Functional Servicing and Stormwater Management Design Report

12489 Dixie Road and 12861 Dixie Road, Caledon, ON

December 5, 2024

Prepared for:

QuadReal Property Group

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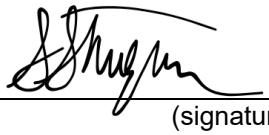
Prepared by 
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1.0 INTRODUCTION

Stantec Consulting Ltd (Stantec) was retained by QuadReal Property Group (QuadReal) to complete a Functional Servicing and Stormwater Management Report (FSSMR) in support of a development application including an Official Plan Amendment (OPA) Application, and Zoning By-law Amendment (ZBLA) Application for the properties with municipal addresses 12489 & 12861 Dixie Road in the Town of Caledon, herein referred to as the "Primary Subject Area (PSA)".

The PSA is generally located west of Bramalea Road, north of Mayfield Road, east of Dixie Road and south of Old School Road, in the Town of Caledon as shown on Figure 1. The PSA is bound by Old School Road to the north, Dixie Road to the west, a golf course to the east, and agricultural lands to the south. The PSA includes two connected parcels of land, which encompass a total area of approximately 116.4 ha. The PSA is currently used for agricultural purposes and is established with two residential dwellings, several barns, and outbuildings. The majority of undeveloped lands are under active management including an active cattle range and approximately eight crop fields planted with soybean or corn.

For the purpose of this FSSMR including civil services and stormwater infrastructure, the PSA is described throughout as the South Site (12489 Dixie Road) and the North Site (12689 Dixie Road), which are further detailed below. The Secondary Study Area (SSA) are lands adjacent to the PSA that will be evaluated to support Local SWS objectives. Specifically, for the FSSMR, the SSA includes external drainage catchments north of Old School Rd that drain through developable land, and the adjacent lands west of Dixie Road (12892 and 12668 Dixie Road).

The proposed developments include the construction of five industrial warehouse buildings and the development of associated parking areas and private roads. To service the development, two stormwater ponds and associated subsurface infrastructure are also proposed.

This FSSMR should be read in conjunction with the Comprehensive Environmental Impact Study and Management Plan (CEISMP), dated December 4, 2024, and the Hydrogeological Assessment Report (HR), dated December 5, 2024, both prepared by Stantec Consulting. These reports will describe the location, extent, sensitivity and significance of natural features and functions within the PSA, evaluate the factors and influences important to their sustainability, establish goals and objectives for terrestrial and aquatic systems (i.e., natural heritage) and water resource systems in accordance with the PPS, the Region's OP, Caledon's OP, and the applicable Watershed Plans and Subwatershed Studies, and the SABE SWS.

1.1 SOUTH SITE

The 58.13-hectare South Site (12489 Dixie Rd) is generally located west of Bramalea Rd., north of Mayfield Rd., east of Dixie Rd., and south of Old School Rd, in the Town of Caledon. The site is bound by agricultural lands to the north, Dixie Road to the west, a golf course to the east, and agricultural lands to the south. The proposed site plan includes 3 industrial last-mile warehouse buildings, parking areas, private roads, 1 stormwater pond, and Natural Heritage Areas along the north and south limit of the Site. There are 2 watercourses on the South Site, a Tributary of the West Humber River traversing through a natural heritage

area along the northern portion of the South Site, and Kilamanagh Creek, traversing through a natural heritage area at the southwest portion of the South Site.

1.2 NORTH SITE

The 58.27-hectare North Site (12861 Dixie Rd) is located west of Bramalea Rd., north of Mayfield Rd., east of Dixie Rd., and South of Old School Rd, in the Town of Caledon. The Site is bound by Old School Road to the north, Dixie Road to the west, a golf course to the east and agricultural lands to the south. The proposed plan includes 2 industrial buildings, parking areas, private roads, 1 stormwater pond, and a Natural Heritage Area located on the south and west limit of the North Site. A permanent watercourse referred to as Tributary of the West Humber River traverses the west side of the North Site through a natural heritage area.

An 8.4 metre wide area of the North Site directly adjacent to Old School Road will be dedicated to the Town for future expansion of the right-of-way, which results in an effective gross site area of 57.75 hectares.

2.0 BACKGROUND INFORMATION

The following documents were reviewed in preparing this FSSMR report:

- Stormwater Management Planning and Design Manual 2003, Ministry of the Environment Ontario, March 2003 [MOE Manual];
- Town of Caledon Development Standards Manual (2019)
- Region of Peel Guidelines
- TRCA Stormwater Management Criteria (2012)
- Geotechnical Investigation and Design Report, Prepared by Stantec Consulting, December 2024
- Comprehensive Environmental Impact Study and Management Plan (CEISMP) Report, Prepared by Stantec Consulting, Dated December 2024
- Hydrogeological Site Assessment, Prepared by Stantec Consulting, Dated December 2024
- Humber River Watershed Plan (TRCA 2008) & Humber River Watershed Characterization Report October 2023
- Functional Servicing Report 12668 & 12862 Dixie Road, Prepared by WSP, Dated February 2024
- Stormwater Management Report 12668 & 12862 Dixie Road, Prepared by WSP, Dated March 2024
- Feature Based Water Balance Analysis 12668 & 12862 Dixie Road, Prepared by WSP, Dated March 2024
- Settlement Area Boundary Expansion Scoped Subwatershed Study (SABE SWS) prepared by Wood et. Al., December 2021

The 2024 CEISMP describes the existing conditions of the PSA and evaluates conformance with the PPS and other applicable natural heritage legislation and municipal policy requirements (e.g., ESA). The CEISMP confirms the presence and extent of natural heritage features including valleylands, woodlands, wetlands and watercourses, on and adjacent to the PSA. Further the CEISMP identifies the existing constraints (i.e. existing TRCA floodplain limit, staked top of bank, staked dripline, meander belt width etc.) and applicable buffers, confirm the developable area within the PSA, identifies permitting requirements and provides recommendations for environmental protection, mitigation and habitat compensation based on known and potential impacts anticipated to result from the proposed development.

The 2024 HR describes the baseline groundwater conditions throughout the PSA including geological and hydrogeological conditions, identifying the hydrostratigraphic/aquifer units, hydraulic conductivity of the subsurface deposits, groundwater depths and flow regimes, groundwater recharge and discharge zones/features, and groundwater quality. The HR also evaluates how the form and/or function of the

groundwater system could potentially be impacted by future development and if appliable propose other strategies that could be used within the PSA to mitigate any of the potential impacts.

3.0 EXISTING CONDITIONS

3.1 SOUTH SITE LAND USE

The South Site is currently designated as a Prime Agricultural Area and contains an Environmental Policy Area at the north and south end of the property, in the Town of Caledon Official Plan. It is currently zoned as Agricultural. The South Site consists primarily of agricultural fields with various buildings and structures and one residential building.

3.2 NORTH SITE LAND USE

The North Site is currently designated as a Prime Agricultural Area and contains and Environmental Policy Area (EPA) along the west and south limit of the property, in the Town of Caledon Official Plan. It is currently zoned as Agricultural. The North Site consists primarily of agricultural fields with various buildings and structures, and one residential building.

4.0 STORMWATER MANAGEMENT AND DRAINAGE

The PSA and SSA are located within Humber River Watershed, specifically the West Humber subwatershed.

The online Ontario Watershed Information tool was used to delineate the existing total drainage catchment to Kilamanagh Creek and Tributary of West Humber River including the PSA and SSA (refer to Watershed Mapping Figure in Appendix B). **TABLE 4.1** summarizes the total contributing catchment areas for each watercourse, the total PSA contributing areas as well as the developable PSA contributing areas, and the developable PSA contributing area as percentage of the total catchment area.

TABLE 4.1 – WATERSHED AREA SUMMARY

Subwatershed	Total Catchment Area (ha)	Total PSA Contributing Area (ha)	Developable PSA Contributing Areas (ha)	Developable PSA Contributing as a % of Total Catchment
Kilamanagh Creek	1,195	33	24	2.0%
Tributary of West Humber River	978	83	51	5.2%

This summary illustrates that the developable contributing areas of the North and South Sites within the PSA are both small percentages of the total contributing catchment areas to each watercourse (2.0% and 5.2%) with minimal impacts to the overall flow within these watercourses.

Section 4.1 and **Section 4.2** describe the existing storm drainage conditions for the PSA (South Site and North Site).

As noted above, the Secondary Study Area (SSA) are lands adjacent to the PSA. Specifically, for the FSSMR, the SSA includes external drainage catchments north of Old School Rd that drain through developable land, and the adjacent lands west of Dixie Road (12892 and 12668 Dixie Road).

The SSA areas east of Dixie Road and north of Old School Road, approximately 71.9ha) drain through existing culverts under Old School Road, through the PSA North Site to the Tributary of West Humber River. Refer to **Section 4.2** and **4.3.1** for more information related to external drainage to the site and to the HWDF.

The SSA areas west of Dixie Road are detailed in the *12688 & 12682 Dixie Road Stormwater Management Report dated March 2024 by WSP.* The majority of the site drainage (69.95ha) and external drainage (85.7ha) drain to the Tributary of West Humber River and contributing reaches west of Dixie Road. A small portion of the site (9.1ha) drains directly to Kilimanagh Creek west of Dixie Road.

4.1 SOUTH SITE EXISTING STORM DRAINAGE CONDITIONS

The South Site is located within Humber River Watershed, specifically the West Humber subwatershed. The South Site has two watercourses, Kilamanagh Creek and Tributary of West Humber River, traversing

the site. There is a drainage split on the South Site with the majority of the Site (29.56 ha) draining south towards Kilamanagh Creek and the remainder (12.69 ha) draining north towards the Tributary of West Humber River. As noted in the CEISMP for the SPA, Kilamanagh Creek is an occupied reach for Redside Dace and Tributary of West Humber River is contributing habitat.

Based on a review of the available information for the South Site, including record drawings and the existing servicing drawings, there are no stormwater management controls in place.

There are several existing culverts under Dixie Road adjacent to the PSA. Kilamanagh Creek is conveyed through an existing box culvert approximately 5m wide and 3.m high within Dixie Road (1650 m south of Old School Road) which overtops the road during the Regional storm event.

Based on record drawings from 1997 (**Appendix A**), a tile drainage system is located throughout the agricultural fields and designed to follow the existing surface drainage pattern of the South Site, with the tile drains installed approximately 0.6m below existing ground. Based on the record drawings of the tile drainage system, there are 5 tile drainage outlets to the Tributary of West Humber River and 2 tile drainage outlets to Kilamanagh Creek. During survey work conducted, 3 outlets were identified in the vicinity of the tile drainage record drawing outlets discharging to Tributary of West Humber River and outlets discharging toward Kilamanagh Creek were not identified. It is possible that the remaining tile drainage outlets were not located during survey work as they were outside of the detailed site survey areas, hidden beneath vegetation, or have become buried since installation.

With the tile drainage system designed to mimic the existing surface drainage pattern of the South Site, all runoff (both the piped and overland) flows ultimately discharge to either the Tributary of West Humber River or Kilamanagh Creek. **TABLE 4.2** below summarizes the drainage areas and their respective outlets. **Drawing 4.1S** outlines the existing drainage conditions for the South Site.

TABLE 4.2 – SOUTH SITE EXISTING DRAINAGE CATCHMENTS

Catchment	Area (ha)	Drainage Conveyance	Ultimate Discharge Location
107	12.69	Tile Drainage and/or Overland Sheet Flow	Tributary of West Humber River
110	12.40	Overland Sheet Flow	Tributary of West Humber River
108	29.56	Tile Drainage and/or Overland Sheet Flow	Kilamanagh Creek
109	3.32	Overland Sheet Flow	Kilamanagh Creek

The above noted catchments have been modeled in Visual Otthymo 6 (VO 6.2) to determine the existing conditions flows for the South Site for the 2 through 100 year storm events as well as the Regional (Hazel) storm event. To accurately depict the existing condition flows the following parameters were calculated for input into the VO model:

Soil Conditions (CN^*_{II} Values): The hydrological soil group on South Site was obtained from the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) AgMaps. As per the OMAFRA hydrological soil group mapping the South Site consists of Class C soils which have a slow infiltration rate when thoroughly wet. The hydrological soil group, and the existing land use within each catchment, were used

to determine the appropriate CN^*_{II} values used in the VO model. Detailed calculation of CN^*_{II} values can be found in **Appendix B.**

Time To Peak (T_p): The time to peak for each catchment was calculated using the Site topographic survey. The Uplands Method, Bransby William Equation, and Airport Equation were used to calculate the time to peak (T_p) based on the Site topography and land use, with the most conservative (largest) T_p value selected for modeling. Based on the results the Airport Equation was selected as the governing equation for all catchments. Detailed calculations of T_p values can be found in **Appendix B.**

Existing conditions peak flows were modeled in VO6 using the existing catchments and input parameters discussed herein. **TABLE 4.3** summarizes the existing conditions flows for the South Site. Existing conditions modeling is included in **Appendix B**.

TABLE 4.3 – SOUTH SITE EXISTING CONDITIONS PEAK FLOWS

Catchment	Area (ha)	Storm Event						
		Hazel Existing	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
107	12.69	1.637	1.440	1.196	0.980	0.695	0.495	0.249
108	29.56	3.344	2.351	1.955	1.604	1.136	0.816	0.408

4.1.1 SOUTH SITE GROUNDWATER

The December 2024 Hydrogeological Report prepared by Stantec Consulting indicates that the existing seasonal high groundwater elevations on South Site range between 252m and 265.35m. The groundwater elevations follow the general topography of the South Site, with the higher groundwater elevation occurring near the drainage split bisecting the Site and sloping towards the Tributary of West Humber River and Kilamanagh Creek. Groundwater elevations can be seen in **Figure 9** within the December 2024 Hydrogeological Report.

The existing tile drainage system may impact the groundwater recharge and infiltration occurring on South Site. As per the Hydro-G report the South Site infiltration rate is estimated to be 17 mm/hr or less.

4.2 NORTH SITE EXISTING CONDITIONS

The North Site is located within Humber River subwatershed, specifically the West Humber subwatershed. The North site has one watercourse, Tributary of West Humber River, and a headwater drainage feature traversing the North Site. The existing North Site slopes from Old School Road to the south with runoff ultimately draining into the EPA. A portion of the North Site sheet drains south-west to a Tributary of West Humber, a portion of the North Site drains south-east to the existing ponds within the adjacent golf course which ultimately discharges to a Tributary of West Humber, and the remainder of the North Site drains south.

