TOTAL RAINFALL (mm)= 32.596
RUNOFF COEFFICIENT = 0.120

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

CALIB			
NASHYD (0202)	Area (ha)=	3.50	Curve Number (CN)= 65.8
ID= 1 DT= 5.0 min	Ia (mm)=	4.61	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.18	

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	2.60	1.083	14.29	2.083	5.35	3.08	3.01
0.167	2.60	1.167	14.29	2.167	5.35	3.17	3.01
0.250	2.92	1.250	73.21	2.250	4.68	3.25	2.83
0.333	2.92	1.333	73.21	2.333	4.68	3.33	2.83
0.417	3.35	1.417	18.03	2.417	4.19	3.42	2.67
0.500	3.35	1.500	18.03	2.500	4.19	3.50	2.67
0.583	3.99	1.583	10.56	2.583	3.80	3.58	2.53
0.667	3.99	1.667	10.56	2.667	3.80	3.67	2.53
0.750	5.01	1.750	7.80	2.750	3.49	3.75	2.40
0.833	5.01	1.833	7.80	2.833	3.49	3.83	2.40
0.917	7.05	1.917	6.31	2.917	3.23	3.92	2.29
1.000	7.05	2.000	6.31	3.000	3.23	4.00	2.29

Unit Hyd Qpeak (cms)= 0.743

PEAK FLOW (cms)= 0.046 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 4.881
TOTAL RAINFALL (mm)= 32.596
RUNOFF COEFFICIENT = 0.150

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

RESERVOIR(0050)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	**** WARNING : FIRST OUTFLOW IS NOT ZERO.			
	0.0016	0.0000	1.0000	0.0450
	0.0016	0.0449	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	3.500	0.046	1.50	4.88
OUTFLOW: ID= 1 (0050)	3.500	0.002	1.25	4.89

PEAK FLOW REDUCTION [Qout/Qin](%)= 3.41
TIME SHIFT OF PEAK FLOW (min)=-15.00
MAXIMUM STORAGE USED (ha.m.)= 0.0152

CALIB		
STANDHYD (0204)	Area (ha)= 1.39	
ID= 1 DT= 5.0 min	Total Imp(%)= 20.00	Dir. Conn.(%)= 1.00

	IMPERVIOUS	PERVIOUS (i)

Surface Area	(ha)=	0.28	1.11
Dep. Storage	(mm)=	2.00	2.00
Average Slope	(%)=	1.50	2.00
Length	(m)=	20.00	25.00
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	2.60	1.083	14.29	2.083	5.35	3.08	3.01
0.167	2.60	1.167	14.29	2.167	5.35	3.17	3.01
0.250	2.92	1.250	73.21	2.250	4.68	3.25	2.83
0.333	2.92	1.333	73.21	2.333	4.68	3.33	2.83
0.417	3.35	1.417	18.03	2.417	4.19	3.42	2.67
0.500	3.35	1.500	18.03	2.500	4.19	3.50	2.67
0.583	3.99	1.583	10.56	2.583	3.80	3.58	2.53
0.667	3.99	1.667	10.56	2.667	3.80	3.67	2.53
0.750	5.01	1.750	7.80	2.750	3.49	3.75	2.40
0.833	5.01	1.833	7.80	2.833	3.49	3.83	2.40
0.917	7.05	1.917	6.31	2.917	3.23	3.92	2.29
1.000	7.05	2.000	6.31	3.000	3.23	4.00	2.29

Max.Eff.Inten.(mm/hr)=	73.21	10.58		
over (min)	5.00	15.00		
Storage Coeff. (min)=	0.98 (ii)	14.05 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.34	0.08		
			TOTALS	
PEAK FLOW (cms)=	0.00	0.02	0.022 (iii)	
TIME TO PEAK (hrs)=	1.33	1.50	1.50	
RUNOFF VOLUME (mm)=	30.60	5.92	6.16	
TOTAL RAINFALL (mm)=	32.60	32.60	32.60	
RUNOFF COEFFICIENT =	0.94	0.18	0.19	

***** 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* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0051)		OVERFLOW IS OFF

```
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                          0.0010     0.0000   |   1.0000      0.0278
                          0.0010     0.0277   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0204)      1.390      0.022      1.50       6.16
   OUTFLOW: ID= 1 (  0051)      1.390      0.001      1.08       6.17

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.38
                    TIME SHIFT OF PEAK FLOW         (min)=-25.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0073

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0201):    12.44   0.054     1.83     2.90
      + ID2= 2 (  0203):     0.07   0.001     1.33     3.90
        ====================================================
        ID = 3 (  0001):    12.51   0.055     1.83     2.91

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

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0001):    12.51   0.055     1.83     2.91
      + ID2= 2 (  0050):     3.50   0.002     1.25     4.89
        ====================================================
        ID = 1 (  0001):    16.01   0.056     1.83     3.34

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):    16.01   0.056     1.83     3.34
      + ID2= 2 (  0051):     1.39   0.001     1.08     6.17
        ====================================================
        ID = 3 (  0001):    17.40   0.057     1.83     3.57
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0205)	Area (ha)= 0.83	Curve Number (CN)= 65.9	
ID= 1 DT= 5.0 min	Ia (mm)= 4.60	# 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	2.60	1.083	14.29	2.083	5.35	3.08	3.01
0.167	2.60	1.167	14.29	2.167	5.35	3.17	3.01
0.250	2.92	1.250	73.21	2.250	4.68	3.25	2.83
0.333	2.92	1.333	73.21	2.333	4.68	3.33	2.83
0.417	3.35	1.417	18.03	2.417	4.19	3.42	2.67
0.500	3.35	1.500	18.03	2.500	4.19	3.50	2.67
0.583	3.99	1.583	10.56	2.583	3.80	3.58	2.53
0.667	3.99	1.667	10.56	2.667	3.80	3.67	2.53
0.750	5.01	1.750	7.80	2.750	3.49	3.75	2.40
0.833	5.01	1.833	7.80	2.833	3.49	3.83	2.40
0.917	7.05	1.917	6.31	2.917	3.23	3.92	2.29
1.000	7.05	2.000	6.31	3.000	3.23	4.00	2.29

Unit Hyd Qpeak (cms)= 0.226

PEAK FLOW (cms)= 0.013 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 4.879
TOTAL RAINFALL (mm)= 32.596
RUNOFF COEFFICIENT = 0.150

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

RESERVOIR(0052)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)

**** WARNING : FIRST OUTFLOW IS NOT ZERO.

0.0005	0.0000	1.0000	0.0156
0.0005	0.0155	0.0000	0.0000

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

```
   INFLOW : ID= 2 (  0205)      0.830      0.013      1.42       4.88
   OUTFLOW: ID= 1 (  0052)      0.830      0.001      1.25       4.89

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.30
                  TIME SHIFT OF PEAK FLOW         (min)=-10.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0034

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--------------------
| CALIB            |
| NASHYD   (  0206)|   Area    (ha)=   2.15   Curve Number   (CN)= 58.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.15   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

         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    2.60 | 1.083   14.29 | 2.083    5.35 |  3.08    3.01
               0.167    2.60 | 1.167   14.29 | 2.167    5.35 |  3.17    3.01
               0.250    2.92 | 1.250   73.21 | 2.250    4.68 |  3.25    2.83
               0.333    2.92 | 1.333   73.21 | 2.333    4.68 |  3.33    2.83
               0.417    3.35 | 1.417   18.03 | 2.417    4.19 |  3.42    2.67
               0.500    3.35 | 1.500   18.03 | 2.500    4.19 |  3.50    2.67
               0.583    3.99 | 1.583   10.56 | 2.583    3.80 |  3.58    2.53
               0.667    3.99 | 1.667   10.56 | 2.667    3.80 |  3.67    2.53
               0.750    5.01 | 1.750    7.80 | 2.750    3.49 |  3.75    2.40
               0.833    5.01 | 1.833    7.80 | 2.833    3.49 |  3.83    2.40
               0.917    7.05 | 1.917    6.31 | 2.917    3.23 |  3.92    2.29
               1.000    7.05 | 2.000    6.31 | 3.000    3.23 |  4.00    2.29

     Unit Hyd Qpeak  (cms)=   0.684

     PEAK FLOW       (cms)=   0.019 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=   3.095
     TOTAL RAINFALL   (mm)=  32.596
     RUNOFF COEFFICIENT   =   0.095

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

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--------------------
| ADD HYD  (  0002)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0206):     2.15   0.019     1.42     3.10
```

```
      + ID2= 2 (  0052):     0.83   0.001     1.25     4.89
        ================================================
        ID = 3 (  0002):     2.98   0.020     1.42     3.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       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

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DATE: 06/29/2022                          TIME: 12:14:26

USER:



COMMENTS: _____________________________________________________________


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  ******************************************
  ** SIMULATION : 02 - 5yr Chicago             **
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CHICAGO STORM Ptotal= 44.01 mm	IDF curve parameters: A= 575.144 B= 1.500 C= 0.721 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
0.17	3.50	1.17	19.29	2.17	7.23	3.17	4.07
0.33	3.94	1.33	98.86	2.33	6.33	3.33	3.82
0.50	4.53	1.50	24.35	2.50	5.65	3.50	3.60
0.67	5.38	1.67	14.25	2.67	5.13	3.67	3.41
0.83	6.77	1.83	10.53	2.83	4.71	3.83	3.25
1.00	9.52	2.00	8.52	3.00	4.36	4.00	3.10

CALIB NASHYD (0201) ID= 1 DT= 5.0 min	Area (ha)= 12.44 Curve Number (CN)= 58.1 Ia (mm)= 8.04 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.39

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	3.50	1.083	19.29	2.083	7.23	3.08	4.07
0.167	3.50	1.167	19.29	2.167	7.23	3.17	4.07
0.250	3.94	1.250	98.86	2.250	6.33	3.25	3.82
0.333	3.94	1.333	98.86	2.333	6.33	3.33	3.82
0.417	4.53	1.417	24.35	2.417	5.65	3.42	3.60
0.500	4.53	1.500	24.35	2.500	5.65	3.50	3.60
0.583	5.38	1.583	14.25	2.583	5.13	3.58	3.41
0.667	5.38	1.667	14.25	2.667	5.13	3.67	3.41
0.750	6.77	1.750	10.53	2.750	4.71	3.75	3.25
0.833	6.77	1.833	10.53	2.833	4.71	3.83	3.25
0.917	9.52	1.917	8.52	2.917	4.36	3.92	3.10
1.000	9.52	2.000	8.52	3.000	4.36	4.00	3.10

Unit Hyd Qpeak (cms)= 1.218

```
     PEAK FLOW       (cms)=   0.120 (i)
     TIME TO PEAK    (hrs)=   1.833
     RUNOFF VOLUME    (mm)=   5.904
     TOTAL RAINFALL   (mm)=  44.015
     RUNOFF COEFFICIENT   =   0.134

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0203)|   Area    (ha)=   0.07   Curve Number   (CN)= 61.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.10

         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    3.50 | 1.083   19.29 | 2.083    7.23 |  3.08    4.07
               0.167    3.50 | 1.167   19.29 | 2.167    7.23 |  3.17    4.07
               0.250    3.94 | 1.250   98.86 | 2.250    6.33 |  3.25    3.82
               0.333    3.94 | 1.333   98.86 | 2.333    6.33 |  3.33    3.82
               0.417    4.53 | 1.417   24.35 | 2.417    5.65 |  3.42    3.60
               0.500    4.53 | 1.500   24.35 | 2.500    5.65 |  3.50    3.60
               0.583    5.38 | 1.583   14.25 | 2.583    5.13 |  3.58    3.41
               0.667    5.38 | 1.667   14.25 | 2.667    5.13 |  3.67    3.41
               0.750    6.77 | 1.750   10.53 | 2.750    4.71 |  3.75    3.25
               0.833    6.77 | 1.833   10.53 | 2.833    4.71 |  3.83    3.25
               0.917    9.52 | 1.917    8.52 | 2.917    4.36 |  3.92    3.10
               1.000    9.52 | 2.000    8.52 | 3.000    4.36 |  4.00    3.10

     Unit Hyd Qpeak  (cms)=   0.027

     PEAK FLOW       (cms)=   0.002 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   7.358
     TOTAL RAINFALL   (mm)=  44.015
     RUNOFF COEFFICIENT   =   0.167

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   3.50   Curve Number   (CN)= 65.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.61   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18
```