Based on a review of the information currently available for the North Site including record drawings and the existing servicing (SUE) drawings, there are no stormwater management controls in place.

TABLE 4.4 below summarizes the drainage areas within the North Site and their respective outlets. **Drawing 4.1N** outlines the existing drainage conditions within the PSA.

Drawing 4.3 outlines the existing external drainage within the SSA north of Old School Road. Catchment EXT-1 (14.1 ha) drains through an existing 400mm diameter CSP culvert under Old School Road into an existing HWDF within the North site and ultimately discharges to the Tributary of West Humber. Refer to **Section 4.3.1** for more information. Catchment EXT-2 (57.8ha) drains through an existing 800mm diameter CSP culvert under Old School Road through the site North site and ultimately discharges to the Tributary of West Humber.

There are several existing culverts under Dixie Road adjacent to the PSA.

The main Tributary of the West Humber is conveyed through an existing box culvert approximately 5m wide and 3.m high within Dixie Road (420 m south of Old School Road) which overtops the road during the Regional storm event.

A 1.25m diameter culvert (690m south of Old School Road) and 1.3m diameter culvert (920m south of Old School Road) are located within Dixie Road and convey drainage from the SSA lands west of Dixie into the smaller tributaries that feed into the Tributary of the West Humber. All of these culvert discharge into the NHS of the Tributary of the West Humber adjacent to Dixie Road.

TABLE 4.4 – NORTH SITE EXISTING DRAINAGE CATCHMENTS

Catchment	Area (ha)	Drainage Conveyance	Ultimate Discharge Location
101	3.29	Overland Sheet Flow	Tributary of West Humber River
102	6.05	Tile Drainage and/or Overland Sheet Flow	Tributary of West Humber River
103	9.81	Overland Sheet Flow	Tributary of West Humber River
104	11.23	Overland Sheet Flow	Tributary of West Humber River
105	15.65	Overland Sheet Flow	Tributary of West Humber River
106	11.73	Overland Sheet Flow	Tributary of West Humber River

The above noted catchments have been modeled in Visual Otthymo 6 (VO 6.2) to determine the existing conditions flows for the North Site for the 2 through 100 year storm events as well as the Regional (Hazel) storm event. To accurately depict the existing condition flows the following parameters were calculated for input into the VO model:

Soil Conditions (CN^*_{II} Values): The hydrological soil group on North Site was obtained from the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) AgMaps. As per the OMAFRA hydrological soil group mapping the North Site consists of Class C soils which have a slow infiltration rate when thoroughly wet. The hydrological soil group, and the existing land use within each catchment, were used to determine the appropriate CN^*_{II} values used in the VO model. Detailed calculation of CN^*_{II} values can be found in **Appendix B.**

Time To Peak (T_p): The time to peak for each catchment was calculated using the North Site topographic survey. The Uplands Method, Bransby William Equation, and Airport Equation were used to calculate the time to peak (T_p) based on the Site topography and land use, with the most conservative (largest) T_p value selected for modeling. Based on the results the Airport Equation was selected as the governing equation for all catchments. Detailed calculations of T_p values can be found in **Appendix B.**

Existing conditions peak flows were modeled in VO6 using the existing catchments and input parameters discussed herein. TABLE 4.5 summarizes the existing conditions flows for the North Site. Existing conditions modeling is included in **Appendix B**.

TABLE 4.5 – NORTH SITE EXISTING CONDITIONS PEAK FLOWS

Catchment	Area (ha)	Storm Event						
		Hazel Existing	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
101	3.29	0.400	0.318	0.264	0.216	0.153	0.109	0.055
102	6.05	0.669	0.452	0.376	0.308	0.218	0.157	0.078
103	9.81	1.083	0.725	0.603	0.495	0.351	0.252	0.126
104	11.23	1.201	0.748	0.623	0.512	0.362	0.261	0.130
105	15.65	1.568	0.831	0.689	0.563	0.396	0.284	0.139
106	11.73	1.251	0.774	0.644	0.529	0.375	0.270	0.135

4.2.1 NORTH SITE GROUNDWATER

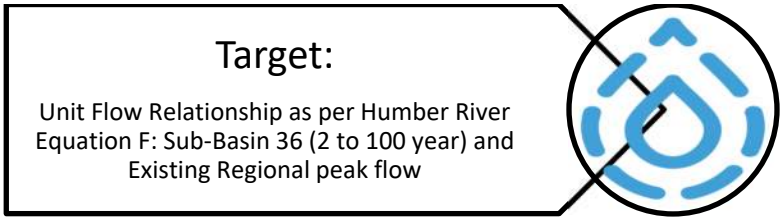
The December 2024 Hydrogeological Report prepared by Stantec Consulting indicates that the existing seasonal high groundwater elevations on North Site range between 257.2 m and 267.9m. The groundwater elevations follow the general topography of the North Site, with the higher groundwater elevation occurring near Old School Road and sloping towards the EPA and Tributary of West Humber River. Groundwater elevations can be seen in **Figure 9** within the December 2024 Hydrogeological Report.

The existing tile drainage system through part of the North Site may impact the groundwater recharge and infiltration occurring. As per the December 2024 Hydrogeological Report the North Site infiltration rate is estimated to be 22 mm/hr or less.

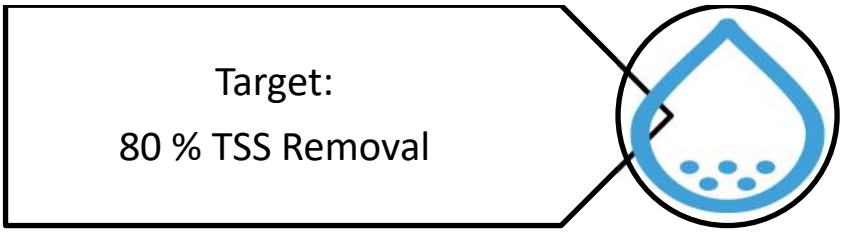
4.3 STORMWATER MANAGEMENT CRITERIA

The PSA will be subject to the following Stormwater (SWM) criteria as per the Town of Caledon and the Toronto Region Conservation Authority guidelines:

1. **Quantity Control:** Control post-development peak flows to the target flows, calculated using the unit flow relationships for the Humber River Watershed established by the TRCA for 2 to 100 year storm, and to existing Regional peak flow from the site;



2. **Quality Control:** Provide 80% Total Suspended Solids (TSS) removal.



3. **Water Balance (5 mm On-Site Retention):** Retain the equivalent 5 mm storm event and maintain runoff volumes to HDF (where applicable);

4. **Erosion Control (SWM Pond):** Extended detention of the 25 mm event for a period of 48 hours for drainage directed to a SWM pond as both Kilamanagh Creek and Tributary of the West Humber are both permanent watercourses.

4.3.1 NORTH SITE HEADWATER DRAINAGE FEATURE

A headwater drainage feature (HDF) extends from Old School Road through the North Site to the EPA. The HDF includes a tile drainage system (refer to record drawings in **Appendix A**) and conveys runoff from the

North Site Catchment 105 and external area (EXT-1) north of Old School Road. External areas can be seen in **Drawing 4.3**.

The HDF was evaluated as part of the 2024 CEISMP prepared by Stantec (under separate cover). The upstream end of the HDF (located at the north end of the North Site) will be removed and the downstream end (located at the south end of the North Site) will remain on the landscape as part of the EPA as it is contained within a staked top of bank section of the valleyland.

4.3.1.1 Thornthwaite and Mather Approach for Feature Based Water Balance Assessment

A Thornthwaite and Mather (TWM) feature based water balance assessment was completed for the 29.76ha contributing catchment area (consisting of EXT-1 and Catchment 105) to the HDF to determine the existing annual evapotranspiration, runoff and infiltration volumes to help guide the proposed Stormwater strategy and minimize impacts to the remaining portion of the HDF and receiving EPA. The approach and methodologies of the TWM analysis is detailed in Section of 5.1 the December 2024 Hydrogeological Report (under separate cover) and the existing conditions calculations are included in **Appendix B** of this report.

4.3.1.2 Visual OTTHMO (VO6) Continuous Modelling for Feature Based Water Balance Assessment

A continuous Visual OTTHMO (VO6) hydrologic model has been prepared for the 29.76ha contributing catchment area (consisting of External 1 and Catchment 105) to the HDF to determine the existing annual evapotranspiration, runoff and infiltration volumes to help guide the proposed Stormwater strategy and minimize impacts to the remaining portion of the HDF and receiving EPA .

A continuous simulation model analyzes extended time periods and can account for infiltration, groundwater flow, runoff, and evapotranspiration. Continuous hydrology models can provide a more detailed representation of the features hydrologic response for both pre-development and post-development conditions.

For this continuous hydrologic assessment, the latest version of the VO6 (VO Version 6.2) was used. VO6 has been listed as a suitable deterministic continuous simulation model in Toronto and Region Conservation Authority's (TRCA) list of acceptable models in the Draft Wetland Water Balance Modelling Guidance Document (TRCA, August 2019).

The daily precipitation data (1991-2007) from TRCA's STEP program was obtained from Smart City Water (SCW) and was utilized for this assessment.

Model calibration was conducted by utilizing field observations and field collected data and making iterative adjustments to the input parameters and comparing simulated output with observed values or values from other trusted methodologies for water balance analysis. For this model, iterative adjustments were made to the land cover inputs (including GI/Pan, EEGK3) and soil type inputs (including soil texture, total porosity, filed capacity, wilting point, saturated K) to mimic the annual infiltration, evapotranspiration, and runoff

distributions as a percentage of the average annual precipitation volume to the Thornthwaite and Mather (TWM) method described in **Section 4.3.1.1** as closely as possible.

Two surface water level loggers were installed in HDF as noted in the December 2024 Hydrogeological Report including SW3-23 (just south of Old School Road) and SW4-23 (within the NHS at south end of the HWDF). The hydrographs in the December 2024 Hydrogeological Report confirm the feature is intermittent and dries out between storm events.

4.3.1.3 Head Water Drainage Feature Existing Conditions

Catchment 105 (C105) and External Area (EXT-1) catchment consists of primarily agricultural lands. The site consists of sandy lean clay (Per the Hydrogeological Report) and has been modeled as a Clay soil with an adjusted saturated hydraulic conductivity. The saturated hydraulic conductivity was adjusted from 6.1 mm/day to 4 mm/day, to provide a more accurate depiction of in-situ soil characteristics of low permeability clay soils described in the Hydrogeological Report and provide a similar distribution of infiltration and runoff as compared to the TWM method.

Based on the existing land use pattern the area-weighted CN value of the C105 and EXT-1 are 77 and 82 respectively. Both C105 and EXT-1 are modelled as Nashyd catchments. The continuous hydrologic assessment results for the average annual infiltration, evapotranspiration (ET) , runoff and storage are shown in **TABLE 4.6**.

TABLE 4.6 - CONTINUOUS HYDROLOGIC ASSESSMENT RESULTS

	Depth (mm)	% Distribution (of Total Precipitation)
Evapotranspiration	347.9	41.8%
Storage	4.5	0.5%
Ground Water Infiltration	148.4	17.8%
Surface Runoff	331.2	39.8%
Total Precipitation	832.0	100.0%

Based on the contributing drainage areas of C105 and EXT-1 the equivalent average annual volumes have been calculated to determine the post development targets for both infiltration and surface water runoff volume contributions to the HDF. **TABLE 4.7** below summarizes the targets for the post development conditions.

TABLE 4.7 - HEADWATER DRAIANGE FEATURE TARGETS

	Ground Water Infiltration	Surface Runoff
Rainfall Event (mm)	148.42	331.20
Area (ha)	29.76	29.76
Target Volume (m^3 year)	44,174	98,576

4.4 LOW IMPACT DEVELOPMENT EVALUATION

An evaluation of best management practices for stormwater management, including lot level and conveyance controls and end of pipe measures, has been undertaken to assess the feasibility of implementing these strategies within the development. Lot level and conveyance controls are commonly referred to as Low Impact Development (LID) measures or Green Infrastructure (GI) and are described in detail within the *2010 CVC/TRCA Low Impact Development Stormwater Management Planning and Design Guide (LID Guide).* End-of-Pipe facilities are implemented at the end of the storm sewer pipe system after LID measures and include wet ponds and wetlands which are both able to provide quality and quantity control.

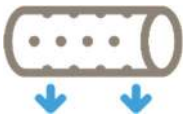
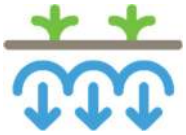
Recognizing the natural heritage areas within the Sites, LID measures are recommended for implementation to satisfy the SWM requirements.

LID is a more integrated approach to stormwater management than traditional end-of pipe measures. LID promotes infiltration and seeks to maintain the existing hydrology of the Sites after development. Site-specific geophysical constraints will determine the applicability or effectiveness of certain LID measures. **TABLE 4.8** describes the various LID measures, Site considerations and conceptual feasibility of implementing these strategies within the proposed development Plan.