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	3.50	1.083	19.29	2.083	7.23	3.08	4.07
0.167	3.50	1.167	19.29	2.167	7.23	3.17	4.07
0.250	3.94	1.250	98.86	2.250	6.33	3.25	3.82
0.333	3.94	1.333	98.86	2.333	6.33	3.33	3.82
0.417	4.53	1.417	24.35	2.417	5.65	3.42	3.60
0.500	4.53	1.500	24.35	2.500	5.65	3.50	3.60
0.583	5.38	1.583	14.25	2.583	5.13	3.58	3.41
0.667	5.38	1.667	14.25	2.667	5.13	3.67	3.41
0.750	6.77	1.750	10.53	2.750	4.71	3.75	3.25
0.833	6.77	1.833	10.53	2.833	4.71	3.83	3.25
0.917	9.52	1.917	8.52	2.917	4.36	3.92	3.10
1.000	9.52	2.000	8.52	3.000	4.36	4.00	3.10

Unit Hyd Qpeak (cms)=   0.743

PEAK FLOW   (cms)=   0.089 (i)
TIME TO PEAK   (hrs)=   1.500
RUNOFF VOLUME   (mm)=   9.032
TOTAL RAINFALL   (mm)= 44.015
RUNOFF COEFFICIENT   =   0.205

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

RESERVOIR(0050)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
**** WARNING : FIRST OUTFLOW IS NOT ZERO.				
	0.0016	0.0000	1.0000	0.0450
	0.0016	0.0449	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	3.500	0.089	1.50	9.03
OUTFLOW: ID= 1 (0050)	3.500	0.002	1.17	9.04

PEAK   FLOW   REDUCTION [Qout/Qin](%)= 1.75
TIME SHIFT OF PEAK FLOW   (min)=-20.00
MAXIMUM STORAGE   USED   (ha.m.)= 0.0297

```
--------------------
| CALIB            |
| STANDHYD (  0204)|   Area    (ha)=   1.39
|ID= 1 DT= 5.0 min |   Total Imp(%)=  20.00   Dir. Conn.(%)=   1.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         1.11
     Dep. Storage     (mm)=       2.00         2.00
     Average Slope     (%)=       1.50         2.00
     Length            (m)=      20.00        25.00
     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	3.50	1.083	19.29	2.083	7.23	3.08	4.07
0.167	3.50	1.167	19.29	2.167	7.23	3.17	4.07
0.250	3.94	1.250	98.86	2.250	6.33	3.25	3.82
0.333	3.94	1.333	98.86	2.333	6.33	3.33	3.82
0.417	4.53	1.417	24.35	2.417	5.65	3.42	3.60
0.500	4.53	1.500	24.35	2.500	5.65	3.50	3.60
0.583	5.38	1.583	14.25	2.583	5.13	3.58	3.41
0.667	5.38	1.667	14.25	2.667	5.13	3.67	3.41
0.750	6.77	1.750	10.53	2.750	4.71	3.75	3.25
0.833	6.77	1.833	10.53	2.833	4.71	3.83	3.25
0.917	9.52	1.917	8.52	2.917	4.36	3.92	3.10
1.000	9.52	2.000	8.52	3.000	4.36	4.00	3.10

```
     Max.Eff.Inten.(mm/hr)=      98.86        24.10
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       0.87 (ii)   10.27 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.34         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.04          0.045 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.50           1.50
     RUNOFF VOLUME    (mm)=      42.01        10.35          10.67
     TOTAL RAINFALL   (mm)=      44.01        44.01          44.01
     RUNOFF COEFFICIENT   =       0.95         0.24           0.24

***** 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*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
```

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0051)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                           0.0010     0.0000   |   1.0000      0.0278
                           0.0010     0.0277   |   0.0000      0.0000

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0204)      1.390      0.045      1.50      10.67
   OUTFLOW: ID= 1 (  0051)      1.390      0.001      1.00      10.67

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.13
                  TIME SHIFT OF PEAK FLOW         (min)=-30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0135

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0201):    12.44   0.120     1.83     5.90
      + ID2= 2 (  0203):     0.07   0.002     1.33     7.36
        ================================================
        ID = 3 (  0001):    12.51   0.120     1.83     5.91

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

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0001):    12.51   0.120     1.83     5.91
      + ID2= 2 (  0050):     3.50   0.002     1.17     9.04
        ================================================
        ID = 1 (  0001):    16.01   0.122     1.83     6.60

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

--------------------
| ADD HYD  (  0001)|
```

```
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):    16.01   0.122     1.83     6.60
      + ID2= 2 (  0051):     1.39   0.001     1.00    10.67
        ================================================
        ID = 3 (  0001):    17.40   0.123     1.83     6.92

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0205)|   Area    (ha)=   0.83   Curve Number   (CN)= 65.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.60   # 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    3.50 | 1.083   19.29 | 2.083    7.23 |  3.08    4.07
               0.167    3.50 | 1.167   19.29 | 2.167    7.23 |  3.17    4.07
               0.250    3.94 | 1.250   98.86 | 2.250    6.33 |  3.25    3.82
               0.333    3.94 | 1.333   98.86 | 2.333    6.33 |  3.33    3.82
               0.417    4.53 | 1.417   24.35 | 2.417    5.65 |  3.42    3.60
               0.500    4.53 | 1.500   24.35 | 2.500    5.65 |  3.50    3.60
               0.583    5.38 | 1.583   14.25 | 2.583    5.13 |  3.58    3.41
               0.667    5.38 | 1.667   14.25 | 2.667    5.13 |  3.67    3.41
               0.750    6.77 | 1.750   10.53 | 2.750    4.71 |  3.75    3.25
               0.833    6.77 | 1.833   10.53 | 2.833    4.71 |  3.83    3.25
               0.917    9.52 | 1.917    8.52 | 2.917    4.36 |  3.92    3.10
               1.000    9.52 | 2.000    8.52 | 3.000    4.36 |  4.00    3.10

     Unit Hyd Qpeak  (cms)=   0.226

     PEAK FLOW       (cms)=   0.025 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=   9.024
     TOTAL RAINFALL   (mm)=  44.015
     RUNOFF COEFFICIENT   =   0.205

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0052)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
```

```
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                          0.0005     0.0000   |   1.0000      0.0156
                          0.0005     0.0155   |   0.0000      0.0000

                                    AREA     QPEAK     TPEAK       R.V.
                                    (ha)     (cms)     (hrs)       (mm)
    INFLOW : ID= 2 (  0205)      0.830      0.025      1.42       9.02
    OUTFLOW: ID= 1 (  0052)      0.830      0.001      1.17       9.03

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.19
                    TIME SHIFT OF PEAK FLOW         (min)=-15.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0068

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD   (  0206)|   Area    (ha)=   2.15   Curve Number   (CN)= 58.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.15   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

         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    3.50 | 1.083   19.29 | 2.083    7.23 |  3.08    4.07
               0.167    3.50 | 1.167   19.29 | 2.167    7.23 |  3.17    4.07
               0.250    3.94 | 1.250   98.86 | 2.250    6.33 |  3.25    3.82
               0.333    3.94 | 1.333   98.86 | 2.333    6.33 |  3.33    3.82
               0.417    4.53 | 1.417   24.35 | 2.417    5.65 |  3.42    3.60
               0.500    4.53 | 1.500   24.35 | 2.500    5.65 |  3.50    3.60
               0.583    5.38 | 1.583   14.25 | 2.583    5.13 |  3.58    3.41
               0.667    5.38 | 1.667   14.25 | 2.667    5.13 |  3.67    3.41
               0.750    6.77 | 1.750   10.53 | 2.750    4.71 |  3.75    3.25
               0.833    6.77 | 1.833   10.53 | 2.833    4.71 |  3.83    3.25
               0.917    9.52 | 1.917    8.52 | 2.917    4.36 |  3.92    3.10
               1.000    9.52 | 2.000    8.52 | 3.000    4.36 |  4.00    3.10

     Unit Hyd Qpeak  (cms)=   0.684

     PEAK FLOW       (cms)=   0.043 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=   6.156
     TOTAL RAINFALL   (mm)=  44.015
     RUNOFF COEFFICIENT   =   0.140

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

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--------------------
| ADD HYD  (  0002)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0206):     2.15   0.043     1.42     6.16
      + ID2= 2 (  0052):     0.83   0.001     1.17     9.03
        ================================================
        ID = 3 (  0002):     2.98   0.043     1.42     6.96

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       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\bpond\AppData\Local\Civica\VH5\62082276-f617-4be2-807a-c20b5723c417\f63a0b
64-1c13-43f1-ab8d-9b771eedc5ba\scenar
  Summary filename:
C:\Users\bpond\AppData\Local\Civica\VH5\62082276-f617-4be2-807a-c20b5723c417\f63a0b
64-1c13-43f1-ab8d-9b771eedc5ba\scenar


DATE: 06/29/2022                          TIME: 12:14:26

USER:



COMMENTS: _____________________________________________________________
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------------------------
  ********************************************
  ** SIMULATION : 03 - 10yr Chicago          **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 667.963
| Ptotal= 51.68 mm |                          B=   1.500
--------------------                          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
                0.17    4.14 |  1.17   22.67 |  2.17    8.53 |  3.17    4.81
                0.33    4.65 |  1.33  115.37 |  2.33    7.46 |  3.33    4.51
                0.50    5.35 |  1.50   28.60 |  2.50    6.67 |  3.50    4.26
                0.67    6.36 |  1.67   16.77 |  2.67    6.05 |  3.67    4.04
                0.83    7.99 |  1.83   12.41 |  2.83    5.56 |  3.83    3.84
                1.00   11.21 |  2.00   10.04 |  3.00    5.15 |  4.00    3.66


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0201)|   Area    (ha)=  12.44   Curve Number   (CN)= 58.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.04   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.39

         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    4.14 | 1.083   22.67 | 2.083    8.53 |  3.08    4.81
               0.167    4.14 | 1.167   22.67 | 2.167    8.53 |  3.17    4.81
               0.250    4.65 | 1.250  115.37 | 2.250    7.46 |  3.25    4.51
               0.333    4.65 | 1.333  115.37 | 2.333    7.46 |  3.33    4.51
               0.417    5.35 | 1.417   28.60 | 2.417    6.67 |  3.42    4.26
               0.500    5.35 | 1.500   28.60 | 2.500    6.67 |  3.50    4.26
               0.583    6.36 | 1.583   16.77 | 2.583    6.05 |  3.58    4.04
               0.667    6.36 | 1.667   16.77 | 2.667    6.05 |  3.67    4.04
               0.750    7.99 | 1.750   12.41 | 2.750    5.56 |  3.75    3.84
```

0.833	7.99	1.833	12.41	2.833	5.56	3.83	3.84
0.917	11.21	1.917	10.04	2.917	5.15	3.92	3.66
1.000	11.21	2.000	10.04	3.000	5.15	4.00	3.66

Unit Hyd Qpeak (cms)= 1.218

PEAK FLOW (cms)= 0.174 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 8.396
TOTAL RAINFALL (mm)= 51.682
RUNOFF COEFFICIENT = 0.162

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

CALIB			
NASHYD (0203)	Area (ha)= 0.07	Curve Number (CN)= 61.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.10	

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	4.14	1.083	22.67	2.083	8.53	3.08	4.81
0.167	4.14	1.167	22.67	2.167	8.53	3.17	4.81
0.250	4.65	1.250	115.37	2.250	7.46	3.25	4.51
0.333	4.65	1.333	115.37	2.333	7.46	3.33	4.51
0.417	5.35	1.417	28.60	2.417	6.67	3.42	4.26
0.500	5.35	1.500	28.60	2.500	6.67	3.50	4.26
0.583	6.36	1.583	16.77	2.583	6.05	3.58	4.04
0.667	6.36	1.667	16.77	2.667	6.05	3.67	4.04
0.750	7.99	1.750	12.41	2.750	5.56	3.75	3.84
0.833	7.99	1.833	12.41	2.833	5.56	3.83	3.84
0.917	11.21	1.917	10.04	2.917	5.15	3.92	3.66
1.000	11.21	2.000	10.04	3.000	5.15	4.00	3.66