TABLE 4.8 – PSA LID EVALUATION MATRIX

LID Measure	Description	South Site Consideration	Feasible Y/N
Green Roofs 	A roof that is partially or fully covered with a layer of vegetation and growing medium overtop of a waterproof roof membrane. Typically implemented on conventional flat roofs for midrise or high-rise buildings, and ICI buildings. *Benefits* include retention storage/reduced runoff, increased evapotranspiration, improved energy efficiency, and reduced heat-island effect in urban areas.	The PSA consists of five (5) industrial buildings with flat roofs providing opportunities to incorporate green roofs.	Y
Blue Roofs 	A non-vegetated system of rooftop storage installed over a waterproof roof membrane. Typically implemented on conventional flat roofs for midrise or high-rise buildings, and ICI buildings. *Benefits* include detention storage and controlled release to building downspouts.	The PSA consists of five (5) industrial buildings with flat roofs providing opportunities to incorporate blue roofs.	Y
Rainwater Harvesting – Retention Cisterns 	Rainwater harvesting is the process of intercepting, conveying and storing rainfall for future use for irrigation or non-potable water uses (car/bike wash, janitorial needs, toilet flushing). Cisterns are typically used on private lands within the building envelope on midrise or high-rise buildings. *Benefits* include reduced runoff, increased evapotranspiration, and reduced irrigation demand.	Rainwater harvesting/re-use using cisterns for this development may be possible. Applicable types of re-use should be compared to the proposed uses and best fit solutions investigated.	Y
Roof Downspout Disconnection 	Simple downspout disconnection involves directing flow from roof downspouts to a pervious area at grade that drains away from the building. *Benefits* include reduced runoff, increased evapotranspiration and infiltration, and reduced irrigation demand.	Downspout disconnections at grade are typically used in residential sites. Implementation for larger scale buildings with adjacent vegetation may be possible and should be appropriately designed (runoff directed to pervious areas with overland drainage to area drains or catch basins).	N

Increased Topsoil and/or Amended Topsoil 	Increased depth of topsoil (200 - 300mm or more). Amended topsoil is a mixture of higher permeability materials like sand and gravel, with lower percentage of clays and a suitable amount of compost to support plant health. *Benefits* include increased retention storage, increased infiltration and evapotranspiration, and stabilization against erosion.	Appropriate depths and soil mixtures can be incorporated into landscaped areas and other LID measures as applicable.	Y
Bioretention 	Bioretention facilities are shallow depressions that capture runoff, provide treatment (filtration), retention storage (infiltration) and detention storage. These facilities consist of vegetation with layers of soil and aggregates and optional perforated pipe/over drain. Types of bioretention include bump-outs, tree planters/cells, bioretention cells, or dry swales/bioswales *Benefits* include filtration, reduced runoff, increased evapotranspiration and infiltration.	Tree planters/cells are possible within the Site. Bioretention cells or dry swales are possible within landscapes areas. Depth to the groundwater table should be confirmed for the proposed locations to ensure separation from bottom of facilities to water table.	Y
Enhanced Grass Swales 	Enhanced grass swales (enhanced vegetated swales) are vegetated open channels or swales designed to convey stormwater runoff and provide some treatment and retention. *Benefits* include conveyance, increased filtration and infiltration	Enhanced grass swales are possible within landscapes areas.	Y
Permeable Pavement 	Permeable pavement captures runoff, provides retention storage (infiltration) and detention storage. Permeable pavements consist of a porous load bearing surface overtop of a clean aggregate base and optional perforated pipe/over drain. Types of permeable pavements include porous asphalt, pervious concrete, permeable interlocking pavers, or reinforced turf/gravel. *Benefits* include reduced runoff, increased infiltration, detention storage and controlled release to storm sewers.	Permeable pavements are possible for walkways and open spaces but are not recommended for car or trailer parking areas on industrial sites Depth to the groundwater table should be confirmed for the proposed locations to ensure separation from bottom of facilities to water table.	N

Perforated Pipe Systems 	Perforated pipe systems are linear infiltration trenches or linear soakaways that convey stormwater runoff and provide retention storage (infiltration) and some detention storage. These systems consist of clean aggregate surrounding a perforated pipe. *Benefits* include reduced runoff, increased infiltration, detention storage.	Perforated pipes are possible within the Site provided they have sufficient distance from other utilities/services. Distances from other utilities/services will vary. Depth to the groundwater table should be confirmed for the proposed locations to ensure separation from bottom of facilities to water table.	Y
Underground Infiltration Trenches and Chambers 	Underground Infiltration Trenches and Chambers are open bottom storage units that convey stormwater runoff and provide retention storage (infiltration) and detention storage. These systems consist of open bottom chambers surrounded by clean aggregate and wrapped with geotextile fabric. *Benefits* include reduced runoff, increased infiltration, detention storage.	Underground infiltration chambers are possible within the Site drive aisles and parking lots. Depth to the groundwater table should be confirmed for the proposed locations to ensure separation from bottom of facilities to water table.	Y

Based on the LID measures to be considered for implementation within the proposed development include:

- Blue Roofs
- Increased depth and/or amended topsoil in landscape areas
- Bioretention
- Enhanced grass swales
- Underground infiltration trenches

Final selection of the LID measures for implementation will be provided at the detailed design stage with calculations demonstrating compliance. The design and implementation of infiltration-based LID measures will be dependent upon the findings of in-situ infiltration tests.

4.5 SOUTH SITE PROPOSED STORM DRAINAGE CONDITIONS

The SWM criteria outlined above will be satisfied through the implementation of rooftop storage, underground infiltration and storage tanks, and a stormwater management pond (SWM Pond) as illustrated in **Drawing C-121** and **Drawing 4.2S**. The South Site will be serviced by two (2) stormwater outlets: Outlet 1 will discharge to the Tributary of West Humber River and Outlet 2 will discharge to Kilamanagh Creek. Details regarding the stormwater management plan are discussed in the subsequent sections of this report. The following summarizes the proposed drainage plan for Outlet 1 and Outlet 2.

Outlet 1 to the Tributary of West Humber River: Rooftop storage will be provided on Building 2 and Building 3 with controlled outflow directed to underground stormwater tanks located on both the east and west sides of Building 3. Clean rooftop flow will be directed to the underground stormwater tanks sized to store and infiltrate the 5mm retention target for the South Site, thereby providing a water quality treatment train approach for Outlet 1. The underground stormwater tanks provide additional quantity control to attenuate peak flows to the target discharge rates calculated for Outlet 1.
During larger storm events where roof runoff exceeds the available rooftop storage (assumed to be 0.04m in depth), roof runoff will overflow via scuppers and be directed to paved surface areas and flow overland towards the SWM Pond at the southwest limit of the South Site.

Outlet 2 to Kilamanagh Creek: Rooftop storage will be provided on Building 1 with controlled outflow directed to a storm sewer ultimately draining to the SWM pond. Runoff from parking lots and drive isles will be collected via a series of catch basins throughout the South Site and routed to the SWM Pond. During larger storm events where roof runoff exceeds the available rooftop storage (assumed to be 0.04m in depth), roof runoff will overflow via scuppers and be directed to paved surface areas and flow toward the SWM Pond at the southwest limit of the South Site. The SWM pond has been sized to provide both quantity and erosion control, as well as quality treatment for the contributing drainage areas. A control structure located within the SWM Pond will attenuate peak flows to the target discharge rates calculated for Outlet 2.

The proposed drainage plan maintains existing drainage patterns to the extent possible, and will maintain or reduce peak flows from the South Site when compared to existing conditions.

4.6 NORTH SITE PROPOSED STORM DRAINAGE CONDITIONS

The SWM criteria outlined above will be satisfied through the implementation of rooftop storage, underground storage tanks, underground infiltration and storage tanks, and a stormwater management pond (SWM Pond) as illustrated in **Drawing C-121** and **Drawing 4.2N.** The North Site will be serviced by two (2) stormwater outlets: Outlet 1 will discharge to the Tributary of West Humber River and Outlet 2 will discharge to the headwater drainage feature (HDF) which discharges to the Tributary of West Humber River. Details regarding the stormwater management plan are discussed in the subsequent sections of this report.

The proposed drainage plan will maintain existing drainage patterns to the extent possible, provide on-site retention, maintain surface water runoff to the HDF and maintain or reduce peak flows from the North Site when compared to existing conditions. See **Drawing 4.2N** for the proposed stormwater strategy.

4.6.1 NORTH POND - OUTLET 1

Outlet 1 to the Tributary of West Humber River: Runoff from parking lots and drive isles will be collected via a series of catch basins throughout the North Site and routed to an underground storage

tank and SWM Pond. During larger storm events where roof runoff exceeds the available rooftop storage (assumed to be 0.04m in depth), roof runoff will overflow via scuppers and be directed to paved surface areas and flow toward the underground storage tank and SWM Pond at the southwest limit of the North Site. The underground tank and SWM pond have been sized to provide both quantity and erosion control, as well as quality treatment for the contributing drainage areas. A control structure located within the SWM Pond will attenuate peak flows, in combination with Outlet 2, to the target discharge rates calculated for the North Site.

4.6.2 HDF – OUTLET 2

Outlet 2 to the headwater drainage feature (HDF): Rooftop storage will be provided on Building 1 and 2 with clean controlled outflow directed to underground stormwater storage tanks located between the buildings. These tanks are then conveyed in a separate pipe system to underground stormwater infiltration and storage tanks. Clean rooftop flow will be directed to the underground stormwater infiltration tanks which have been sized to store and infiltrate the 5mm retention target from the roof areas within the North Site, thereby providing a water quality treatment train approach for Outlet 2. The underground stormwater tanks also provide quantity control to attenuate peak flows, in combination with Outlet 1, to the target discharge rates calculated for the North Site. Runoff from the roof areas greater than 5mm, will be detained in the active storage within the underground tanks and discharged through Outlet 2 providing surface water runoff volumes to the HDF to replicate existing conditions runoff volumes on an annual basis. During larger storm events where roof runoff exceeds the available rooftop storage (assumed to be 0.04m in depth), roof runoff will overflow via scuppers and be directed to paved surface areas and flow overland towards the underground storage tank and SWM Pond at the southwest limit of the North Site.

4.6.3 EXTERNAL DRAINAGE OUTLETS

Two (2) additional outlets are proposed within the North Site which are designed to convey flows from SSA external drainage areas north of Old School Road as shown on **Drawing 4.2N**. The external flow will be collected at the downstream side of the two existing culverts. One pipe will convey external flow from EXT-1 through the North Site to Outlet 3, discharging at Headwall 1001 on the west side of the Tributary of West Humber River. The outlet HW and splashpad are outside of the meander belt and within the valleyland limit and buffer, with some regrading and restoration proposed. A second pipe will convey external flow from EXT-2 through the North Site to Outlet 4, discharging at Headwall 1101 to the existing ponds within the adjacent golf course to the east which ultimately discharge to the Tributary of West Humber River. The outlet HW and splashpad are generally contained on the property.

4.7 SOUTH SITE STORMWATER MANAGEMENT PLAN

4.7.1 SOUTH SITE WATER BALANCE

To satisfy the water balance criterion, on-site retention of 5mm of runoff is required and can be achieved through implementation of LID measures. A conceptual retention plan for the proposed development is described below:

- Roof areas directing clean roof runoff to underground stormwater tanks for infiltration
- Tree cells within paved areas may be investigated during further detailed design

Impervious surfaces such as roofs and asphalt pavement can typically provide 1 mm abstraction within minor depressions of the surface while landscaped areas can typically provide a 5 mm retention depth. However, in order to promote climate change resiliency initially abstraction have not been considered in the design of the infiltration practices implemented on Site.

Preliminary event retention volumes for the developed areas of the South Site are provided in **TABLE 4.9**. **Drawing 4.2S.** illustrates the proposed stormwater strategy. Supporting calculations are provided in **Appendix B.**

TABLE 4.9 SOUTH SITE REQUIRED RETENTION VOLUMES

Catchment	Area (ha)	Retention Volume to be provided (m^3/event)	Retention Opportunities
Building 1	4.29	215	N/A
Building 2	4.93	247	Subgrade Storm Tanks A to F used for Infiltration
Building 3	4.24	212	Subgrade Storm Tanks A-G used for Infiltration
SWM Pond	2.03	102	N/A
Remaining Paved Areas	14.73	736	N/A
Total	**30.22**	**1511 m^3**	

Preliminary calculations estimate that a total retention volume of 1511 m^3/event will be required for the entire South Site to satisfy the water balance requirement.

In order to achieve the required water balance volume, underground stormwater tanks are proposed to collect clean roof runoff from Building 2 and Building 3 for infiltration. Based on the footprint of Building 2 and Building 3, an equivalent storm event of 16.8mm is required to provide the required water balance volume of 1511 m^3. **TABLE 4.10** summarizes the provided water balance approach.

TABLE 4.10 – SOUT SITE PROVIDED RETENTION VOLUMES

Catchment	Area (ha)	Storm Event (mm)	Retention Volume provided (m^3/event)
Storm Tanks A to F (Building 2, Portion of Building 3)	5.87	12.1	712
Storm Tank G (Portions Building 3)	3.30	25.0	825
Total	**9.17**	**-**	**1537 (102% of Targe Volume 1511)**

Provided retention volumes also satisfy the guidance for development activities within Redside Dace Habitat by providing infiltration of 8mm of runoff from rooftop areas.

All stormwater tanks have been positioned at least 1m above the seasonal high groundwater table and 4m away from all building foundations.

4.7.2 SOUTH SITE WATER QUANTITY CONTROL

To satisfy the quantity control criteria, post development storm runoff for all events up to and including the 100 year design storm will be controlled to the target flows, calculated using the unit flow relationships for the Humber River Watershed established by the TRCA for 2 to 100 year storm, and to existing Regional peak flow from the South Site. The target peak release rates are provided in **TABLE 4.11** below with calculations provided in **Appendix B**.

TABLE 4.11 – SOUTH SITE TARGET PEAK FLOW RATES AND DETENTION STORAGE REQUIREMENTS

Catchment	Area (ha)	Target Peak Flow (m^3/s)						
		Hazel	100-Yr	50-Yr	25-Yr	10-Yr	5-Yr	2-Yr
107	12.69	1.637	0.305	0.270	0.231	0.184	0.149	0.097
108	29.56	3.344	0.652	0.577	0.495	0.393	0.319	0.209
Total	42.25	4.981	0.957	0.847	0.726	0.577	0.469	0.306

Detention storage on Site will be provided through a combination of blue roof storage, below grade stormwater tanks, and a SWM Pond.

Rooftop control will be provided via installation of controlled flow roof drain weirs on all buildings. The available rooftop storage and anticipated maximum flow rate have been estimated at 40mm and 42 L/s/ha respectively, roof control and storage details will be coordinated with a mechanical engineer during detailed design. Roof runoff exceeding the maximum ponding depth will overflow to the surface parking lot via scuppers and will be conveyed to the SWM pond, **TABLE 4.12** below summarizes the proposed roof details.

TABLE 4.12 - SOUTH SITE ROOFTOP DETAILS

Building	Area (ha)	Volume Provided (m^3)	Release at 42 L/s/ha (m^3/s)	Controlled Flow Outlet	Overflow Outlet
Building 1	4.29	1716	0.180	To SWM Pond and Outlet 2: Kilamanagh Creek	SWM Pond Outlet 2:
Building 2	4.93	1972	0.207	To SWM tanks and Outlet 1: Tributary of West Humber River	

Building 3 North	3.30	1320	0.139	To SWM tanks and Outlet 1: Tributary of West Humber River	Kilamanagh Creek
Building 3 South	0.94	376	0.039	To SWM Pond and Outlet 2: Kilamanagh Creek	

Additional flow attenuation and storage will be provided within the stormwater tanks and SWM pond. Flow attenuation to be provided by orifice plates and flow restrictors installed within the control manholes MH106 and MH135 discharging to Outlet 1, and MH3 discharging to Outlet 2. **TABLE 4.13** below summarizes the control outlet details. Outlet 1 discharges to the Tributary of West Humber River, with the HW and splashpad located outside of the valleyland feature limit and within the 30m setback.