Unit Hyd Qpeak (cms)= 0.027

PEAK FLOW (cms)= 0.003 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 10.148
TOTAL RAINFALL (mm)= 51.682
RUNOFF COEFFICIENT = 0.196

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

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--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0202)|   Area    (ha)=   3.50   Curve Number   (CN)= 65.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.61   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         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    4.14 | 1.083   22.67 | 2.083    8.53 |  3.08    4.81
              0.167    4.14 | 1.167   22.67 | 2.167    8.53 |  3.17    4.81
              0.250    4.65 | 1.250  115.37 | 2.250    7.46 |  3.25    4.51
              0.333    4.65 | 1.333  115.37 | 2.333    7.46 |  3.33    4.51
              0.417    5.35 | 1.417   28.60 | 2.417    6.67 |  3.42    4.26
              0.500    5.35 | 1.500   28.60 | 2.500    6.67 |  3.50    4.26
              0.583    6.36 | 1.583   16.77 | 2.583    6.05 |  3.58    4.04
              0.667    6.36 | 1.667   16.77 | 2.667    6.05 |  3.67    4.04
              0.750    7.99 | 1.750   12.41 | 2.750    5.56 |  3.75    3.84
              0.833    7.99 | 1.833   12.41 | 2.833    5.56 |  3.83    3.84
              0.917   11.21 | 1.917   10.04 | 2.917    5.15 |  3.92    3.66
              1.000   11.21 | 2.000   10.04 | 3.000    5.15 |  4.00    3.66

     Unit Hyd Qpeak  (cms)=   0.743

     PEAK FLOW       (cms)=   0.124 (i)
     TIME TO PEAK    (hrs)=   1.500
     RUNOFF VOLUME    (mm)=  12.337
     TOTAL RAINFALL   (mm)=  51.682
     RUNOFF COEFFICIENT   =   0.239

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0050)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                       0.0016     0.0000   |   1.0000      0.0450
                       0.0016     0.0449   |   0.0000      0.0000

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)      3.500      0.124      1.50      12.34
   OUTFLOW: ID= 1 (  0050)      3.500      0.002      1.08      12.34
```

```
                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.26
                    TIME SHIFT OF PEAK FLOW         (min)=-25.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0412

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0204)|   Area    (ha)=   1.39
|ID= 1 DT= 5.0 min |   Total Imp(%)=  20.00   Dir. Conn.(%)=   1.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         1.11
     Dep. Storage     (mm)=       2.00         2.00
     Average Slope     (%)=       1.50         2.00
     Length            (m)=      20.00        25.00
     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    4.14 | 1.083   22.67 | 2.083    8.53 |  3.08    4.81
              0.167    4.14 | 1.167   22.67 | 2.167    8.53 |  3.17    4.81
              0.250    4.65 | 1.250  115.37 | 2.250    7.46 |  3.25    4.51
              0.333    4.65 | 1.333  115.37 | 2.333    7.46 |  3.33    4.51
              0.417    5.35 | 1.417   28.60 | 2.417    6.67 |  3.42    4.26
              0.500    5.35 | 1.500   28.60 | 2.500    6.67 |  3.50    4.26
              0.583    6.36 | 1.583   16.77 | 2.583    6.05 |  3.58    4.04
              0.667    6.36 | 1.667   16.77 | 2.667    6.05 |  3.67    4.04
              0.750    7.99 | 1.750   12.41 | 2.750    5.56 |  3.75    3.84
              0.833    7.99 | 1.833   12.41 | 2.833    5.56 |  3.83    3.84
              0.917   11.21 | 1.917   10.04 | 2.917    5.15 |  3.92    3.66
              1.000   11.21 | 2.000   10.04 | 3.000    5.15 |  4.00    3.66

     Max.Eff.Inten.(mm/hr)=     115.37        32.49
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       0.81 (ii)    9.16 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.12
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.07          0.067 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.42
     RUNOFF VOLUME    (mm)=      49.68        13.83          14.18
     TOTAL RAINFALL   (mm)=      51.68        51.68          51.68
     RUNOFF COEFFICIENT   =       0.96         0.27           0.27

***** 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*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0051)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                           0.0010     0.0000   |   1.0000      0.0278
                           0.0010     0.0277   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0204)      1.390      0.067      1.42      14.18
   OUTFLOW: ID= 1 (  0051)      1.390      0.001      0.83      14.19

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.42
                  TIME SHIFT OF PEAK FLOW         (min)=-35.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0184

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0201):    12.44   0.174     1.83     8.40
      + ID2= 2 (  0203):     0.07   0.003     1.33    10.15
        ================================================
        ID = 3 (  0001):    12.51   0.175     1.83     8.41

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

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0001):    12.51   0.175     1.83     8.41
      + ID2= 2 (  0050):     3.50   0.002     1.08    12.34
        ================================================
        ID = 1 (  0001):    16.01   0.177     1.83     9.27
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0001)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0001):	16.01	0.177	1.83	9.27
	+ ID2= 2 (0051):	1.39	0.001	0.83	14.19
	ID = 3 (0001):	17.40	0.178	1.83	9.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0205)				
ID= 1 DT= 5.0 min	Area (ha)=	0.83	Curve Number (CN)=	65.9
	Ia (mm)=	4.60	# 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	4.14	1.083	22.67	2.083	8.53	3.08	4.81
0.167	4.14	1.167	22.67	2.167	8.53	3.17	4.81
0.250	4.65	1.250	115.37	2.250	7.46	3.25	4.51
0.333	4.65	1.333	115.37	2.333	7.46	3.33	4.51
0.417	5.35	1.417	28.60	2.417	6.67	3.42	4.26
0.500	5.35	1.500	28.60	2.500	6.67	3.50	4.26
0.583	6.36	1.583	16.77	2.583	6.05	3.58	4.04
0.667	6.36	1.667	16.77	2.667	6.05	3.67	4.04
0.750	7.99	1.750	12.41	2.750	5.56	3.75	3.84
0.833	7.99	1.833	12.41	2.833	5.56	3.83	3.84
0.917	11.21	1.917	10.04	2.917	5.15	3.92	3.66
1.000	11.21	2.000	10.04	3.000	5.15	4.00	3.66

Unit Hyd Qpeak (cms)= 0.226

PEAK FLOW (cms)= 0.034 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 12.324
TOTAL RAINFALL (mm)= 51.682
RUNOFF COEFFICIENT = 0.238

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

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--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0052)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                          0.0005     0.0000    |   1.0000      0.0156
                          0.0005     0.0155    |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0205)      0.830      0.034      1.42      12.32
   OUTFLOW: ID= 1 (  0052)      0.830      0.001      1.08      12.33

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.57
                  TIME SHIFT OF PEAK FLOW         (min)=-20.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0096

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0206)|   Area    (ha)=   2.15   Curve Number   (CN)= 58.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.15   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

         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    4.14 | 1.083   22.67 | 2.083    8.53 |  3.08    4.81
              0.167    4.14 | 1.167   22.67 | 2.167    8.53 |  3.17    4.81
              0.250    4.65 | 1.250  115.37 | 2.250    7.46 |  3.25    4.51
              0.333    4.65 | 1.333  115.37 | 2.333    7.46 |  3.33    4.51
              0.417    5.35 | 1.417   28.60 | 2.417    6.67 |  3.42    4.26
              0.500    5.35 | 1.500   28.60 | 2.500    6.67 |  3.50    4.26
              0.583    6.36 | 1.583   16.77 | 2.583    6.05 |  3.58    4.04
              0.667    6.36 | 1.667   16.77 | 2.667    6.05 |  3.67    4.04
              0.750    7.99 | 1.750   12.41 | 2.750    5.56 |  3.75    3.84
              0.833    7.99 | 1.833   12.41 | 2.833    5.56 |  3.83    3.84
              0.917   11.21 | 1.917   10.04 | 2.917    5.15 |  3.92    3.66
              1.000   11.21 | 2.000   10.04 | 3.000    5.15 |  4.00    3.66

     Unit Hyd Qpeak  (cms)=   0.684

     PEAK FLOW       (cms)=   0.062 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=   8.678
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     TOTAL RAINFALL   (mm)=  51.682
     RUNOFF COEFFICIENT   =   0.168

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

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--------------------
| ADD HYD  (  0002)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0206):     2.15   0.062     1.42     8.68
      + ID2= 2 (  0052):     0.83   0.001     1.08    12.33
        ================================================
        ID = 3 (  0002):     2.98   0.063     1.42     9.69

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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 FINISH
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       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\bpond\AppData\Local\Civica\VH5\62082276-f617-4be2-807a-c20b5723c417\c7ca61
25-5bc7-4f3a-908e-a89f55dbd791\scenar
  Summary filename:
```

C:\Users\bpond\AppData\Local\Civica\VH5\62082276-f617-4be2-807a-c20b5723c417\c7ca6125-5bc7-4f3a-908e-a89f55dbd791\scenar

DATE: 06/29/2022 TIME: 12:14:26

USER:

COMMENTS: _____

****
** SIMULATION : 04 - 25yr Chicago **
****

CHICAGO STORM	Ptotal= 61.16 mm

IDF curve parameters: A= 786.108
B= 1.500
C= 0.718
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
0.17	4.92	1.17	26.84	2.17	10.11	3.17	5.70
0.33	5.52	1.33	136.11	2.33	8.85	3.33	5.36
0.50	6.35	1.50	33.84	2.50	7.91	3.50	5.05
0.67	7.54	1.67	19.87	2.67	7.18	3.67	4.79
0.83	9.47	1.83	14.70	2.83	6.60	3.83	4.56
1.00	13.29	2.00	11.90	3.00	6.11	4.00	4.35

CALIB NASHYD (0201) | ID= 1 DT= 5.0 min

Area (ha)= 12.44 Curve Number (CN)= 58.1
Ia (mm)= 8.04 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.39

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	4.92	1.083	26.84	2.083	10.11	3.08	5.70
0.167	4.92	1.167	26.84	2.167	10.11	3.17	5.70
0.250	5.52	1.250	136.11	2.250	8.85	3.25	5.36
0.333	5.52	1.333	136.11	2.333	8.85	3.33	5.36
0.417	6.35	1.417	33.84	2.417	7.91	3.42	5.05
0.500	6.35	1.500	33.84	2.500	7.91	3.50	5.05
0.583	7.54	1.583	19.87	2.583	7.18	3.58	4.79
0.667	7.54	1.667	19.87	2.667	7.18	3.67	4.79
0.750	9.47	1.750	14.70	2.750	6.60	3.75	4.56
0.833	9.47	1.833	14.70	2.833	6.60	3.83	4.56
0.917	13.29	1.917	11.90	2.917	6.11	3.92	4.35
1.000	13.29	2.000	11.90	3.000	6.11	4.00	4.35

Unit Hyd Qpeak (cms)= 1.218

PEAK FLOW (cms)= 0.254 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 11.939
TOTAL RAINFALL (mm)= 61.157
RUNOFF COEFFICIENT = 0.195

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

CALIB			
NASHYD (0203)	Area (ha)=	0.07	Curve Number (CN)= 61.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.10	

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	4.92	1.083	26.84	2.083	10.11	3.08	5.70
0.167	4.92	1.167	26.84	2.167	10.11	3.17	5.70
0.250	5.52	1.250	136.11	2.250	8.85	3.25	5.36
0.333	5.52	1.333	136.11	2.333	8.85	3.33	5.36
0.417	6.35	1.417	33.84	2.417	7.91	3.42	5.05
0.500	6.35	1.500	33.84	2.500	7.91	3.50	5.05
0.583	7.54	1.583	19.87	2.583	7.18	3.58	4.79
0.667	7.54	1.667	19.87	2.667	7.18	3.67	4.79
0.750	9.47	1.750	14.70	2.750	6.60	3.75	4.56
0.833	9.47	1.833	14.70	2.833	6.60	3.83	4.56
0.917	13.29	1.917	11.90	2.917	6.11	3.92	4.35
1.000	13.29	2.000	11.90	3.000	6.11	4.00	4.35

Unit Hyd Qpeak (cms)= 0.027

PEAK FLOW (cms)= 0.004 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 14.051
TOTAL RAINFALL (mm)= 61.157
RUNOFF COEFFICIENT = 0.230

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

CALIB	
NASHYD (0202)	Area (ha)= 3.50 Curve Number (CN)= 65.8
ID= 1 DT= 5.0 min	Ia (mm)= 4.61 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.18

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	4.92	1.083	26.84	2.083	10.11	3.08	5.70
0.167	4.92	1.167	26.84	2.167	10.11	3.17	5.70
0.250	5.52	1.250	136.11	2.250	8.85	3.25	5.36
0.333	5.52	1.333	136.11	2.333	8.85	3.33	5.36
0.417	6.35	1.417	33.84	2.417	7.91	3.42	5.05
0.500	6.35	1.500	33.84	2.500	7.91	3.50	5.05
0.583	7.54	1.583	19.87	2.583	7.18	3.58	4.79
0.667	7.54	1.667	19.87	2.667	7.18	3.67	4.79
0.750	9.47	1.750	14.70	2.750	6.60	3.75	4.56
0.833	9.47	1.833	14.70	2.833	6.60	3.83	4.56
0.917	13.29	1.917	11.90	2.917	6.11	3.92	4.35
1.000	13.29	2.000	11.90	3.000	6.11	4.00	4.35

Unit Hyd Qpeak (cms)= 0.743

PEAK FLOW (cms)= 0.173 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 16.909
TOTAL RAINFALL (mm)= 61.157
RUNOFF COEFFICIENT = 0.276

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

RESERVOIR(0050)	OVERFLOW IS OFF