TABLE 4.13 – SOUTH SITE CONTROL OUTLET DETAILS

Control Location	Type	Size	Invert (m)	Outlet
MH106	Orifice Plate	150 mm diam.	265.70	Outlet 1
	Orifice Plate	110 mm diam.	266.15	
	Orifice/Wier	710mm width	266.42	
MH135	Inlet Control Device Ipex - Tempetst	MHF-D	264.93	Outlet 1
SWM Pond Control MH3	Orifice Plate	80 mm diam.	258.50	Outlet 2
	Orifice Plate	450 mm diam.	259.10	
	Orifice Plate	160 mm x 160 mm (L x W)	259.05	
	Orifice/Wier	1260mm width	260.35	

Modeling was completed using Visual Otthymo in order to assess post development conditions and ensure peak flows are less than\ allowable flows. **TABLE 4.14** and

TABLE 4.15 below summarizes the post development peak flows for Outlet 1 and Outlet 2 respectively, detailed calculations and tables outlining peak flows for all stormwater control measures can be found in **Appendix B.**

TABLE 4.14 - SOUTH SITE POST DEVELOPMENT PEAK FLOWS OUTLET 1

Storm	Total Outlet 1 Outflow (m^3/s)	Allowable Flow (m^3/s)
Hazel Existing	0.385	0.815
100-Year	0.112	0.152
50-Year	0.105	0.135
25-Year	0.100	0.115
10-Year	0.084	0.091

5-Year	0.066	0.074
2-Year	0.042	0.049

TABLE 4.15 - SOUTH SITE POST DEVELOPMENT PEAK FLOWS OUTLET 2

Storm	Controlled Pond Flow (m^3/s)	Allowable Flow (m^3/s)
Hazel Existing	2.694	2.700
100-Year	0.527	0.527
50-Year	0.465	0.466
25-Year	0.392	0.400
10-Year	0.269	0.318
5-Year	0.199	0.258
2-Year	0.074	0.169
Extended Det.	0.024	0.042

Preliminary stormwater tank details based on release rates are provided in **TABLE 4.14** and

TABLE 4.15 and the water balance requirements are provided in **TABLE 4.16** and

TABLE 4.17 below with calculations provided in **Appendix B**. Refer to **Section 4.9** for details regarding the SWM Pond design.

TABLE 4.16 - SOUTH SITE TANK A TO F DETAILS

	Volume (m^3)	Elevation (m)
Available Volume	3,315	266.62
Volume required for Water Balance	712	265.68
Active Storage Volume Required	2,603	265.68 - 266.62
Top of Tanks System (Stone)	3,315	266.62
Bottom of Tanks System (Stone)	0	265.40

TABLE 4.17 - SOUTH SITE TANK G DETAILS

	Volume (m^3)	Elevation (m)
Available Volume	2,168	265.72
Volume required for Water Balance	825	264.93
Active Storage Volume Required	1,343	264.93 - 265.72
Top of Tanks System (Stone)	2,168	265.72
Bottom of Tanks System (Stone)	0	264.50

4.7.3 SOUTH SITE WATER QUALITY CONTROL

To satisfy the water quality target, long-term average removal of 80% of Total Suspended Solids (TSS) on an annual loading basis is required. Quality control will be provided to reduce the sediment loading and to minimize impacts on Reside Dace habitat.

A treatment train approach has been considered during the design of the proposed quality control methods. The following measures are proposed to achieve the water quality control requirements:

- Clean roof flows are routed to Isolation rows within stormwater tanks
- Clean roof flow is routed to stormwater tanks for Infiltration and attenuation.
- SWM Pond sized to provide quality and quantity control

TABLE 4.18 below summarizes the quality control provided on South Site and the total TSS removal achieved on Site.

TABLE 4.18 – SOUTH SITE TSS REMOVAL

Catchment	Area (ha)	Initial Treatment Train Approach and TSS Removal	Secondary Treatment Train Approach and TSS Removal	Total TSS Removal
Building 1	4.29	Clean roof flow TSS removal 80%	Infiltration Galleries TSS removal 25%	85%
Building 2	4.93	Clean roof flow TSS removal 80%	Infiltration Galleries TSS removal 25%	85%
Building 3	4.24	SWM Pond TSS removal 80%	N/A 0%	80%
Paved Areas	14.87	SWM Pond TSS removal 80%	N/A 0%	80%
Pond Block	2.03	SWM Pond TSS removal 80%	N/A 0%	80%
Total	**30.36**		**Total**	**82%**

4.8 NORTH SITE STORMWATER MANAGEMENT PLAN

4.8.1 NORTH SITE WATER BALANCE

To satisfy the water balance criterion, on-site retention of 5mm of runoff is required and can be achieved through implementation of LID measures. A conceptual retention plan for the proposed development is described below:

- Roof areas directing clean roof runoff to underground stormwater tanks for infiltration
- Tree cells within paved areas may be investigated during further detailed design

Impervious surfaces such as roofs and asphalt pavement can typically provide 1 mm abstraction within minor depressions of the surface while landscaped areas can typically provide a 5 mm retention depth. However, in order to promote climate change resiliency initially abstraction have not been considered in the design of the infiltration practices implemented on North Site.

Preliminary event retention volumes for the developed areas of the North Site are provided in **TABLE 4.19**. Supporting calculations are provided in **Appendix B.**

TABLE 4.19 – NORTH SITE REQUIRED RETENTION VOLUMES

Catchment	Area (ha)	Retention Volume to be provided (m^3/event)*	Retention Opportunities
Building 1	10.08	504	Underground Stormwater Tanks used for Infiltration
Building 2	8.80	440	Underground Stormwater Tanks used for Infiltration
SWM Pond	1.12	56	N/A
Remaining Paved Areas	24.65	1233	N/A
Total	**44.65**	**2233 m^3**	

Preliminary calculations estimate that a total retention volume of 2233 m^3/event will be required for the entire North Site to satisfy the water balance requirement.

In order to achieve the required water balance volume, underground stormwater tanks are proposed to collect clean roof runoff from Buildings 1and 2 for infiltration. The provided volume for infiltration within the underground tanks has been reduced to provide just over the minimum 5mm retention for the roof areas so that surface runoff volumes can be directed to the HDF to mimic the existing conditions feature based water balance as described in **Section 4.8.1.2. TABLE 4.20** summarizes the provided water balance approach.

TABLE 4.20 – NORTH SITE PROVIDED RETENTION VOLUMES

Catchment	Area (ha)	Storm Event (mm)	Retention Volume provided (m^3/event)
Infiltration Storm Tanks (Building 1 & 2)	18.88	6	1136
Total	**18.88**	**-**	**1136 (51% of Target Volume 2233)**

The provided retention volumes of 6mm of runoff from rooftop areas is providing 75% of the guidance for development activities within Redside Dace Habitat (8mm of runoff from rooftop areas is recommended).

All stormwater tanks have been positioned at least 1m above the seasonal high groundwater table and 4m away from all building foundations.

4.8.1.1 Headwater Drainage Feature

The proposed stormwater drainage strategy to the HDF is designed to mimic existing conditions to the extent possible.

A 3.97 ha area of undeveloped greenbelt area, including the portion of the HDF to remain, will continue to provide both infiltration and runoff to the feature.

To mitigate the reduction in surface runoff to the HDF and replicate infiltration within the North Site, clean and controlled outflows from Building 1 and 2 will be conveyed to underground stormwater infiltration and storage tanks that are sized to infiltrate 6mm of runoff from the roof areas. The balance of the roof runoff will be controlled within underground stormwater tanks and discharged through a HW at Outlet 2 at the upstream end of the HDF as shown on **Drawing C-121**. The proposed mitigation strategy is able to maintain surface water runoff volumes to the remaining portion of the HDF and minimize impacts by providing a total post development annual runoff volume of 90, 822 m^3/yr (equivalent to 92% of pre-development conditions). Calculations are included in **Appendix B**.

4.8.1.2 HDF Visual OTTHMO (VO6) Continuous Modelling for Feature Based Water Balance Assessment

Based on the proposed land use patterns the area-weighted CN value of the site is for rooftops and undeveloped Catchment 105 (C105) which has been set at 100 and 77 respectively. The proposed rooftops are modelled as Standhyds while the undeveloped C105 is modelled as a Nashyd with a reduced area compared to the existing condition. The proposed infiltration galleries and quantity control tank have been modeled to simulate the mitigation efforts under the proposed conditions. The soil conditions is modeled as a Clay in keeping with the existing conditions modeling described in **Section 4.3.1.2**.

Infiltration volumes to the HDF under the proposed mitigation strategy are provided via the infiltration within the underground tanks and the undeveloped portions of C105. The overall infiltration volumes have been summarized in the **TABLE 4.21**.

TABLE 4.21 - PROPOSED HDF INFILTRATION VOLUMES

	Infiltration Volume (m^3)
Infiltration Tanks	69,058
Undeveloped C105	6,119
Total Infiltration Volume	75,177
Target	44,174
WB Target %	**170%**

Surface water runoff volumes to the HDF under the proposed mitigation strategy are provided via the detention tanks upstream of the HDF outfall and the undeveloped portions of C105. The overall surface water volumes have been summarized in the **TABLE 4.22.**

TABLE 4.22 - PROPOSED HDF RUNOFF VOLUMES

	Runoff Volume (m^3)
Runoff overflow from Tanks	78,371
Undeveloped C105	12,451
Total Runoff Volume	90,822
Target	98,576
Runoff Target %	92%

In summary, the proposed drainage strategy to the HDF closely mimics the existing conditions by providing 92% of the average annual runoff volumes, and exceeds the average annual infiltration target by satisfying the erosion control target (5mm retention for roof areas) and satisfying 75% of the Guidance for development activities within Redside Dace Habitat (8mm retention for roof areas).

4.8.2 NORTH SITE WATER QUANTITY CONTROL

To satisfy the quantity control criteria, post development storm runoff for all events up to and including the 100 year design storm will be controlled to the target flows, calculated using the unit flow relationships for the Humber River Watershed established by the TRCA for 2 to 100 year storm, and to existing Regional peak flow from the North Site. Flow rates to the two outlet locations are controlled so that total flow from the North Site is less than existing and target flows.

The target peak release rates are provided in **TABLE 4.23** below, with calculations provided in **Appendix B**.

TABLE 4.23 – NORTH SITE TARGET PEAK FLOW RATES AND DETENTION STORAGE REQUIREMENTS

Catchment	Area (ha)	Target Peak Flow (m^3/s)						
		Hazel	100-Yr	50-Yr	25-Yr	10-Yr	5-Yr	2-Yr
Total	44.64	4.774	1.092	0.967	0.828	0.657	0.535	0.349

Detention storage on Site will be provided through a combination of blue roof storage, below grade stormwater tanks, and a SWM Pond.

Rooftop control will be provided via installation of controlled flow roof drain weirs on all buildings. The available rooftop storage and anticipated maximum flow rate have been estimated at 40mm and 42 L/s/ha respectively, roof control and storage details will be coordinated with a mechanical engineer during detailed design. Roof runoff exceeding the maximum ponding depth will overflow to the parking lot and will be conveyed overland to the underground tank and SWM pond. **TABLE 4.24** below summarizes the proposed roof details.

TABLE 4.24 – NORTH SITE ROOFTOP DETAILS

Building	Area (ha)	Volume Provided (m^3)	Release at 42 L/s/ha (m^3/s)	Controlled Flow Outlet	Overflow Outlet
Building 1	10.08	4032	0.423	Outlet 2: Headwater Drainage Feature	SWM Pond Outlet 2: Tributary of West Humber River
Building 2	8.80	3520	0.370	Outlet 2: Headwater Drainage Feature	

Flow attenuation within the stormwater tanks and SWM pond is to be provided by orifice plates and flow restrictors installed within the control manholes MH4 discharging to Outlet 1, and MH102 discharging to Outlet 2. TABLE 4.25 below summarizes the control outlet details.

TABLE 4.25 – NORTH SITE CONTROL OUTLET DETAILS

Control Location	Type	Size	Invert (m)	Outlet
MH 4 in SWM Pond	Orifice Plate	155 mm diam.	259.50	Outlet 1
	Orifice Plate	850 mm diam.	262.10	
	Orifice/Weir	1.4m wide x 0.27m tall	261.00	
SWM Pond	Broad Crested Weir	10m wide 3H : 1V	263.00	Overland Flow Route to the Tributary of West Humber River (Outlet 1)
MH 102	Ipex – Tempest ICD 40mm	40 mm diam.	262.72	Outlet 2
	Orifice/Weir	1.90m wide x 1.90m tall	264.20	

Modeling was completed using Visual Otthymo in order to assess post development peak flows with respect to allowable flows. TABLE 4.26 and

TABLE 4.27 below summarizes the post development peak flows for the North Site, detailed calculations and tables outlining peak flows for all stormwater control measures can be found in **Appendix B.**

TABLE 4.26 - NORTH SITE POST DEVELOPMENT PEAK FLOWS OUTLET 1 AND OUTLET 2

Storm	Total Outlet 1 Outflow (m^3/s)	Controlled Outlet 2 Outflow (m^3/s)
Hazel Existing	3.777	0.79300
100-Year	1.075	0.00146
50-Year	0.934	0.00144
25-Year	0.696	0.00142
10-Year	0.266	0.00135
5-Year	0.117	0.00124
2-Year	0.054	0.00107

TABLE 4.27 - NORTH SITE POST DEVELOPMENT PEAK FLOWS

Storm	Total North Site Outflow (m^3/s)	Allowable Flow (m^3/s)
Hazel Existing	4.570	4.774
100-Year	1.076	1.092
50-Year	0.935	0.967
25-Year	0.697	0.828
10-Year	0.267	0.657
5-Year	0.118	0.535
2-Year	0.055	0.349

Extended Det.	0.048	0.053

Preliminary stormwater tank details based on release rates in **TABLE 4.26 and**

TABLE 4.27 and the water balance requirements are provided in **TABLE** 4.28 and

TABLE 4.29 below with calculations provided in **Appendix B**. Additional details regarding the SWM Pond and Storm Trap system design can be found in the following sections of this report.