```
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                          0.0016     0.0000   |   1.0000      0.0450
                          0.0016     0.0449   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)      3.500      0.173      1.50      16.91
   OUTFLOW: ID= 1 (  0050)      3.500      0.045      2.92      16.91

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 25.79
                    TIME SHIFT OF PEAK FLOW         (min)= 85.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0451

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0204)|   Area    (ha)=   1.39
|ID= 1 DT= 5.0 min |   Total Imp(%)=  20.00   Dir. Conn.(%)=   1.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         1.11
     Dep. Storage     (mm)=       2.00         2.00
     Average Slope     (%)=       1.50         2.00
     Length            (m)=      20.00        25.00
     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    4.92 | 1.083   26.84 | 2.083   10.11 |  3.08    5.70
               0.167    4.92 | 1.167   26.84 | 2.167   10.11 |  3.17    5.70
               0.250    5.52 | 1.250  136.11 | 2.250    8.85 |  3.25    5.36
               0.333    5.52 | 1.333  136.11 | 2.333    8.85 |  3.33    5.36
               0.417    6.35 | 1.417   33.84 | 2.417    7.91 |  3.42    5.05
               0.500    6.35 | 1.500   33.84 | 2.500    7.91 |  3.50    5.05
               0.583    7.54 | 1.583   19.87 | 2.583    7.18 |  3.58    4.79
               0.667    7.54 | 1.667   19.87 | 2.667    7.18 |  3.67    4.79
               0.750    9.47 | 1.750   14.70 | 2.750    6.60 |  3.75    4.56
               0.833    9.47 | 1.833   14.70 | 2.833    6.60 |  3.83    4.56
               0.917   13.29 | 1.917   11.90 | 2.917    6.11 |  3.92    4.35
               1.000   13.29 | 2.000   11.90 | 3.000    6.11 |  4.00    4.35

     Max.Eff.Inten.(mm/hr)=     136.11        44.30
                over (min)        5.00        10.00
```

```
     Storage Coeff.  (min)=       0.76 (ii)    8.13 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.09          0.096 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.42
     RUNOFF VOLUME    (mm)=      59.16        18.58          18.98
     TOTAL RAINFALL   (mm)=      61.16        61.16          61.16
     RUNOFF COEFFICIENT   =       0.97         0.30           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*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0051)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                           0.0010     0.0000   |   1.0000      0.0278
                           0.0010     0.0277   |   0.0000      0.0000

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0204)      1.390      0.096      1.42       18.98
   OUTFLOW: ID= 1 (  0051)      1.390      0.001      0.75       18.99

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.00
                  TIME SHIFT OF PEAK FLOW         (min)=-40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0250

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0201):    12.44   0.254     1.75    11.94
      + ID2= 2 (  0203):     0.07   0.004     1.33    14.05
        ================================================
        ID = 3 (  0001):    12.51   0.255     1.75    11.95
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0001)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0001):	12.51	0.255	1.75	11.95
	+ ID2= 2 (0050):	3.50	0.045	2.92	16.91
	ID = 1 (0001):	16.01	0.257	1.75	13.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0001)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0001):	16.01	0.257	1.75	13.04
	+ ID2= 2 (0051):	1.39	0.001	0.75	18.99
	ID = 3 (0001):	17.40	0.258	1.75	13.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0205)	Area (ha)= 0.83	Curve Number (CN)= 65.9	
ID= 1 DT= 5.0 min	Ia (mm)= 4.60	# 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	4.92	1.083	26.84	2.083	10.11	3.08	5.70
0.167	4.92	1.167	26.84	2.167	10.11	3.17	5.70
0.250	5.52	1.250	136.11	2.250	8.85	3.25	5.36
0.333	5.52	1.333	136.11	2.333	8.85	3.33	5.36
0.417	6.35	1.417	33.84	2.417	7.91	3.42	5.05
0.500	6.35	1.500	33.84	2.500	7.91	3.50	5.05
0.583	7.54	1.583	19.87	2.583	7.18	3.58	4.79
0.667	7.54	1.667	19.87	2.667	7.18	3.67	4.79
0.750	9.47	1.750	14.70	2.750	6.60	3.75	4.56
0.833	9.47	1.833	14.70	2.833	6.60	3.83	4.56
0.917	13.29	1.917	11.90	2.917	6.11	3.92	4.35
1.000	13.29	2.000	11.90	3.000	6.11	4.00	4.35

```
     Unit Hyd Qpeak  (cms)=   0.226

     PEAK FLOW       (cms)=   0.048 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  16.888
     TOTAL RAINFALL   (mm)=  61.157
     RUNOFF COEFFICIENT   =   0.276

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0052)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                           0.0005     0.0000   |   1.0000      0.0156
                           0.0005     0.0155   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0205)      0.830      0.048      1.42      16.89
   OUTFLOW: ID= 1 (  0052)      0.830      0.001      1.00      16.89

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.12
                    TIME SHIFT OF PEAK FLOW         (min)=-25.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0133

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0206)|   Area    (ha)=   2.15   Curve Number   (CN)= 58.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.15   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

         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    4.92 | 1.083   26.84 | 2.083   10.11 |  3.08    5.70
              0.167    4.92 | 1.167   26.84 | 2.167   10.11 |  3.17    5.70
              0.250    5.52 | 1.250  136.11 | 2.250    8.85 |  3.25    5.36
              0.333    5.52 | 1.333  136.11 | 2.333    8.85 |  3.33    5.36
              0.417    6.35 | 1.417   33.84 | 2.417    7.91 |  3.42    5.05
              0.500    6.35 | 1.500   33.84 | 2.500    7.91 |  3.50    5.05
              0.583    7.54 | 1.583   19.87 | 2.583    7.18 |  3.58    4.79
```

```
                0.667    7.54 | 1.667   19.87 | 2.667    7.18 |  3.67    4.79
                0.750    9.47 | 1.750   14.70 | 2.750    6.60 |  3.75    4.56
                0.833    9.47 | 1.833   14.70 | 2.833    6.60 |  3.83    4.56
                0.917   13.29 | 1.917   11.90 | 2.917    6.11 |  3.92    4.35
                1.000   13.29 | 2.000   11.90 | 3.000    6.11 |  4.00    4.35

     Unit Hyd Qpeak  (cms)=   0.684

     PEAK FLOW       (cms)=   0.091 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  12.249
     TOTAL RAINFALL   (mm)=  61.157
     RUNOFF COEFFICIENT   =   0.200

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

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

--------------------
| ADD HYD  (  0002)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0206):     2.15   0.091     1.42    12.25
      + ID2= 2 (  0052):     0.83   0.001     1.00    16.89
        ====================================================
        ID = 3 (  0002):     2.98   0.091     1.42    13.54

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       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\bpond\AppData\Local\Civica\VH5\62082276-f617-4be2-807a-c20b5723c417\6eb48f
37-ef04-465d-8581-1aa731dd2087\scenar
  Summary filename:
C:\Users\bpond\AppData\Local\Civica\VH5\62082276-f617-4be2-807a-c20b5723c417\6eb48f
37-ef04-465d-8581-1aa731dd2087\scenar


DATE: 06/29/2022                          TIME: 12:14:26

USER:



COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
------------------------
  **********************************************
  ** SIMULATION : 05 - 50yr Chicago            **
  **********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 878.307
| Ptotal= 68.33 mm |                          B=   1.500
--------------------                          C=   0.718
                       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
                0.17    5.49 |  1.17   29.99 |  2.17   11.30 |  3.17    6.37
                0.33    6.17 |  1.33  152.08 |  2.33    9.89 |  3.33    5.98
                0.50    7.09 |  1.50   37.81 |  2.50    8.84 |  3.50    5.65
                0.67    8.43 |  1.67   22.20 |  2.67    8.03 |  3.67    5.35
                0.83   10.58 |  1.83   16.43 |  2.83    7.37 |  3.83    5.09
                1.00   14.85 |  2.00   13.30 |  3.00    6.83 |  4.00    4.86


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0201)|   Area    (ha)=  12.44   Curve Number   (CN)= 58.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.04   # of Linear Res.(N)= 3.00
```

--------------------   U.H. Tp(hrs)=   0.39

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	5.49	1.083	29.99	2.083	11.30	3.08	6.37
0.167	5.49	1.167	29.99	2.167	11.30	3.17	6.37
0.250	6.17	1.250	152.08	2.250	9.89	3.25	5.98
0.333	6.17	1.333	152.08	2.333	9.89	3.33	5.98
0.417	7.09	1.417	37.81	2.417	8.84	3.42	5.65
0.500	7.09	1.500	37.81	2.500	8.84	3.50	5.65
0.583	8.43	1.583	22.20	2.583	8.03	3.58	5.35
0.667	8.43	1.667	22.20	2.667	8.03	3.67	5.35
0.750	10.58	1.750	16.43	2.750	7.37	3.75	5.09
0.833	10.58	1.833	16.43	2.833	7.37	3.83	5.09
0.917	14.85	1.917	13.30	2.917	6.83	3.92	4.86
1.000	14.85	2.000	13.30	3.000	6.83	4.00	4.86

Unit Hyd Qpeak (cms)=   1.218

PEAK FLOW   (cms)=   0.324 (i)
TIME TO PEAK   (hrs)=   1.750
RUNOFF VOLUME   (mm)= 14.928
TOTAL RAINFALL   (mm)= 68.330
RUNOFF COEFFICIENT   =   0.218

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

CALIB					
NASHYD (0203)	Area (ha)=	0.07	Curve Number (CN)=	61.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.10			

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	5.49	1.083	29.99	2.083	11.30	3.08	6.37
0.167	5.49	1.167	29.99	2.167	11.30	3.17	6.37
0.250	6.17	1.250	152.08	2.250	9.89	3.25	5.98
0.333	6.17	1.333	152.08	2.333	9.89	3.33	5.98
0.417	7.09	1.417	37.81	2.417	8.84	3.42	5.65
0.500	7.09	1.500	37.81	2.500	8.84	3.50	5.65

0.583	8.43	1.583	22.20	2.583	8.03	3.58	5.35
0.667	8.43	1.667	22.20	2.667	8.03	3.67	5.35
0.750	10.58	1.750	16.43	2.750	7.37	3.75	5.09
0.833	10.58	1.833	16.43	2.833	7.37	3.83	5.09
0.917	14.85	1.917	13.30	2.917	6.83	3.92	4.86
1.000	14.85	2.000	13.30	3.000	6.83	4.00	4.86