TABLE 4.28 - NORTH SITE TANK A TO G DETAILS

	Volume (m^3)	**Elevation (m)**
Available Volume	15,090	264.17
Volume required for Water Balance	1,134	262.90
Active Storage Volume Required	13,956	262.9 - 264.17
Top of Tanks System (Stone)	15,090	264.17
Bottom of Tanks System (Stone)	0	262.47

TABLE 4.29 – NORTH SITE STORM TRAP DOUBLE TANK DETAILS

	Volume (m^3)	**Elevation (m)**
Available Volume	15,070	263.15
Active Storage Volume Required	15,070	263.15
Top of Tanks System (Stone)	15,070	263.15
Bottom of Tanks System (Structure)	0	260.10
Underside of Tank System (Stone)	0	259.80

4.8.3 NORTH SITE WATER QUALITY CONTROL

To satisfy the water quality target, long-term average removal of 80% of Total Suspended Solids (TSS) on an annual loading basis is required. Quality control will be provided to reduce the sediment loading and minimize impacts on Reside Dace habitat.

A treatment train approach has been considered during the design of the proposed quality control methods. The following measures are proposed to achieve the water quality control requirements:

- Clean roof flows are routed to Isolation rows within stormwater tanks
- Clean roof flow is routed to stormwater tanks for Infiltration and attenuation.
- SWM Pond sized to provide quality and quantity control

TABLE 4.30 below summarizes the quality control provided on North Site and the total TSS removal achieved on Site.

TABLE 4.30 - NORTH SITE TSS REMOVAL

Catchment	Area (ha)	Initial Treatment Train Approach and TSS Removal	Secondary Treatment Train Approach and TSS Removal	Total TSS Removal
Building 1	10.08	Clean roof flow TSS removal 80%	Infiltration Galleries TSS removal 25%	85%
Building 2	8.80	Clean roof flow TSS removal 80%	Infiltration Galleries TSS removal 25%	85%
Paved Areas	1.12	SWM Pond + OGS TSS removal 80%	N/A 0%	80%
Pond Block	24.65	SWM Pond + OGS TSS removal 80%	N/A 0%	80%
Total	**44.64**		**Total**	**82%**

4.9 SOUTH SITE STORMWATER POND

A proposed private stormwater management pond is proposed within the South Site. The preliminary pond grading has been completed to meet the requirements of the MOECC SWM Manual, March 2003 and is shown on **Drawing C-111**. Typical criteria for the design of SWM pond include:

- The pond will be graded with side slopes of 3:1 from the pond bottom to 0.6m below the normal water level, a 5:1 safety shelf centered at the normal water level with a horizontal distance of 6 m, and 3:1 slopes above the shelf to the top of the pond;
- Permanent pool volume will be sized to provide MOECC Enhanced Level Protection with 2 m forebay and at least 3m deep pool at the pond outlet (as receiving watercourse is Redside Dace habitat);
- Extended detention storage as per the requirements in the Subwatershed Management Study to a maximum depth of 1.0 m as per the MOE guidelines;
- Extended detention storage and flood control storage up to and including the Regional storm event will be provided within the SWM pond;
- Emergency spillway will be sized to convey the Regional Flow; and
- A 4 m wide maintenance access road with a maximum slope of 10:1 and a maximum cross-fall of 2% to be provided in the SWM Pond. It will be used to facilitate the access to the forebay and outlet structure for maintenance.

4.9.1 QUALITY CONTROL

Quality control is provided by the permanent pool within the pond based on the MOECC Enhanced Level of Protection criteria (80% TSS removal). The required permanent pool volume is 4,450 m^3 (for the minor system drainage area of 21.19 ha and a weighted imperviousness of 97%), and the provided permanent pool volume in the pond is 11,679 m^3. Calculations are provided in **Appendix B.**

4.9.2 EROSION CONTROL

MOE recommendation for extended detention storage is detention of runoff from a 25 mm storm over 48 hours. The required extended detention volume in the pond is 4,867 m^3. Calculations are provided in **Appendix B.**

4.9.3 QUANTITY CONTROL

The stage-storage-discharge characteristics of the Pond are summarized in

TABLE 4.31. Calculations and supporting modeling is provided in **Appendix B.** Conceptual control structure is listed below:

- 80 mm diameter orifice plate (INV=258.50) in control MH 3
- 450 mm diameter orifice plate (INV=258.50) cutout in control MH 3
- 0.16 m wide by 0.16 m tall weir (INV=259.05) cutout in control MH 3
- 1.26 m wide weir (INV=260.35) cutout in control MH 3

TABLE 4.31 - SOUTH SITE POST DEVELOPMENT PEAK FLOWS OUTLET 2

Storm	Stage (m)	Active Storage (m^3)	Total Outlet 2 Outflow (m^3/s)	Allowable Flow (m^3/s)
Hazel Existing	261.28	26,607	2.694	2.700
100-Year	260.30	15,745	0.527	0.527
50-Year	260.08	13,485	0.465	0.466
25-Year	259.87	11,253	0.392	0.400
10-Year	259.56	8,569	0.269	0.318
5-Year	259.45	7,590	0.199	0.258
2-Year	259.25	5,781	0.074	0.169
Ext Det	259.13	4,799	0.024	0.042
NWL	258.50	0	0.000	0.000

4.9.4 POND OUTFALL

The SWM Pond is proposed to outlet to Kilamanagh Creek, with the HW and splashpad located outside of the meander belt and within the 30 m buffer (RSD habitat area) as shown on **Drawing C-111**. The

outlet is set above the 100-year flood elevation and close to the Regional flood elevation. Erosion protection details will be provided at detailed design. Final outfall location to be field verified with review agencies at detailed design

4.10 NORTH SITE STORMWATER POND AND STORM TRAP SYSTEM

A private stormwater management facility is proposed within the North Site consisting of a wetpond combined with an underground Storm Trap tank system. The preliminary pond grading has been completed to meet the requirements of the MOECC SWM Manual, March 2003 and is shown on **Drawing C-111**. Typical criteria for the design of SWM facility includes:

- A pond will be graded with side slopes of 3:1 from the pond bottom to 0.6m below the normal water level, a 5:1 safety shelf centered at the normal water level with a horizontal distance of 6 m, and 3:1 slopes above the shelf to the top of the pond;
- Permanent pool volume and OGS unit will provide MOECC Enhanced Level Protection, and pond will include a 2 m forebay and at least 3m deep afebay (as receiving watercourse is Redside Dace habitat);
- Extended detention storage with a maximum depth of 1.0 m as per the MOE guidelines;
- Extended detention storage and flood control storage up to and including the Regional storm event will be provided;
- Emergency spillway will be sized to convey the Regional Flow; and
- A 4 m wide maintenance access road with a maximum slope of 10:1 and a maximum cross-fall of 2% to be provided in the SWM Pond to facilitate the access to the forebay and inlet structure for maintenance.

4.10.1 QUALITY CONTROL

Quality control is provided by the permanent pool within the pond based on the MOECC Enhanced Level of Protection criteria (80% TSS removal). The required permanent pool volume is 5,412 m^3 (for the minor system drainage area of 25.77 ha with a weighted imperviousness of 93%), and the provided permanent pool volume in the pond is 4,377 m^3. To enhance the water quality treatment, an OGS unit is proposed to provide treat the extended detention discharge from the pond. Calculations are provided in **Appendix B.**

4.10.2 EROSION CONTROL

MOE recommendation for extended detention storage is detention of runoff from a 25 mm storm over 48 hours. The required extended detention volume is 6,095 m^3. Calculations are provided in **Appendix B.**

4.10.3 QUANTITY CONTROL

The stage-storage-discharge characteristics of the underground Storm Trap tank and SWM Pond are summarized in

TABLE 4.32. Calculations and supporting modeling is provided in **Appendix B.** Conceptual control structure is listed below:

- 155 mm diameter orifice plate (INV=259.50) in control MH 4
- 850 mm diameter orifice plate (INV=262.10) cutout in control MH 4
- 1.40 m wide by 0.27 m tall weir (INV=261.00) cutout in control MH 4
- 10m wide broad crested weir and emergency spillway (INV=263.0) overtopping into the valley of the Tributary of the West Humber

TABLE 4.32 - NORTH SITE POST DEVELOPMENT PEAK FLOWS OUTLET 2

Storm	Stage (m)	Active Storage (m^3)	Total Outlet 2 Outflow (m^3/s)
Hazel Existing	263.15	34,913	3.777
100-Year	262.05	22,183	1.075
50-Year	261.82	19,606	0.934
25-Year	261.50	16,180	0.696
10-Year	261.18	12,882	0.266
5-Year	261.07	11,717	0.117
2-Year	260.68	7,862	0.054
Ext Det	260.44	5,523	0.048
NWL	259.50	0	0.000

4.10.4 NORTH SITE POND OUTFALL AND SPILLWAY WEIR

The SWM facility is proposed to discharge to the Tributary of the West Humber at Outlet 1, with a HW and splashpad located outside of the meander belt and within the valley land limit and buffer as shown on **Drawing C-111**. The outlet is set above the 100-year flood elevation and below the Regional flood elevation. Erosion protection details will be provided at detailed design. Final outfall location to be field verified with review agencies at detailed design.

A broad crested weir and emergency spillway from the pond to the valley is proposed and will require regrading of the valley wall as shown on **Drawing C-111.** The regraded slopes will be stabilized and landscaped.

5.0 WATER SUPPLY

5.1 DIXIE ROAD WATERMAIN EXTENSION

The Peel Region 2020 Water and Wastewater Master Plan for the Lake-Based Systems identifies Project 10-1210 C5 with extension of the existing 400mm diameter watermain along Dixie Road up to the Old School Road. This work is anticipated to be completed as part of the capital works program, road widening and urbanization. The 400mm diameter watermain will be constructed on the east side of Dixie Rd. Service connections for the subject lands will be provided up to the property line to service the subject lands. Stantec will coordinate the service connections with the Region to ensure the service connection locations are aligned and included in the Dixie Rd construction drawings.

5.2 SOUTH SITE EXISTING WATER SUPPLY

There is an existing 150mm diameter watermain located on the east side of Dixie Road.

5.3 NORTH SITE EXISTING WATER SUPPLY

There is an existing 150mm diameter watermain located on the east side of Dixie Road.

5.4 SOUTH SITE PROPOSED WATER SUPPLY

Under post-development conditions, the South Site will be serviced by one (1) new 300mm diameter watermain connection to the proposed 400mm diameter municipal watermain on Dixie Road (to be completed as part of the capital works by the Region). To provide appropriate fire protection, reliable supply, and pressures, the fire main system is looped around each proposed building with a single connection to the proposed 400mm diameter watermain on Dixie Road. **Drawing C-123** illustrates the layout of the proposed watermain.

The minimum pipe size servicing the proposed industrial area will be 150mm diameter. The domestic service connections for each proposed building will connect to a 150mm diameter watermain which runs within the drive aisle along the west side of the South Site. The fire service connections for each proposed building will connect to the looped 300mm diameter watermain.

Per Region standards, incoming domestic and fire supply to each building would be split at the property line. At the property boundary, a detector check valve in chamber is proposed on the incoming fire line as well as a valve and box on both the incoming fire and domestic lines. Individual water service connections would be provided for each proposed industrial building and a detector assembly and backflow preventor for domestic and fire mains will be installed within the building mechanical rooms. **Drawing C-123** illustrates the above noted design elements.

In addition to proposed hydrants (by others) along Dixie Road, fire hydrants will be provided along the proposed drive aisles and parking areas within the South Site in accordance with current Region standards, and as required to satisfy the fire protection requirements of the development proposal. The proposed watermains will be designed and constructed to current Region criteria and specifications.

5.5 NORTH SITE PROPOSED WATER SUPPLY

Under post-development conditions, the North Site will be serviced by one (1) new 300mm diameter watermain connection to the proposed 400mm diameter municipal watermain on Dixie Road (to be completed as part of the capital works by the Region). To provide appropriate fire protection, reliable supply, and pressures, the fire main system is looped around each proposed building with a single connection to the proposed 400mm diameter watermain on Dixie Road. **Drawing C-122** illustrates the layout of the proposed watermain.

The minimum pipe size servicing the proposed industrial area will be 150mm diameter. The domestic service connections for each proposed building will connect to a 150mm diameter watermain which runs along part of the southwest portion of the North Site. The fire service connections for each proposed building will connect to the looped 300mm diameter watermain.

Per Region standards, incoming domestic and fire supply to each building would be split at the property line. At the property boundary, a detector check valve in chamber is proposed on the incoming fire line as well as a valve and box on both the incoming fire and domestic line. Individual water service connections would be provided for each proposed industrial building and a detector assembly and backflow preventor for domestic and fire mains will be installed within the building mechanical rooms. **Drawing C-122** illustrates the above noted design elements.

In addition to proposed hydrants (by others) along Dixie Road, fire hydrants will be provided along the proposed drive aisles and parking areas within the North Site in accordance with current Region standards, and as required to satisfy the fire protection requirements of the development proposal. The proposed watermains will be designed and constructed to current Region criteria and specifications.

5.6 SOUTH SITE DOMESTIC WATER DEMAND

The domestic water demand for the South Site is calculated using the process described in the Region of Peel Public Works Design, Specifications and Procedures Manual, Linear Infrastructure, Watermain Design Criteria (revised June 2010). The number of occupants is calculated using a rate of 70 persons/ha for light industrial areas, which is multiplied with the South Site Development Area of 30.19 ha. The population count of 2113 persons is then multiplied with the Average Consumption Rate of 300 L/cap/Day and a peaking factor of 1.40 which results in a domestic water demand of **616 L/minute (163 USGPM)** for the proposed industrial buildings – refer to **Appendix C** for detailed calculations.

5.7 NORTH SITE DOMESTIC WATER DEMAND

The domestic water demand for the North Site is calculated using the process described in the Region of Peel Public Works Design, Specifications and Procedures Manual, Linear Infrastructure, Watermain Design Criteria (revised June 2010). The number of occupants is calculated using a rate of 70 persons/ha for light industrial areas, which is multiplied with the North Site Development Area of 44.64 ha. The population count of 3125 persons is then multiplied with the Average Consumption Rate of 300 L/cap/Day and a peaking factor of 1.40 which results in a domestic water demand of **911 L/minute (241 USGPM)** for the proposed industrial buildings – refer to **Appendix C** for detailed calculations.

5.8 SOUTH SITE FIRE FLOW CALCULATIONS

The Region of Peel and Town of Caledon require that fire protection is to meet requirements of the Fire Underwriters Survey (FUS). A detailed fire flow calculation has been prepared using recommendations of the FUS (see **Appendix C**). The proposed buildings are expected to be of non-combustible construction (unprotected metal structural components, masonry, or metal walls) and be equipped with complete automatic sprinkler systems which will be supervised per the requirements of the Ontario Building Code.

The calculated fire flows for the proposed buildings on the South Site range from 23,000 to 24,000 L/minute (rounded to the nearest 1,000 L/minute as per FUS guidelines). The higher value of **24,000 (6,340 USGPM)** has been used for the total water demand calculations.

5.9 NORTH SITE FIRE FLOW CALCULATIONS

The Region of Peel and Town of Caledon require that fire protection is to meet requirements of the Fire Underwriters Survey (FUS). A detailed fire flow calculation has been prepared using recommendations of the FUS (see **Appendix C**). The proposed buildings are expected to be of non-combustible construction (unprotected metal structural components, masonry, or metal walls) and be equipped with complete automatic sprinkler systems which will be supervised per the requirements of the Ontario Building Code.

The calculated fire flows for the proposed buildings on the North Site range from 33,000 to 35,000 L/minute (rounded to the nearest 1,000 L/minute as per FUS guidelines). The higher value of **35,000 (9246 USGPM)** has been used for the total water demand calculations.

5.10 SOUTH SITE TOTAL WATER DEMAND

The total water demand for the proposed development is calculated as a sum of the domestic water demand (616 L/minute) plus fire flow (24,000 L/minute) that equates to **24,616 L/minute** (**6,503 USGPM**) – refer to **Appendix C** for detailed calculations.

5.11 NORTH SITE TOTAL WATER DEMAND

The total water demand for the proposed development is calculated as a sum of the domestic water demand (911 L/minute) plus fire flow (35,000 L/minute) that equates to **35,911 L/minute** (**9,487 USGPM**) – refer to **Appendix C** for detailed calculations.

6.0 SANITARY

6.1 DIXIE ROAD SANITARY SEWER EXTENSION

The Peel Region 2020 Water and Wastewater Master Plan for the Lake-Based Systems identifies Project 10-1210 C5 with extension of the existing 600mm diameter sanitary sewer along Dixie Road past the Old School Road. This work is anticipated to be completed as part of the capital works program, road widening and urbanization. The 600mm diameter watermain will be constructed on the west side of Dixie Rd. Service connections for the subject lands will be provided up to the property line to service the proposed buildings. Stantec will coordinate the proposed service connections with the Region to ensure the service connection locations and inverts are aligned and included in the Dixie Rd construction drawings. The 600mm diameter sanitary sewer will be constructed deep, therefore, providing service connections for the subject lands is considered feasible.

6.2 SOUTH SITE EXISTING SANITARY

Under existing conditions, there are no sanitary sewers located in the immediate vicinity of the South Site, it is anticipated that wastewater generated from the existing Site is treated using an onsite private septic system. The existing septic system will be removed during the demolition/site preparation process of the development.

6.3 NORTH SITE EXISTING SANITARY

Under existing conditions, there are no sanitary sewers located in the immediate vicinity of the North Site, it is anticipated that wastewater generated from the existing North Site is treated using an onsite private septic system. The existing septic system will be removed during the demolition/site preparation process of the development.

6.4 SOUTH SITE PROPOSED SANITARY

As noted above, a 600mm diameter sanitary sewer along Dixie Road will be constructed as part of the Dixie Rd improvements. The proposed 600mm diameter sanitary sewer is expected to flow south from Old School Road along Dixie Road and connect to an existing 600mm diameter sanitary sewer on Dixie Road near the 12423 Dixie Road property. It is anticipated that the Dixie Road sanitary sewer will be constructed prior to completion of the site works.

The South Site will be developed with sanitary sewer along most of the southeast property boundary, along and adjacent to the southwest face of Building 1, and the northeast face of Building 2 – refer to **Drawing C-123** for the proposed sanitary sewer layout. The proposed sanitary sewer network will have one (1) 300 mm diameter connection to the proposed 600 mm diameter sanitary sewer on Dixie Road. The sanitary service connection will include a control manhole at the property line.

The proposed sanitary flows were calculated using the Region of Peel Linear Wastewater Standards which for light industrial areas specifies an equivalent population of 70 persons/ha and for non-residential areas specifies a Daily per Capita Sanitary Flow of 270 litres/employee/day. By multiplying the total population with the Daily per Capita Sanitary Flow, the Average Daily Dry Weather Flow is calculated as 6.60 L/s. After applying a peaking factor and allowance for infiltration, the peak sanitary flow from the proposed South Site is calculated as **31.41 L/s**.

The post development sanitary peak flows are provided in **Table 6.1** and detailed calculations are included in **Appendix D**.

TABLE 6.1 – SOUTH SITE POST DEVELOPMENT SANITARY PEAK FLOW

Flow Type	Redevelopment Flow (L/s)
Sewage	23.56
Extraneous	7.85
Total South Site Design Flow	**31.41**

6.5 NORTH SITE PROPOSED SANITARY

As noted above, a 600mm diameter sanitary sewer along Dixie Road will be constructed as part of the Dixie Rd improvements. The proposed 600mm diameter sanitary sewer is expected to flow south from Old School Road along Dixie Road and connect to an existing 600mm diameter sanitary sewer on Dixie Road near the 12423 Dixie Road property. It is anticipated that the Dixie Road sanitary sewer will be constructed prior to completion of the site works.

The North Site will be developed with sanitary sewer along the southwest property boundary, the northeast property boundary, and in between Building 1 and Building 2 – refer to **Drawing C-122** for the proposed sanitary sewer layout. The proposed sanitary sewer network will have one (1) 300 mm diameter connection to the proposed 600 mm diameter sanitary sewer on Dixie Road. The sanitary service connection will include a control manhole at the property line.

The proposed sanitary flows were calculated using the Region of Peel Linear Wastewater Standards which for light industrial areas specifies an equivalent population of 70 persons/ha and for non-residential areas specifies a Daily per Capita Sanitary Flow of 270 litres/employee/day. By multiplying the total population with the Daily per Capita Sanitary Flow, the Average Daily Dry Weather Flow is calculated as 9.77 L/s. After applying a peaking factor and allowance for infiltration, the peak sanitary flow from the proposed North Site is calculated as **45.07 L/s**.

The post development sanitary peak flows are provided in TABLE 6.2 and detailed calculations are included in **Appendix D**.

TABLE 6.2 – NORTH SITE POST DEVELOPMENT SANITARY PEAK FLOW

Flow Type	Redevelopment Flow (L/s)
Sewage	33.51
Extraneous	11.61
Total North Site Design Flow	**45.07**

7.0 CONCEPTUAL GRADING AND ROAD ACCESS

7.1 SOUTH SITE EXISTING TOPOGRAPHY

The South Site is relatively flat as it is currently used for farming. The topography of the South Site is generally sloping towards the existing water features located along the north and south end of the South Site.

7.2 NORTH SITE EXISTING TOPOGRAPHY

Similar to the South Site, the North Site is relatively flat as it is currently used for farming. The existing North Site slopes from Old School Road to the south with runoff ultimately draining in the EPA. A portion of this site sheet drains south-west to a Tributary of West Humber, a portion of the North Site drains south-east to the existing ponds within the adjacent golf course which ultimately discharges to a Tributary of West Humber, and the remainder of the North Site drains south.

7.3 SOUTH SITE PROPOSED GRADING DESIGN AND ROAD ACCESS

As per the site plan by Ware Malcomb, the proposed development includes:

- Two (2) new entrances on Dixie Road. The first is located in the west corner and the second in the south corner of the South Site;
- Private drive aisles along the northwest, northeast, and southeast sides of the South Site, as well as between Building 3 and Building 2, Building 2 and Building 1, and Building 1 and Dixie Road;
- Parking stalls located between Building 3 and Building 2, Building 2 and Building 1, and Building 1 and Dixie Road; and
- One (1) retaining wall located in the northeast corner of the South Site with a length of approximately 200m and a varying height reaching 2.9m at its maximum.

The proposed elevations at the paved areas of the South Site are provided as indicated on the enclosed Conceptual Grading Plan (2 of 2) (**Drawing C-113**).

The grading design for the development will achieve the following objectives:

- Match existing elevations at the project limits.
- Ensure that drainage is self-contained.
- Respect the stormwater management requirements.
- Be within Town criteria for minimum and maximum slopes.

- Minimize the need for engineered fill.
- Achieve the required sewer and watermain cover.
- Minimize the cut and fill earthwork operations to the extent possible.

7.4 NORTH SITE PROPOSED GRADING DESIGN AND ROAD ACCESS

As per the site plan by Ware Malcomb, the proposed development includes:

- One (1) new site entrance on Dixie Road located on the southwest property boundary;
- Two (2) new site entrances on Old School Road located on the northwest property boundary;
- Private drive aisles and parking stalls surrounding Building 1 and Building 2; and
- Four (4) retaining walls located throughout the North Site as follows:
    - A retaining wall in the south corner located directly adjacent to the proposed stormwater management pond, approximately 45m in length and 3.0m in maximum height.
    - A retaining wall in the southwest corner of approximately 165m in length and 0.9m in maximum height.
    - A retaining wall in the north corner of approximately 85m in length and 1.0m in maximum height.
    - A retaining wall in the north corner of approximately 40m in length and 1.8m in maximum height.

The proposed elevations at the paved areas of the North Site are provided as indicated on the enclosed Conceptual Grading Plan (1 of 2) (**Drawing C-112**).

The grading design for the development will achieve the following objectives:

- Match existing elevations at the project limits.
- Ensure that drainage is self-contained.
- Respect the stormwater management requirements.
- Be within Town criteria for minimum and maximum slopes.
- Minimize the need for engineered fill.
- Achieve the required sewer and watermain cover.

- Minimize the cut and fill earthwork operations to the extent possible.

8.0 GROUNDWATER

8.1 SOUTH SITE GROUNDWATER

A Hydrogeological Assessment dated December 2024 was prepared by Stantec Consulting for both the South and North Sites. This report is provided under separate cover**.** This report determined the long-term groundwater elevations throughout both sites, tested groundwater quality, assessed infiltration rates on-site, completed and pre and post development water balance assessment and evaluated dewatering rates for construction. The groundwater elevations and infiltration rates for the sites were used to evaluate the LID feasibility for the South Site.

8.2 NORTH SITE GROUNDWATER

A Hydrogeological Assessment dated December 2024 was prepared by Stantec Consulting for both the South and North Sites. This report is provided under separate cover**.** This report determined the long-term groundwater elevations throughout both sites, tested groundwater quality, assessed infiltration rates on-site, completed and pre and post development water balance assessment and evaluated dewatering rates for construction. The groundwater elevations and infiltration rates for the sites were used to evaluate the LID feasibility for the North Site.

9.0 PRELIMINARY CONSTRUCTION PHASING

9.1 SOUTH SITE PHASING

The preliminary methodology developed for the proposed South Site construction involves two primary phases. Phase 1 is ESC installation and earthworks, and Phase 2 is site servicing and building construction.

Servicing and stormwater management infrastructure will be installed within Phase 2.

9.2 NORTH SITE PHASING

The preliminary methodology developed for the proposed North Site construction involves two primary phases. Phase 1 is ESC installation and earthworks, and Phase 2 is site servicing and building construction.

Servicing and stormwater management infrastructure will be installed within Phase 2.

10.0 NORTH/SOUTH SITE EROSION AND SEDIMENT CONTROL

Prior to the initiation of any construction within the Sites, a comprehensive Erosion and Sediment Control program acceptable to the Town of Caledon, Region of Peel and the TRCA must be implemented. Appropriate drawings will be prepared at the detailed design stage and submitted to the Agencies for review and approval with supporting report and calculations.

The future ESC plans will include all necessary siltation control facilities and will be designed in accordance with current Town guidelines and the requirements of TRCA 2019 Erosion and Sediment Control Guide for Urban Construction. Below is a list of recommended erosion and sediment control measures that will be installed and maintained during the construction of the Subject Sites:

- Temporary sediment control fence and tree protection fences (where required) will be placed at construction limits and/or downstream of any disturbed areas prior to grading
- Gravel mud mats at construction vehicle access points to minimize off-site tracking of sediments
- Install temporary swales throughout site along with rock check dams or silt socks;
- Prior to topsoil stripping phase and bulk earthworks, install temporary sediment traps and/or small temporary sediment control ponds to capture and treat runoff before releasing to open space areas;
- Proposed SWM ponds will be constructed early on in the earthworks phase and will function as ESC ponds during the earthworks and servicing phases of construction;
- Seed temporary topsoil stockpiles to prevent wind erosion;
- Locate stockpiles in appropriate areas complete with perimeter fence and ESC control as required
- Routine inspection, monitoring, and repair as necessary of all erosion and sediment control measures during construction
- Removal of temporary controls once the areas they serve are restored and stabilized

All reasonable measures will be taken to ensure that sediment loading is minimized both during and following construction.

11.0 LONG TERM ENVIRONMENTAL MANAGEMENT PLAN AND COMPREHENSIVE ADAPTIVE MANAGEMENT PLAN

The CEISMP outlines the basis of a long term environmental management plan (LTEMP) and comprehensive adaptive management plan (CAMP).

The CAMP will provide the opportunity, if appropriate, to modify and/or adjust the functionality of the stormwater management infrastructure on the basis of monitoring results throughout the project implementation and through completion. Further details such as proposed CAMP tools and infrastructure implement will be provided further during detailed design.

12.0 CONCLUSION AND RECOMMENDATIONS

12.1 SOUTH SITE

From the findings of this report, the conclusions are as follows:

Stormwater Management

The proposed plan will satisfy the requirements and achieve the following:

- **Water Balance:** Retain the equivalent 5 mm storm event;
- **Water Quantity:** Control post development storm runoff for all events up to and including the 100 year design storm to the target flows, calculated using the unit flow relationships for the Humber River Watershed established by the TRCA for 2 to 100 year storm, and to existing Regional peak flow from the South Site;
- **Water Quality:** Provide 80% Total Suspended Solids (TSS) removal;
- **Outfalls:** Infiltration and quantity control tanks are proposed to discharge to the Tributary of West Humber River via Outlet #1. The outlet HW and splashpad are located outside of the valleyland feature limit and within the 30m setback.
  The SWM Pond is proposed to discharge to Kilamanagh Creek via Outlet #2. The outlet HW and splashpad are outside of the meander belt and within the 30 m buffer (RSD habitat area).

Water Servicing

- **Watermain:** Construct fire and domestic watermains within the South Site in accordance with Town / Region standards and connect to the 400mm diameter watermain on Dixie Road (to be completed as part of Capital works by the Region).

Sanitary Sewer

- **Sanitary Sewers:** Construct sanitary sewers within the South Site in accordance with Town / Region standards and connect to the 600mm diameter sanitary sewer on Dixie Road (to be completed as part of Capital works by the Region).
- The proposed development results in a sanitary peak flow of 31.41 L/s in post development conditions. The proposed downstream 600mm diameter sanitary sewer on Dixie Road will be designed to accommodate sanitary flows from the South Site.