Unit Hyd Qpeak (cms)= 0.027

PEAK FLOW (cms)= 0.005 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 17.301
TOTAL RAINFALL (mm)= 68.330
RUNOFF COEFFICIENT = 0.253

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

CALIB NASHYD (0202)	Area (ha)= 3.50	Curve Number (CN)= 65.8
ID= 1 DT= 5.0 min	Ia (mm)= 4.61	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.18	

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	5.49	1.083	29.99	2.083	11.30	3.08	6.37
0.167	5.49	1.167	29.99	2.167	11.30	3.17	6.37
0.250	6.17	1.250	152.08	2.250	9.89	3.25	5.98
0.333	6.17	1.333	152.08	2.333	9.89	3.33	5.98
0.417	7.09	1.417	37.81	2.417	8.84	3.42	5.65
0.500	7.09	1.500	37.81	2.500	8.84	3.50	5.65
0.583	8.43	1.583	22.20	2.583	8.03	3.58	5.35
0.667	8.43	1.667	22.20	2.667	8.03	3.67	5.35
0.750	10.58	1.750	16.43	2.750	7.37	3.75	5.09
0.833	10.58	1.833	16.43	2.833	7.37	3.83	5.09
0.917	14.85	1.917	13.30	2.917	6.83	3.92	4.86
1.000	14.85	2.000	13.30	3.000	6.83	4.00	4.86

Unit Hyd Qpeak (cms)= 0.743

PEAK FLOW (cms)= 0.214 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 20.684
TOTAL RAINFALL (mm)= 68.330
RUNOFF COEFFICIENT = 0.303

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

```
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0050)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                           0.0016     0.0000    |   1.0000      0.0450
                           0.0016     0.0449    |   0.0000      0.0000

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)      3.500      0.214      1.50      20.68
   OUTFLOW: ID= 1 (  0050)      3.500      0.099      2.25      20.69

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 46.17
                  TIME SHIFT OF PEAK FLOW         (min)= 45.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0468

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0204)|   Area    (ha)=   1.39
|ID= 1 DT= 5.0 min |   Total Imp(%)=  20.00   Dir. Conn.(%)=   1.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         1.11
     Dep. Storage     (mm)=       2.00         2.00
     Average Slope     (%)=       1.50         2.00
     Length            (m)=      20.00        25.00
     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    5.49 | 1.083   29.99 | 2.083   11.30 |  3.08    6.37
              0.167    5.49 | 1.167   29.99 | 2.167   11.30 |  3.17    6.37
              0.250    6.17 | 1.250  152.08 | 2.250    9.89 |  3.25    5.98
              0.333    6.17 | 1.333  152.08 | 2.333    9.89 |  3.33    5.98
              0.417    7.09 | 1.417   37.81 | 2.417    8.84 |  3.42    5.65
              0.500    7.09 | 1.500   37.81 | 2.500    8.84 |  3.50    5.65
              0.583    8.43 | 1.583   22.20 | 2.583    8.03 |  3.58    5.35
              0.667    8.43 | 1.667   22.20 | 2.667    8.03 |  3.67    5.35
              0.750   10.58 | 1.750   16.43 | 2.750    7.37 |  3.75    5.09
```

```
               0.833   10.58 | 1.833   16.43 | 2.833    7.37 |  3.83    5.09
               0.917   14.85 | 1.917   13.30 | 2.917    6.83 |  3.92    4.86
               1.000   14.85 | 2.000   13.30 | 3.000    6.83 |  4.00    4.86

     Max.Eff.Inten.(mm/hr)=     152.08        54.23
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      0.73 (ii)    7.53 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.34         0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.01         0.12          0.121 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.42           1.42
     RUNOFF VOLUME    (mm)=     66.33        22.49          22.92
     TOTAL RAINFALL   (mm)=     68.33        68.33          68.33
     RUNOFF COEFFICIENT   =      0.97         0.33           0.34

***** 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*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0051)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                           0.0010     0.0000   |   1.0000      0.0278
                           0.0010     0.0277   |   0.0000      0.0000

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0204)      1.390      0.121      1.42      22.92
   OUTFLOW: ID= 1 (  0051)      1.390      0.023      3.50      22.93

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 19.31
                    TIME SHIFT OF PEAK FLOW         (min)=125.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0279

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
```

```
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0201):    12.44   0.324     1.75    14.93
      + ID2= 2 (  0203):     0.07   0.005     1.33    17.30
        ================================================
        ID = 3 (  0001):    12.51   0.325     1.75    14.94

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

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0001):    12.51   0.325     1.75    14.94
      + ID2= 2 (  0050):     3.50   0.099     2.25    20.69
        ================================================
        ID = 1 (  0001):    16.01   0.333     2.25    16.20

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):    16.01   0.333     2.25    16.20
      + ID2= 2 (  0051):     1.39   0.023     3.50    22.93
        ================================================
        ID = 3 (  0001):    17.40   0.334     2.25    16.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0205)|   Area    (ha)=   0.83   Curve Number   (CN)= 65.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.60   # 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    5.49 | 1.083   29.99 | 2.083   11.30 |  3.08    6.37
              0.167    5.49 | 1.167   29.99 | 2.167   11.30 |  3.17    6.37
              0.250    6.17 | 1.250  152.08 | 2.250    9.89 |  3.25    5.98
              0.333    6.17 | 1.333  152.08 | 2.333    9.89 |  3.33    5.98
              0.417    7.09 | 1.417   37.81 | 2.417    8.84 |  3.42    5.65
              0.500    7.09 | 1.500   37.81 | 2.500    8.84 |  3.50    5.65
```

```
                0.583    8.43 | 1.583   22.20 | 2.583    8.03 |  3.58    5.35
                0.667    8.43 | 1.667   22.20 | 2.667    8.03 |  3.67    5.35
                0.750   10.58 | 1.750   16.43 | 2.750    7.37 |  3.75    5.09
                0.833   10.58 | 1.833   16.43 | 2.833    7.37 |  3.83    5.09
                0.917   14.85 | 1.917   13.30 | 2.917    6.83 |  3.92    4.86
                1.000   14.85 | 2.000   13.30 | 3.000    6.83 |  4.00    4.86

     Unit Hyd Qpeak  (cms)=   0.226

     PEAK FLOW       (cms)=   0.060 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  20.655
     TOTAL RAINFALL   (mm)=  68.330
     RUNOFF COEFFICIENT   =   0.302

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0052)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                          0.0005     0.0000    |   1.0000      0.0156
                          0.0005     0.0155    |   0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0205)      0.830      0.060      1.42      20.65
   OUTFLOW: ID= 1 (  0052)      0.830      0.009      3.75      20.66

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 15.25
                   TIME SHIFT OF PEAK FLOW         (min)=140.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  0.0156

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0206)|   Area    (ha)=   2.15   Curve Number   (CN)= 58.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.15   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

         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    5.49 | 1.083   29.99 | 2.083   11.30 |  3.08    6.37
```

```
                0.167    5.49 | 1.167   29.99 | 2.167   11.30 |  3.17    6.37
                0.250    6.17 | 1.250  152.08 | 2.250    9.89 |  3.25    5.98
                0.333    6.17 | 1.333  152.08 | 2.333    9.89 |  3.33    5.98
                0.417    7.09 | 1.417   37.81 | 2.417    8.84 |  3.42    5.65
                0.500    7.09 | 1.500   37.81 | 2.500    8.84 |  3.50    5.65
                0.583    8.43 | 1.583   22.20 | 2.583    8.03 |  3.58    5.35
                0.667    8.43 | 1.667   22.20 | 2.667    8.03 |  3.67    5.35
                0.750   10.58 | 1.750   16.43 | 2.750    7.37 |  3.75    5.09
                0.833   10.58 | 1.833   16.43 | 2.833    7.37 |  3.83    5.09
                0.917   14.85 | 1.917   13.30 | 2.917    6.83 |  3.92    4.86
                1.000   14.85 | 2.000   13.30 | 3.000    6.83 |  4.00    4.86

     Unit Hyd Qpeak  (cms)=   0.684

     PEAK FLOW       (cms)=   0.115 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  15.253
     TOTAL RAINFALL   (mm)=  68.330
     RUNOFF COEFFICIENT   =   0.223

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

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

--------------------
| ADD HYD  (  0002)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0206):     2.15   0.115     1.42    15.25
      + ID2= 2 (  0052):     0.83   0.009     3.75    20.66
        ================================================
        ID = 3 (  0002):     2.98   0.115     1.42    16.76

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2005)
       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\bpond\AppData\Local\Civica\VH5\62082276-f617-4be2-807a-c20b5723c417\e0b7d654-a50f-4785-b207-c6b7263eadaa\scenar
Summary filename:
C:\Users\bpond\AppData\Local\Civica\VH5\62082276-f617-4be2-807a-c20b5723c417\e0b7d654-a50f-4785-b207-c6b7263eadaa\scenar

DATE: 06/29/2022 TIME: 12:14:26

USER:

COMMENTS: _____

****
** SIMULATION : 06 - 100yr Chicago **
****

| CHICAGO STORM |
| Ptotal= 75.17 mm |

IDF curve parameters: A= 971.524
B= 1.500
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
0.17	6.02	1.17	32.97	2.17	12.40	3.17	6.99
0.33	6.77	1.33	167.81	2.33	10.86	3.33	6.56
0.50	7.78	1.50	41.59	2.50	9.70	3.50	6.19
0.67	9.24	1.67	24.40	2.67	8.81	3.67	5.87
0.83	11.62	1.83	18.04	2.83	8.08	3.83	5.58
1.00	16.31	2.00	14.60	3.00	7.49	4.00	5.33

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0201)|   Area    (ha)=  12.44   Curve Number   (CN)= 58.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.04   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.39

         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    6.02 | 1.083   32.97 | 2.083   12.40 |  3.08    6.99
              0.167    6.02 | 1.167   32.97 | 2.167   12.40 |  3.17    6.99
              0.250    6.77 | 1.250  167.81 | 2.250   10.86 |  3.25    6.56
              0.333    6.77 | 1.333  167.81 | 2.333   10.86 |  3.33    6.56
              0.417    7.78 | 1.417   41.59 | 2.417    9.70 |  3.42    6.19
              0.500    7.78 | 1.500   41.59 | 2.500    9.70 |  3.50    6.19
              0.583    9.24 | 1.583   24.40 | 2.583    8.81 |  3.58    5.87
              0.667    9.24 | 1.667   24.40 | 2.667    8.81 |  3.67    5.87
              0.750   11.62 | 1.750   18.04 | 2.750    8.08 |  3.75    5.58
              0.833   11.62 | 1.833   18.04 | 2.833    8.08 |  3.83    5.58
              0.917   16.31 | 1.917   14.60 | 2.917    7.49 |  3.92    5.33
              1.000   16.31 | 2.000   14.60 | 3.000    7.49 |  4.00    5.33

     Unit Hyd Qpeak  (cms)=   1.218

     PEAK FLOW       (cms)=   0.397 (i)
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  18.001
     TOTAL RAINFALL   (mm)=  75.169
     RUNOFF COEFFICIENT   =   0.239

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0203)|   Area    (ha)=   0.07   Curve Number   (CN)= 61.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.10

         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	6.02	1.083	32.97	2.083	12.40	3.08	6.99
0.167	6.02	1.167	32.97	2.167	12.40	3.17	6.99
0.250	6.77	1.250	167.81	2.250	10.86	3.25	6.56
0.333	6.77	1.333	167.81	2.333	10.86	3.33	6.56
0.417	7.78	1.417	41.59	2.417	9.70	3.42	6.19
0.500	7.78	1.500	41.59	2.500	9.70	3.50	6.19
0.583	9.24	1.583	24.40	2.583	8.81	3.58	5.87
0.667	9.24	1.667	24.40	2.667	8.81	3.67	5.87
0.750	11.62	1.750	18.04	2.750	8.08	3.75	5.58
0.833	11.62	1.833	18.04	2.833	8.08	3.83	5.58
0.917	16.31	1.917	14.60	2.917	7.49	3.92	5.33
1.000	16.31	2.000	14.60	3.000	7.49	4.00	5.33

Unit Hyd Qpeak (cms)= 0.027

PEAK FLOW (cms)= 0.006 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 20.619
TOTAL RAINFALL (mm)= 75.169
RUNOFF COEFFICIENT = 0.274

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

CALIB NASHYD (0202) ID= 1 DT= 5.0 min	Area (ha)= 3.50	Curve Number (CN)= 65.8
	Ia (mm)= 4.61	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.18	

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	6.02	1.083	32.97	2.083	12.40	3.08	6.99
0.167	6.02	1.167	32.97	2.167	12.40	3.17	6.99
0.250	6.77	1.250	167.81	2.250	10.86	3.25	6.56
0.333	6.77	1.333	167.81	2.333	10.86	3.33	6.56
0.417	7.78	1.417	41.59	2.417	9.70	3.42	6.19
0.500	7.78	1.500	41.59	2.500	9.70	3.50	6.19
0.583	9.24	1.583	24.40	2.583	8.81	3.58	5.87
0.667	9.24	1.667	24.40	2.667	8.81	3.67	5.87
0.750	11.62	1.750	18.04	2.750	8.08	3.75	5.58
0.833	11.62	1.833	18.04	2.833	8.08	3.83	5.58
0.917	16.31	1.917	14.60	2.917	7.49	3.92	5.33
1.000	16.31	2.000	14.60	3.000	7.49	4.00	5.33

Unit Hyd Qpeak (cms)= 0.743

```
     PEAK FLOW       (cms)=   0.257 (i)
     TIME TO PEAK    (hrs)=   1.500
     RUNOFF VOLUME    (mm)=  24.506
     TOTAL RAINFALL   (mm)=  75.169
     RUNOFF COEFFICIENT   =   0.326

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0050)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                           0.0016     0.0000   |   1.0000      0.0450
                           0.0016     0.0449   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)      3.500      0.257      1.50      24.51
   OUTFLOW: ID= 1 (  0050)      3.500      0.125      2.00      24.51

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 48.56
                    TIME SHIFT OF PEAK FLOW         (min)= 30.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0454

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0204)|   Area    (ha)=   1.39
|ID= 1 DT= 5.0 min |   Total Imp(%)=  20.00   Dir. Conn.(%)=   1.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         1.11
     Dep. Storage     (mm)=       2.00         2.00
     Average Slope     (%)=       1.50         2.00
     Length            (m)=      20.00        25.00
     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    6.02 | 1.083   32.97 | 2.083   12.40 |  3.08    6.99
              0.167    6.02 | 1.167   32.97 | 2.167   12.40 |  3.17    6.99
              0.250    6.77 | 1.250  167.81 | 2.250   10.86 |  3.25    6.56
```

```
                0.333    6.77 | 1.333  167.81 | 2.333   10.86 |  3.33    6.56
                0.417    7.78 | 1.417   41.59 | 2.417    9.70 |  3.42    6.19
                0.500    7.78 | 1.500   41.59 | 2.500    9.70 |  3.50    6.19
                0.583    9.24 | 1.583   24.40 | 2.583    8.81 |  3.58    5.87
                0.667    9.24 | 1.667   24.40 | 2.667    8.81 |  3.67    5.87
                0.750   11.62 | 1.750   18.04 | 2.750    8.08 |  3.75    5.58
                0.833   11.62 | 1.833   18.04 | 2.833    8.08 |  3.83    5.58
                0.917   16.31 | 1.917   14.60 | 2.917    7.49 |  3.92    5.33
                1.000   16.31 | 2.000   14.60 | 3.000    7.49 |  4.00    5.33

     Max.Eff.Inten.(mm/hr)=     167.81        64.59
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       0.70 (ii)    7.04 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.15          0.147 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.42
     RUNOFF VOLUME    (mm)=      73.17        26.42          26.88
     TOTAL RAINFALL   (mm)=      75.17        75.17          75.17
     RUNOFF COEFFICIENT   =       0.97         0.35           0.36

***** 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*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0051)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                          0.0010     0.0000   |   1.0000      0.0278
                          0.0010     0.0277   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0204)      1.390      0.147      1.42       26.88
   OUTFLOW: ID= 1 (  0051)      1.390      0.027      2.67       26.89