Grading and Road Access

- The proposed overall grading design can be achieved using conventional design standards and compliance to the proposed stormwater management and overland flow concepts

12.2 NORTH SITE

From the findings of this report, the conclusions are as follows:

Stormwater Management

The proposed plan will satisfy the requirements and achieve the following:

- **Water Balance:** Retain the equivalent 5 mm storm event from roof areas and maintain runoff volumes to the HDF;
- **Water Quantity:** Control post development storm runoff for all events up to and including the 100 year design storm to the target flows, calculated using the unit flow relationships for the Humber River Watershed established by the TRCA for 2 to 100 year storm, and to existing Regional peak flow from the North Site;
- **Water Quality:** Provide 80% Total Suspended Solids (TSS) removal;
- **Outfalls:**
    - The SWM Pond and Storm Trap system will discharge to the Tributary of West Humber River via Outlet 1. The outlet HW and splashpad are outside of the meander belt and within the valleyland limit and buffer. A broad crested weir and emergency spillway from the pond will discharge to the valley. The outlet and spillway will require some regrading and restoration.
    - Building roofs are directed to underground tanks for infiltration and quantity control and will discharge to the HDF via Outlet 2. The outlet HW and splashpad are located outside of the valleyland feature limit with some regrading and restoration proposed at the top end of the feature.
    - Existing external flow will be piped through the North Site to Outlet 3 discharging at Headwall 1001 to the Tributary of West Humber River. The outlet HW and splashpad are outside of the meander belt and within the valleyland limit and buffer, with some regrading and restoration proposed.
    - Existing external flow will be piped through the North Site to Outlet 4 discharging at Headwall 1101 to the existing ponds to the east which ultimately discharge to the Tributary of West Humber River. The outlet HW and splashpad are generally contained on the property.

Water Servicing

- **Watermain:** Construct fire and domestic watermains within the South Site in accordance with Town / Region standards and connect to the 400mm diameter watermain on Dixie Road (to be completed as part of Capital works by the Region).

Sanitary Sewer

- **Sanitary Sewers:** Construct sanitary sewers within the North Site in accordance with Town / Region standards and connect to the 600mm diameter sanitary sewer on Dixie Road (to be completed as part of Capital works by the Region).
- The proposed development results in a sanitary peak flow of 45.07 L/s in post development conditions. The proposed downstream 600mm diameter sanitary sewer on Dixie Road will be designed to accommodate sanitary flows from the North Site.

Grading and Road Access

The proposed overall grading design for the North Site can be achieved using conventional design standards and compliance to the proposed stormwater management and overland flow concepts.

We trust the information provided will assist you in completing your review of this Report for the Sites. Should you require any additional information, please contact the undersigned.

Sincerely,

STANTEC CONSULTING LTD.

Amber Palmer, P.Eng.
Senior Associate, Water Resources
Tel.: (905) 944-4806
Fax: (905) 474-9889
Amber.Palmer@stantec.com

Riz Akhtar, P.Eng.
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Tel.: (416) 416-3642
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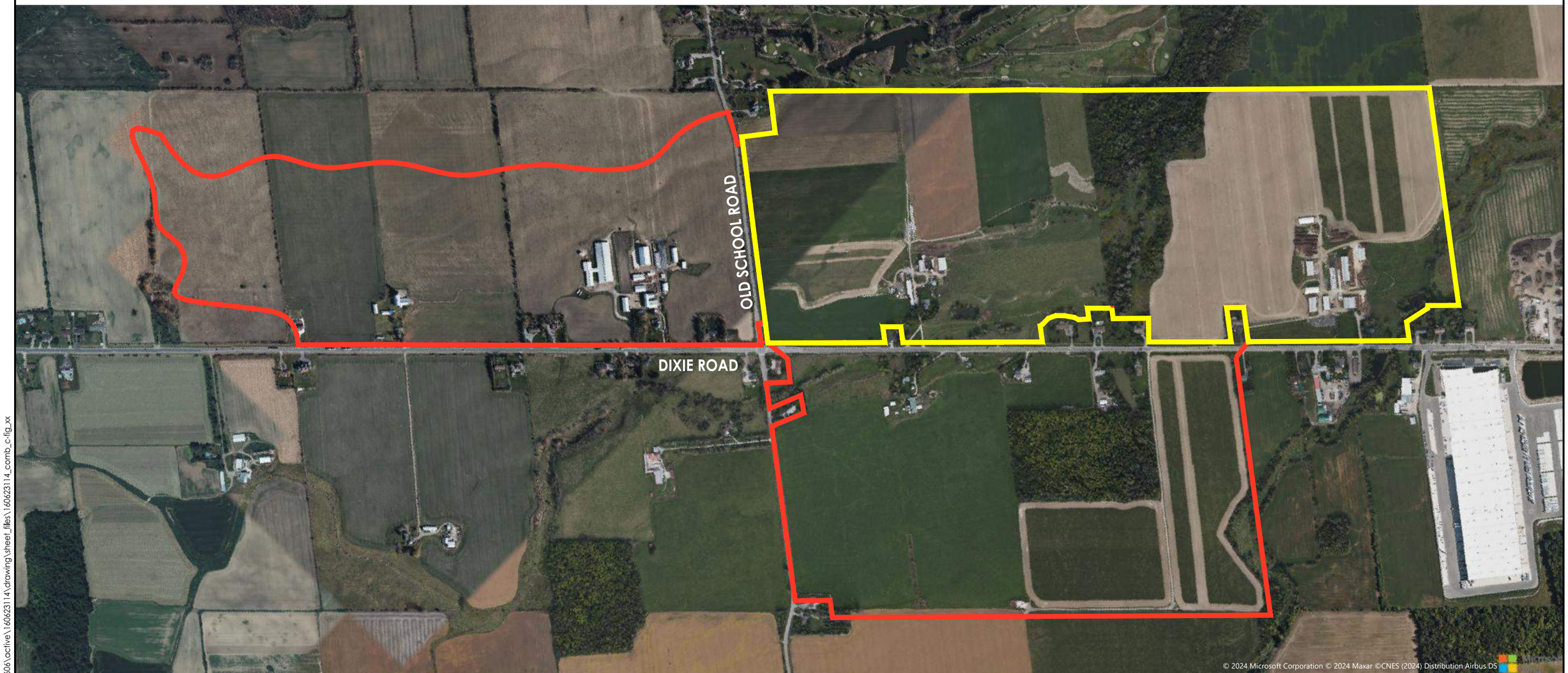
Riz Akhtar@stantec.com



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Legend

PRIMARY STUDY AREA

SECONDARY STUDY AREA

Client/Project

QUADREAL PROPERTY GROUP

INDUSTRIAL DEVELOPMENT

12489 & 12861 Dixie Road, Caledon, ON

Project No.

1606 23114

Title

FSSMR STUDY AREAS

Revision

Date

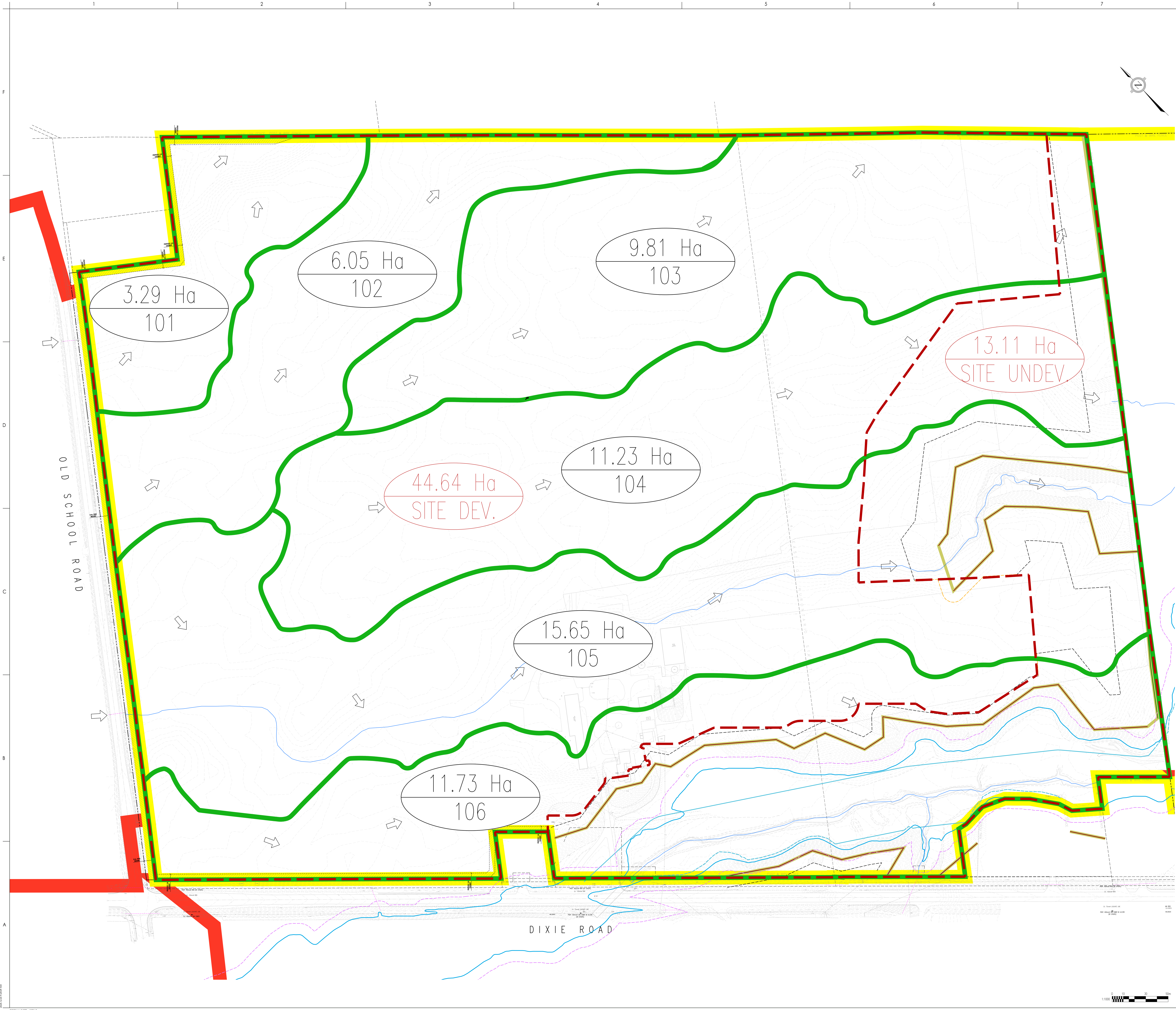
2024.12.05

Reference Sheet

-

Figure No.

1.0



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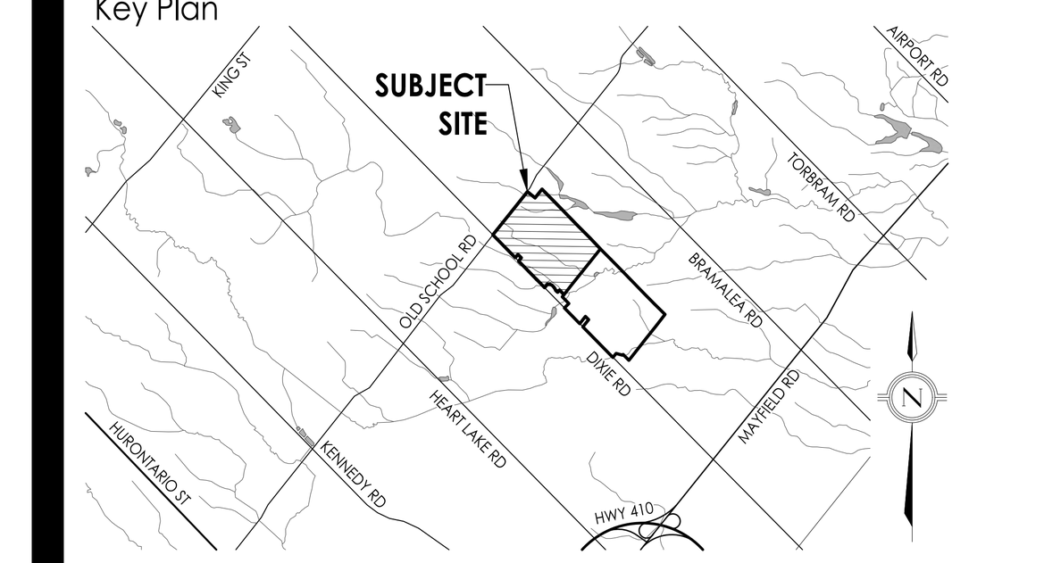
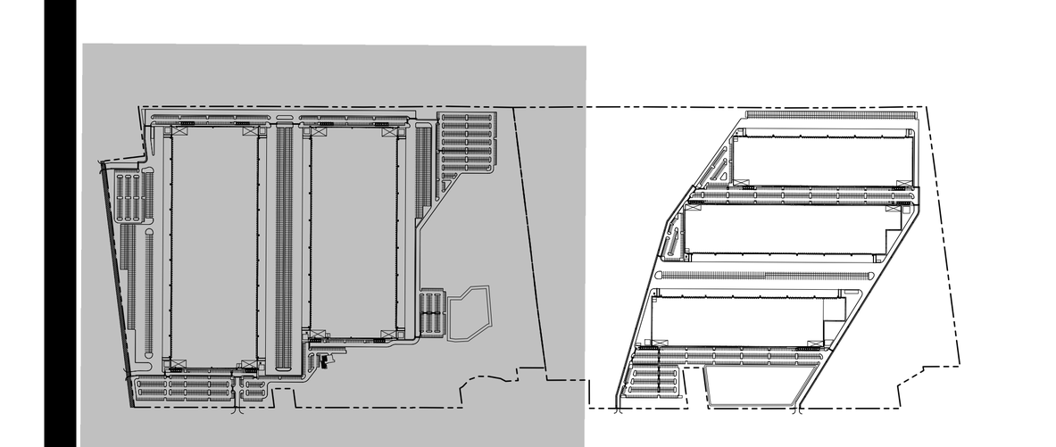
Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- AREA (Ha) / PROPOSED CATCHMENT SPLIT ID (3.32 Ha, 109)
- AREA (Ha) / EXISTING CATCHMENT ID (3.32 Ha, 109)
- DRAINAGE BOUNDARY
- PROPOSED FUTURE DEVELOPMENT SPLIT
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STACKED BY TRCA, AUGUST 24, 2023)
- FLOODPLAN (TRCA)
- 10m SETBACK FROM REGIONAL FLOODLINE (STANTEC 2023)
- VALLEYLAND FEATURE LIMIT (STANTEC 2023)
- 10–30m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC 2023)
- PROPOSED STORM SEWER
- EXISTING CULVERT
- OVERLAND FLOW
- STORM MANHOLE
- CATCH BASIN
- EXISTING CATCH BASIN
- PRIMARY STUDY AREA
- SECONDARY STUDY AREA