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 18.23
                    TIME SHIFT OF PEAK FLOW         (min)= 75.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0278
```

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0201):    12.44   0.397     1.75    18.00
      + ID2= 2 (  0203):     0.07   0.006     1.33    20.62
        ================================================
        ID = 3 (  0001):    12.51   0.399     1.75    18.02

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

--------------------
| ADD HYD  (  0001)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0001):    12.51   0.399     1.75    18.02
      + ID2= 2 (  0050):     3.50   0.125     2.00    24.51
        ================================================
        ID = 1 (  0001):    16.01   0.483     2.00    19.44

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

--------------------
| ADD HYD  (  0001)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):    16.01   0.483     2.00    19.44
      + ID2= 2 (  0051):     1.39   0.027     2.67    26.89
        ================================================
        ID = 3 (  0001):    17.40   0.484     2.00    20.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0205)|   Area    (ha)=   0.83   Curve Number   (CN)= 65.9
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.60   # 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    6.02 | 1.083   32.97 | 2.083   12.40 |  3.08    6.99
                0.167    6.02 | 1.167   32.97 | 2.167   12.40 |  3.17    6.99
                0.250    6.77 | 1.250  167.81 | 2.250   10.86 |  3.25    6.56
                0.333    6.77 | 1.333  167.81 | 2.333   10.86 |  3.33    6.56
                0.417    7.78 | 1.417   41.59 | 2.417    9.70 |  3.42    6.19
                0.500    7.78 | 1.500   41.59 | 2.500    9.70 |  3.50    6.19
                0.583    9.24 | 1.583   24.40 | 2.583    8.81 |  3.58    5.87
                0.667    9.24 | 1.667   24.40 | 2.667    8.81 |  3.67    5.87
                0.750   11.62 | 1.750   18.04 | 2.750    8.08 |  3.75    5.58
                0.833   11.62 | 1.833   18.04 | 2.833    8.08 |  3.83    5.58
                0.917   16.31 | 1.917   14.60 | 2.917    7.49 |  3.92    5.33
                1.000   16.31 | 2.000   14.60 | 3.000    7.49 |  4.00    5.33

     Unit Hyd Qpeak  (cms)=   0.226

     PEAK FLOW       (cms)=   0.072 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  24.468
     TOTAL RAINFALL   (mm)=  75.169
     RUNOFF COEFFICIENT   =   0.326

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0052)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                           0.0005     0.0000    |   1.0000      0.0156
                           0.0005     0.0155    |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0205)      0.830      0.072      1.42       24.47
   OUTFLOW: ID= 1 (  0052)      0.830      0.014      2.83       24.47

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 20.16
                    TIME SHIFT OF PEAK FLOW         (min)= 85.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0156

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0206)|   Area    (ha)=   2.15   Curve Number   (CN)= 58.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.15   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

         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	6.02	1.083	32.97	2.083	12.40	3.08	6.99
0.167	6.02	1.167	32.97	2.167	12.40	3.17	6.99
0.250	6.77	1.250	167.81	2.250	10.86	3.25	6.56
0.333	6.77	1.333	167.81	2.333	10.86	3.33	6.56
0.417	7.78	1.417	41.59	2.417	9.70	3.42	6.19
0.500	7.78	1.500	41.59	2.500	9.70	3.50	6.19
0.583	9.24	1.583	24.40	2.583	8.81	3.58	5.87
0.667	9.24	1.667	24.40	2.667	8.81	3.67	5.87
0.750	11.62	1.750	18.04	2.750	8.08	3.75	5.58
0.833	11.62	1.833	18.04	2.833	8.08	3.83	5.58
0.917	16.31	1.917	14.60	2.917	7.49	3.92	5.33
1.000	16.31	2.000	14.60	3.000	7.49	4.00	5.33

Unit Hyd Qpeak (cms)= 0.684

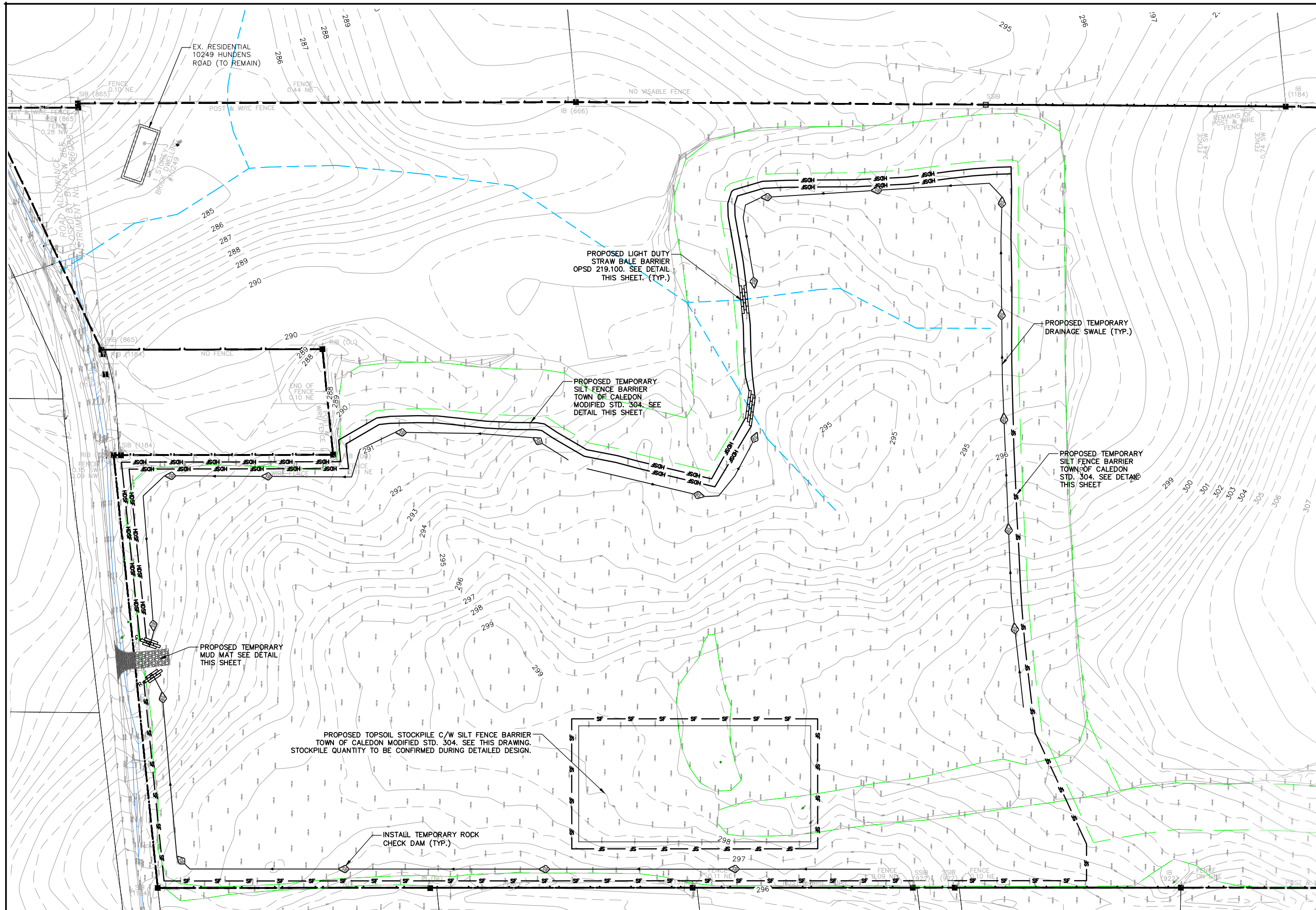
PEAK FLOW (cms)= 0.140 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 18.336
TOTAL RAINFALL (mm)= 75.169
RUNOFF COEFFICIENT = 0.244

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

ADD HYD (0002)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0206):	2.15	0.140	1.42	18.34
	+ ID2= 2 (0052):	0.83	0.014	2.83	24.47
	ID = 3 (0002):	2.98	0.141	1.42	20.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

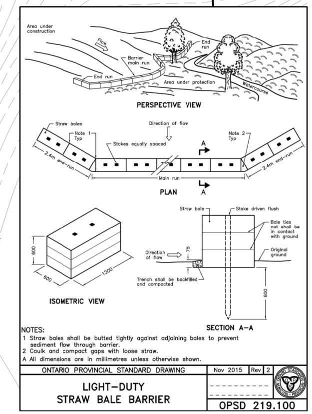
DRAWINGS



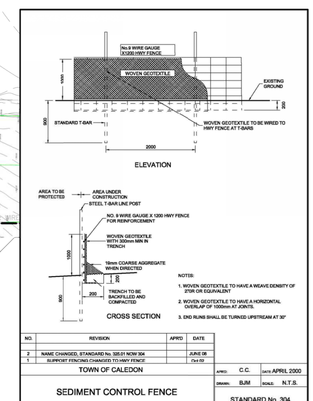
EX. RESIDENTIAL 10249 HUNDENS ROAD (TO REMAIN)
PROPOSED LIGHT DUTY STRAW BALE BARRIER OPSD 219.100. SEE DETAIL THIS SHEET. (TYP.)
PROPOSED TEMPORARY DRAINAGE SWALE (TYP.)
PROPOSED TEMPORARY SILT FENCE BARRIER TOWN OF CALEDON MODIFIED STD. 304. SEE DETAIL THIS SHEET
PROPOSED TEMPORARY SILT FENCE BARRIER TOWN OF CALEDON STD. 304. SEE DETAIL THIS SHEET
PROPOSED TEMPORARY MUD MAT SEE DETAIL THIS SHEET
PROPOSED TOPSOIL STOCKPILE C/W SILT FENCE BARRIER TOWN OF CALEDON MODIFIED STD. 304. SEE THIS DRAWING. STOCKPILE QUANTITY TO BE CONFIRMED DURING DETAILED DESIGN.
INSTALL TEMPORARY ROCK CHECK DAM (TYP.)
NO VISABLE FENCE
POST & WIRE FENCE
REMAINS OF POST & WIRE FENCE
SCALE: 1:1000

LEGEND

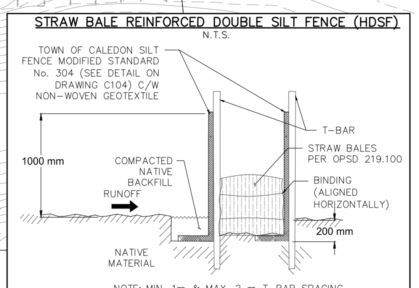
— · —	PROPERTY LINE
	EXISTING CONTOUR (0.5m)
	EXISTING CONTOUR (1.0m)
	EXISTING DITCH
x 215.00	EXISTING GRADE
	MUD-MAT; SEE DETAIL MODIFIED
— SF —	SILT FENCE (T.O.C. STD. DWG. No. 304) – SEE DETAIL ON C104
— HDSF —	HEAVY DUTY SILT FENCE (STRAW BALE REINFORCED DOUBLE SILT FENCE) – SEE DETAIL ON THIS DRAWING
	ROCK FLOW CHECK DAM; OPSD 219.210



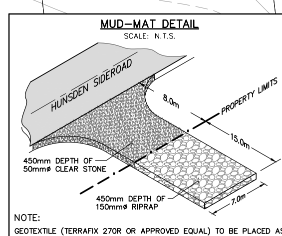
PERSPECTIVE VIEW
PLAN
ISOMETRIC VIEW
SECTION A–A
NOTES:
1 Straw bales shall be butted tightly against adjoining bales to prevent sediment flow through barrier.
2 Caulk and compact gaps with loose straw.
A All dimensions are in millimetres unless otherwise shown.
ONTARIO PROVINCIAL STANDARD DRAWING
Nov 2015 Rev 2
LIGHT–DUTY STRAW BALE BARRIER
OPSD 219.100



ELEVATION
CROSS SECTION
NOTES:
1. WOVEN GEOTEXTILE TO HAVE A WEAVE DENSITY OF 270R OR EQUIVALENT
2. WOVEN GEOTEXTILE TO HAVE A HORIZONTAL OVERLAP OF 1000mm AT JOINTS.
3. END RUNS SHALL BE TURNED UPSTREAM AT 30°
TOWN OF CALEDON
SEDIMENT CONTROL FENCE
DATE: APRIL 2000
SCALE: N.T.S.
STANDARD No. 304



STRAW BALE REINFORCED DOUBLE SILT FENCE (HDSF)
N.T.S.
TOWN OF CALEDON SILT FENCE MODIFIED STANDARD No. 304 (SEE DETAIL ON DRAWING C104) C/W NON–WOVEN GEOTEXTILE
T–BAR
STRAW BALES PER OPSD 219.100
BINDING (ALIGNED HORIZONTALLY)
1000 mm
COMPACTED NATIVE BACKFILL
RUNOFF
200 mm
NATIVE MATERIAL
NOTE: MIN. 1m & MAX. 2 m T–BAR SPACING



MUD–MAT DETAIL
SCALE: N.T.S.
HUNSDEN SIDEROAD
PROPERTY LIMITS
8.0m
15.0m
7.0m
450mm DEPTH OF 50mmø CLEAR STONE
450mm DEPTH OF 150mmø RIPRAP
NOTE:
GEOTEXTILE (TERRAFIX 270R OR APPROVED EQUAL) TO BE PLACED AS SEPARATION BARRIER BETWEEN EXISTING GROUND AND CLEAR STONE.

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR FIRST SUBMISSION (ZBA)	2022/JUNE/30

ELEVATION NOTE:

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SITE BENCHMARK:

No. 00820108111
ELEVATION = 286.833m
No. 00820108113
ELEVATION = 290.087

SURVEY NOTES:

THIS TOPOGRAPHIC SURVEY WAS COMPLETED BY J.D. BARNES LIMITED ON MARCH 22, 2022. REF. No: 22-30-839-00

DRAWING NOTES:

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Project

10249 HUNSDEN SIDEROAD
TOWN OF CALEDON

Drawing

PRELIMINARY EROSION AND SEDIMENT CONTROL PLAN

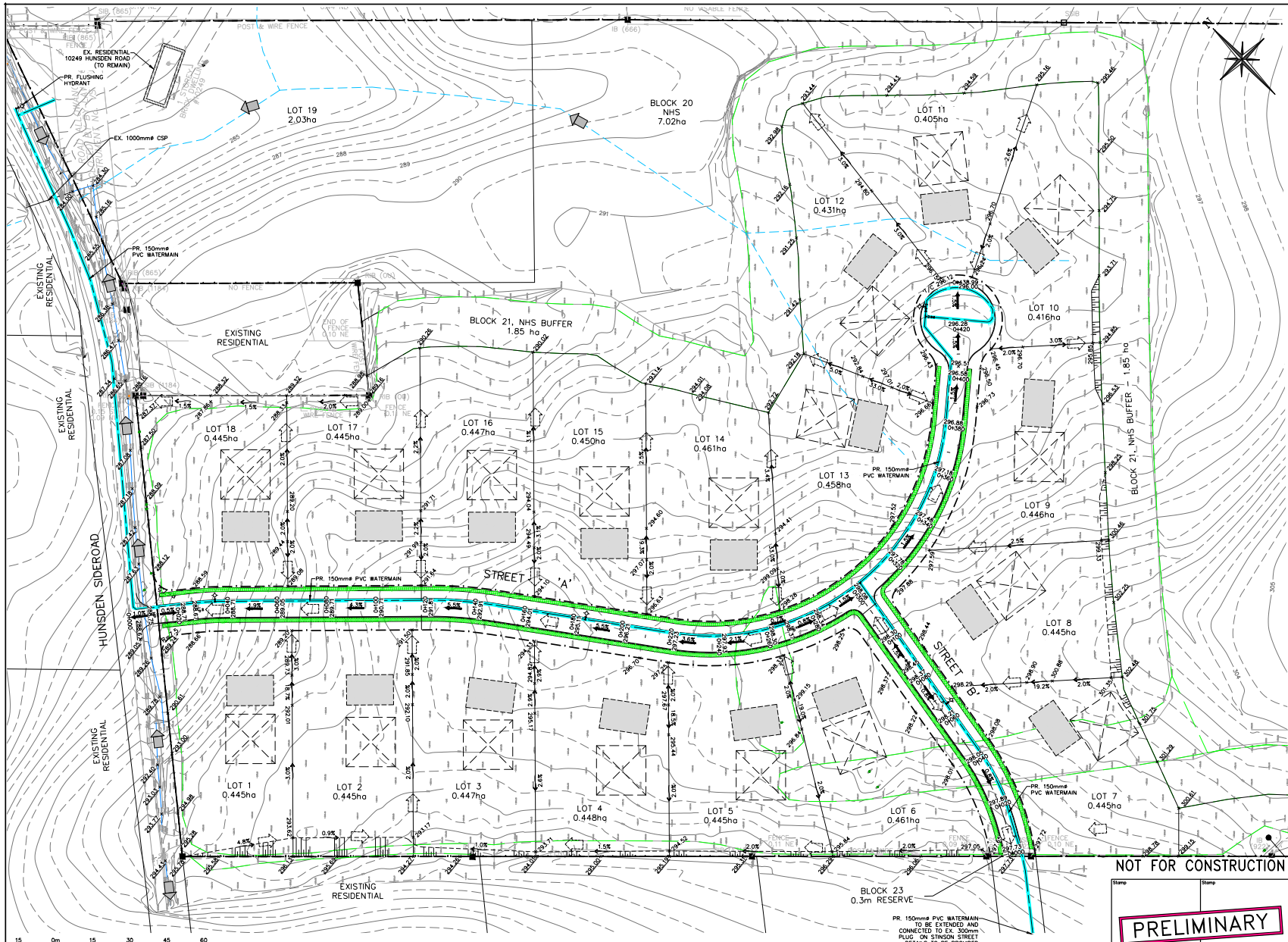
NOT FOR CONSTRUCTION

Stamp | Stamp

PRELIMINARY

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.
M.I.M.	P.S.	952–6305
Check S.C.	Check T.E.	Scale 1:1000 / Dwg. C101



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING FENCE
- EXISTING GRADE
- PROPOSED GRADE
- PROPOSED GRADE (TO MATCH EXISTING)
- PROPOSED MINOR FLOW DIRECTION
- PROPOSED GRASSED SWALE
- PROPOSED SLOPE (3:1 MAX.)
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED WATERMAIN & GATE VALVE
- PR. BIOSWALE
- PR. BUILDING ENVELOPE
- SANITARY SEPTIC BED TO BE DESIGNED BY OTHERS

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR FIRST SUBMISSION (ZBA)	2022/JUNE/30

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SITE BENCHMARK:

No. 050210811
ELEVATION = 286.833m
No. 050210813
ELEVATION = 290.087

SURVEY NOTES:

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Project: 10249 HUNSDEN SIDEROAD
TOWN OF CALEDON

Drawing: PRELIMINARY SITE GRADING & SERVICING PLAN

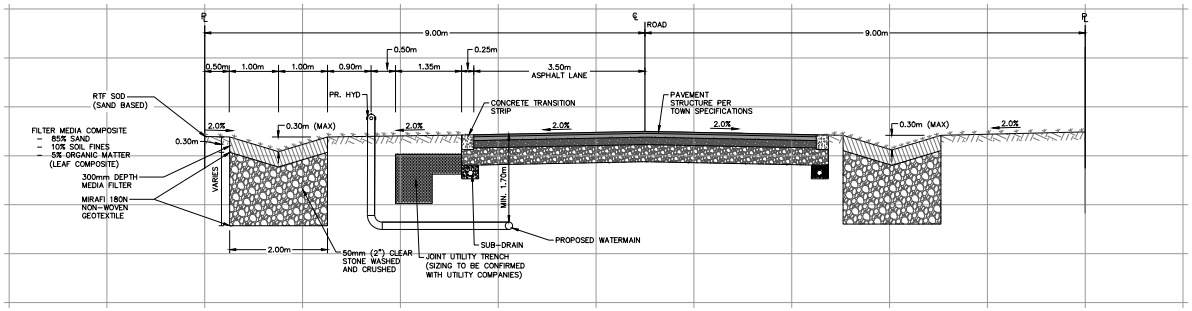
Stamp: PRELIMINARY

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA

Drawn	M.I.M.	Design	P.S.	Project No.	952-6305
Check	S.C.	Check	T.E.	Scale	1: 750
				Dwg.	C 102

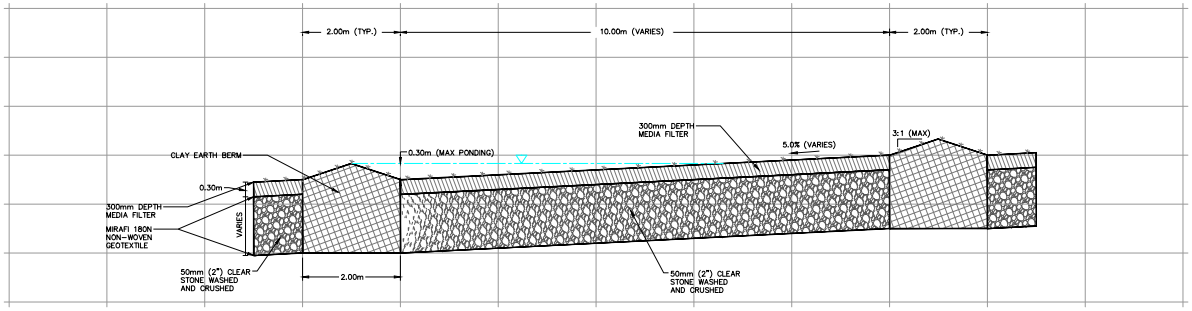
TYPICAL 18.0m R.OW. ROAD SECTION

SCALE: HOR: 1:50
VER: 1:50



TYPICAL ROADSIDE BIOSWALE SECTION

SCALE: HOR: 1:50
VER: 1:50



No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR FIRST SUBMISSION (ZBA)	2022/JUNE/30

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SITE BENCHMARK:

No. 00820108111
ELEVATION = 286.833m
No. 00820108113
ELEVATION = 290.087

SURVEY NOTES:

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Project

10249 HUNSDEN SIDEROAD
TOWN OF CALEDON

Drawing

SECTIONS AND DETAILS

NOT FOR CONSTRUCTION

Stamp

PRELIMINARY

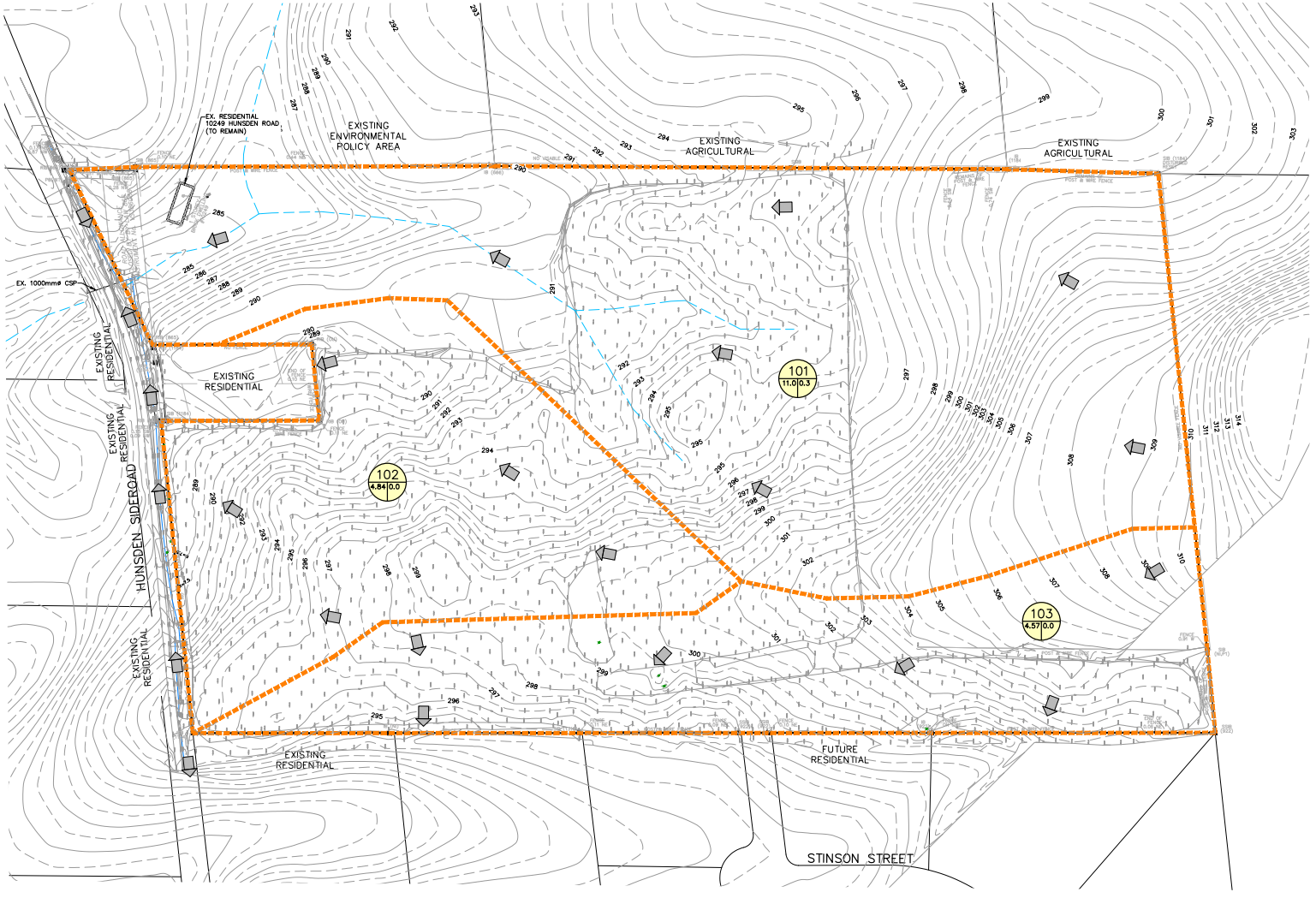
Stamp

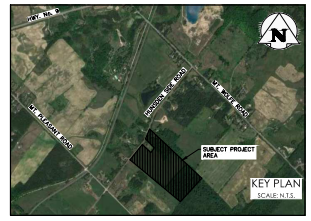
CROZIER
CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875 0026 T
905 875 4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
M.I.M.	P.S.		952-6305
Check	Check	Scale	Dwg.
S.C.	T.E.	AS SHOWN	C 103

10 0m 10 20 30 40
SCALE: 1:500

FIGURES





LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING GRADE
- EXISTING OVERLAND FLOW DIRECTION
- EXISTING STORM DRAINAGE CATCHMENT
- CATCHMENT I.D.
- AREA (ha) | PERCENT IMPERVIOUS (%)

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR FIRST SUBMISSION (ZBA)	2022/JUNE/30

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SITE BENCHMARK:

No. 00820108111
ELEVATION = 286.833m
No. 00820108113
ELEVATION = 290.087

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Project

10249 HUNSDEN SIDEROAD
TOWN OF CALEDON

Drawing

PRE-DEVELOPMENT DRAINAGE PLAN

NOT FOR CONSTRUCTION

Stamp

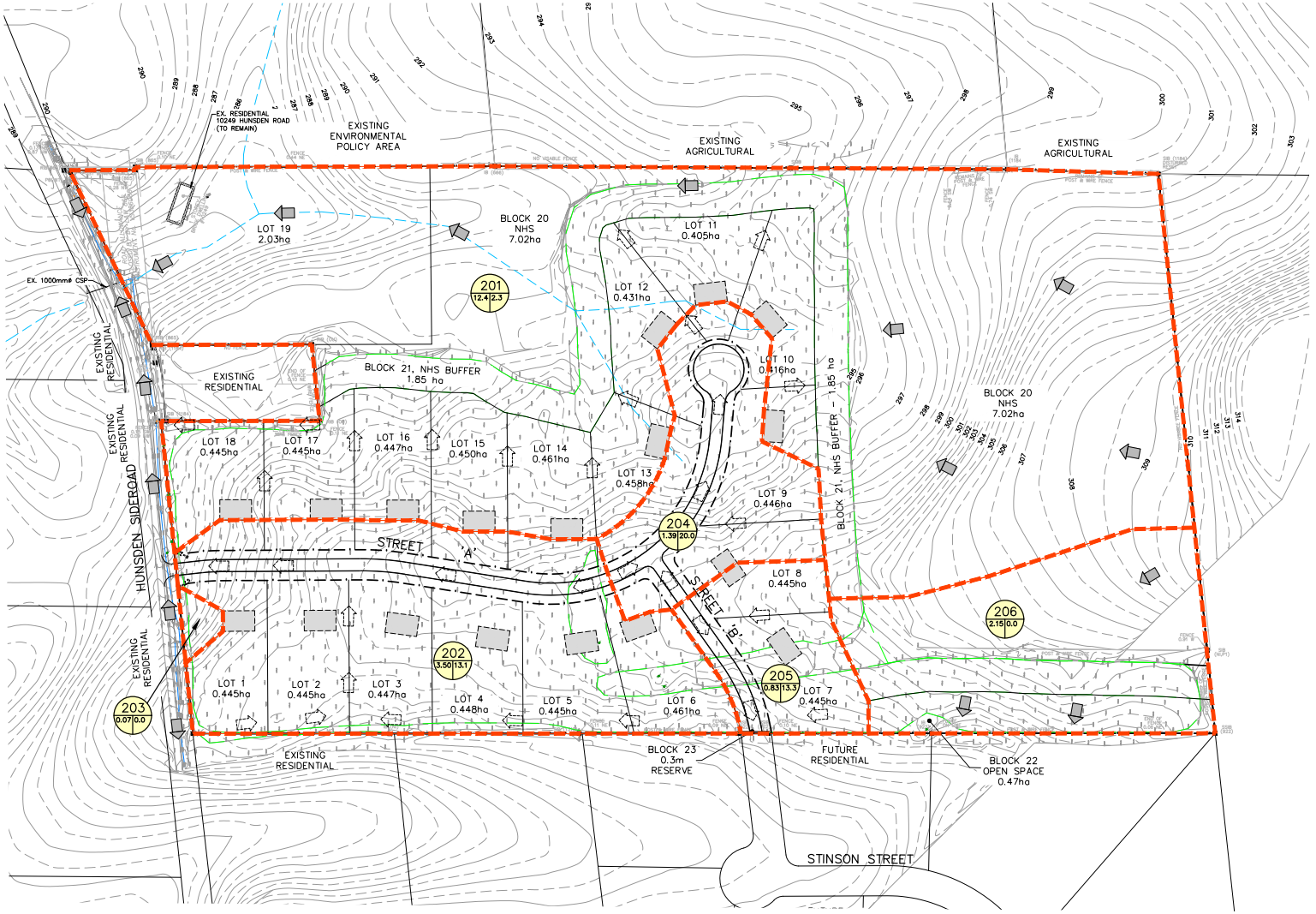
PRELIMINARY

Stamp

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875-0026 T
905 875-4915 F
WWW.CFCROZIER.CA

Drawn	M.I.M.	Design	P.S.	Project No.	952-6305
Check	S.C.	Check	T.E.	Scale	1:1250
				Dwg.	FIG1

25 0m 25 50 75 100
SCALE: 1:1250



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING GRADE
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- EXISTING MAJOR OVERLAND FLOW DIRECTION
- PROPOSED STORM DRAINAGE CATCHMENT
- CATCHMENT I.D.
- AREA (ha) | PERCENT IMPERVIOUS (%)
- PROPOSED BUILDING ENVELOPE

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR FIRST SUBMISSION (ZBA)	2022/JUNE/30

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No. 00820108113
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Project

10249 HUNSDEN SIDEROAD
TOWN OF CALEDON

Drawing

POST DEVELOPMENT DRAINAGE PLAN

NOT FOR CONSTRUCTION

Stamp

PRELIMINARY

Stamp

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
M.I.M.	P.S.		952-6305
Check	Check	Scale	Dwg.
S.C.	T.E.	1:1250	FIG2

25 0m 25 50 75 100
SCALE: 1:1250