Notes

1. THE LOCATION OF ALL UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE LOCATION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
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3. FOR NOTES, DETAILS, AND PROJECT REQUIREMENTS, REFER TO NOTES & DETAILS SHEETS ON DRAWING C-501

Benchmark

1. SURVEY PREPARED BY J.D. BARNES, REFERENCE No. 22-30-852-00-B-TOPO, DATED APRIL 28, 2022.
2. ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF BRAMPTON BENCHMARKS:
No. 042200367, ELEVATION = 257.317m
No. 042200366, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD

Issued	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06

File Name: 160623115_C-4.1	KB	KB	RA	2024.12.06
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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Client/Project Logo

Client/Project
QUADREAL PROPERTY GROUP

INDUSTRIAL DEVELOPMENT

12489 & 12861 Dixie Road, Caledon, ON

Title
NORTH EXISTING STORMWATER DRAWING

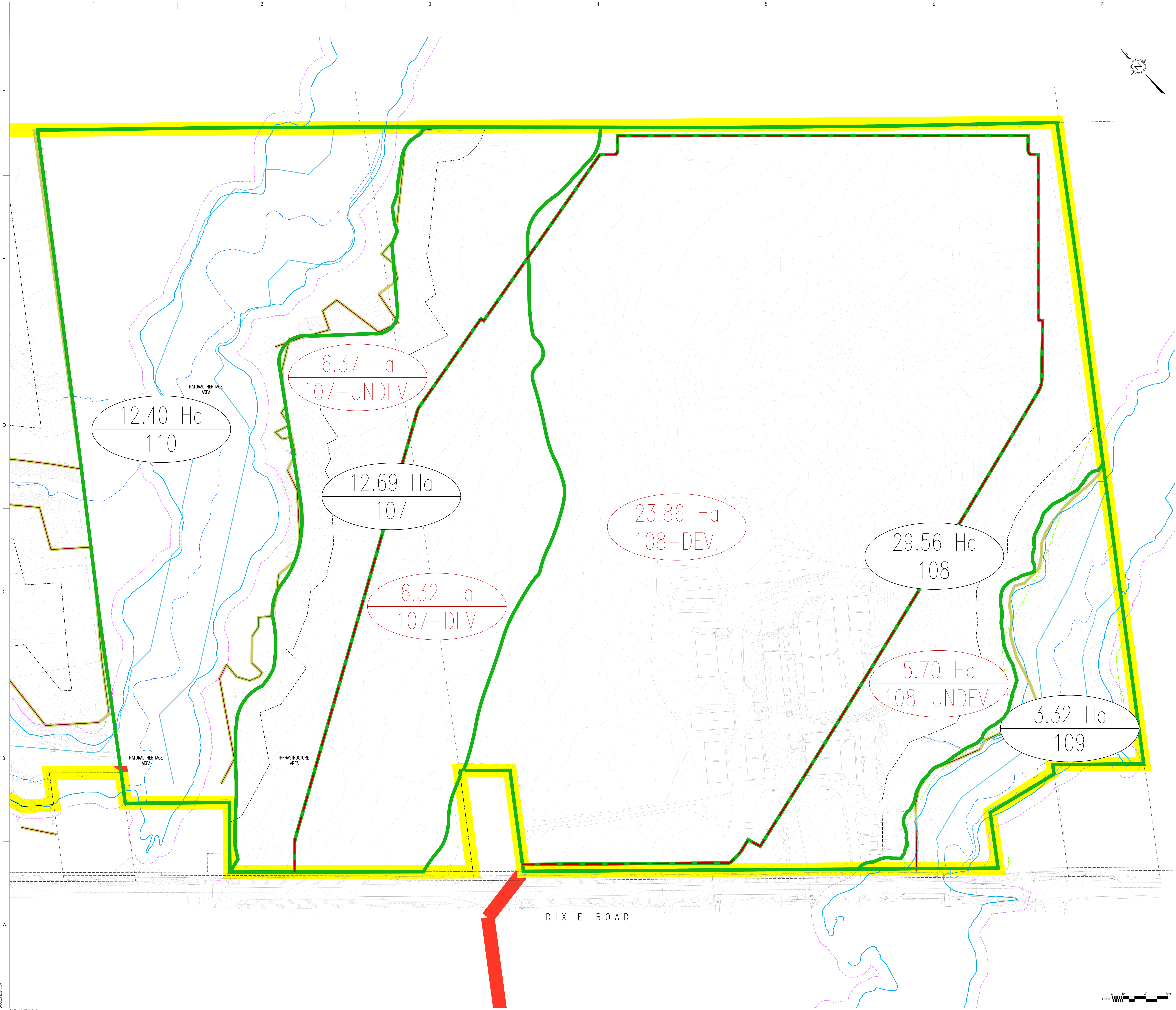
Project No. 1606 23115

Scale 1:1000

Revision 0

Sheet of

Drawing No. **4.1N**



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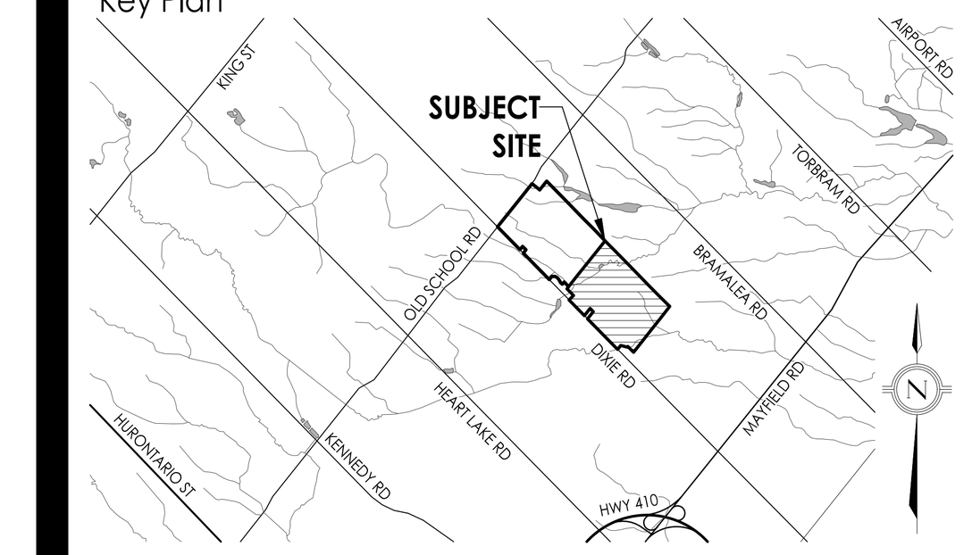
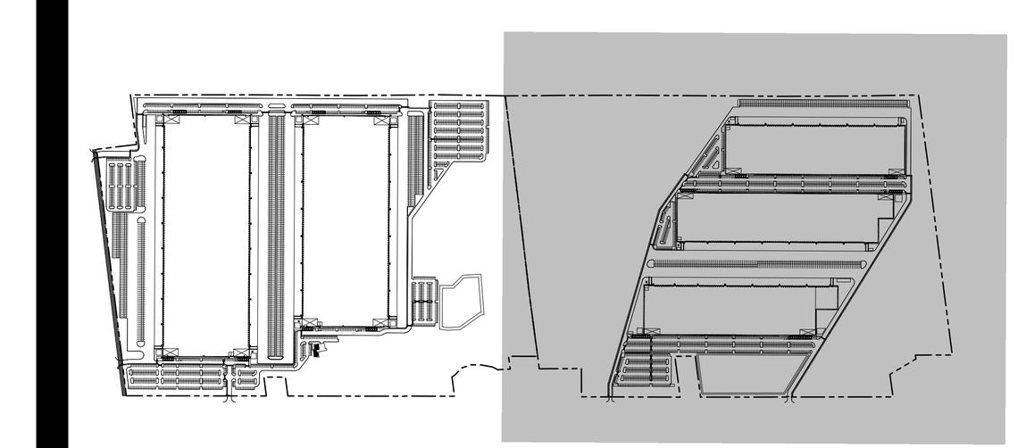
Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- 3.32 Ha / 109 (red): PROPOSED CATCHMENT SPLIT ID; AREA (Ha); RUNOFF COEFFICIENT
- 3.32 Ha / 109 (black): EXISTING CATCHMENT ID; AREA (Ha); RUNOFF COEFFICIENT
- DRAINAGE BOUNDARY
- PROPOSED FUTURE DEVELOPMENT SPLIT
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
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- PROPOSED STORM SEWER
- EXISTING CULVERT
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- EXISTING CATCH BASIN
- PRIMARY STUDY AREA
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Benchmark

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No. 042200367, ELEVATION = 257.317m
No. 042200366, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD

Issued	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06

File Name: 160623114_C-4.1SWM	KB	KB	RA	2024.12.06
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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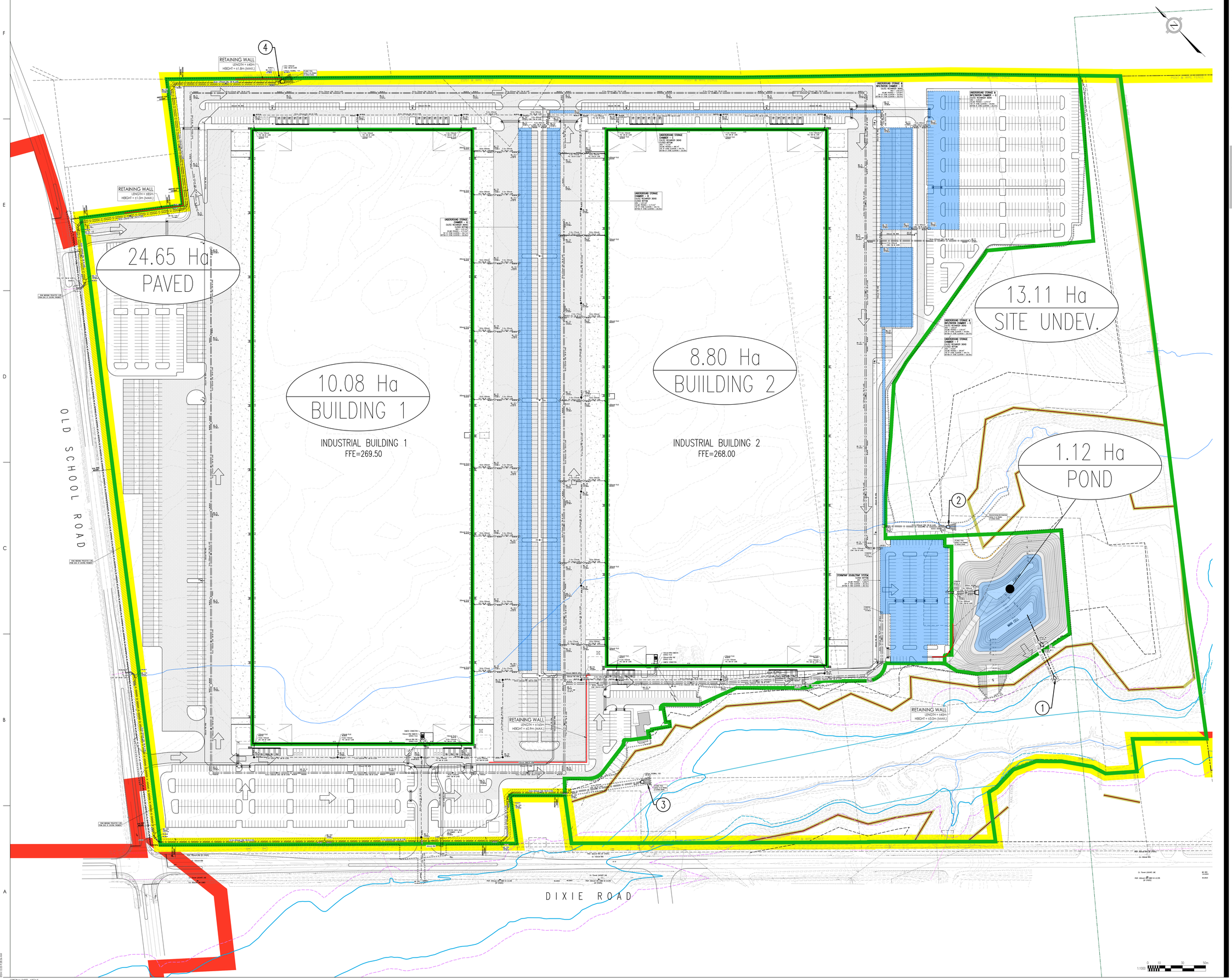
12489 & 12861 Dixie Road, Caledon, ON

Title
SOUTH EXISTING STORMWATER FIGURE

Project No.	Scale
1606 23114	1:1000

Revision	Sheet	Drawing No.
0	of	**4.1S**



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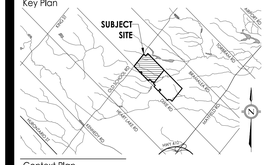
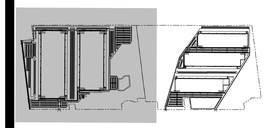
Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- AREA (Ha)
- CATCHMENT ID
- DRAINAGE BOUNDARY
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STAKED BY TRCA, AUGUST 24, 2023)
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- PROPOSED STORM SEWER
- EXISTING CULVERT
- OVERLAND FLOW
- OUTLET ID
- STORM MANHOLE
- CATCH BASIN
- EXISTING CATCH BASIN
- HEADWALL
- PRIMARY STUDY AREA
- SECONDARY STUDY AREA

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Benchmark

1. SURVEY PREPARED BY J.D. BARNES, REFERENCE No. 22-351-BSS-00-B-TOPO, DATED APRIL 28, 2022.
2. ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF BRAMPTON BENCHMARKS:
No. 042D0367, ELEVATION = 257.317m
No. 042D0366, ELEVATION = 251.560m

Revision	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06

Issued	By	Appd	YYYY.MM.DD
File Name: 160623115_C-4.2	KB Dwn.	KB Dsgn.	RA Chkd. 2024.12.06 YYYY.MM.DD

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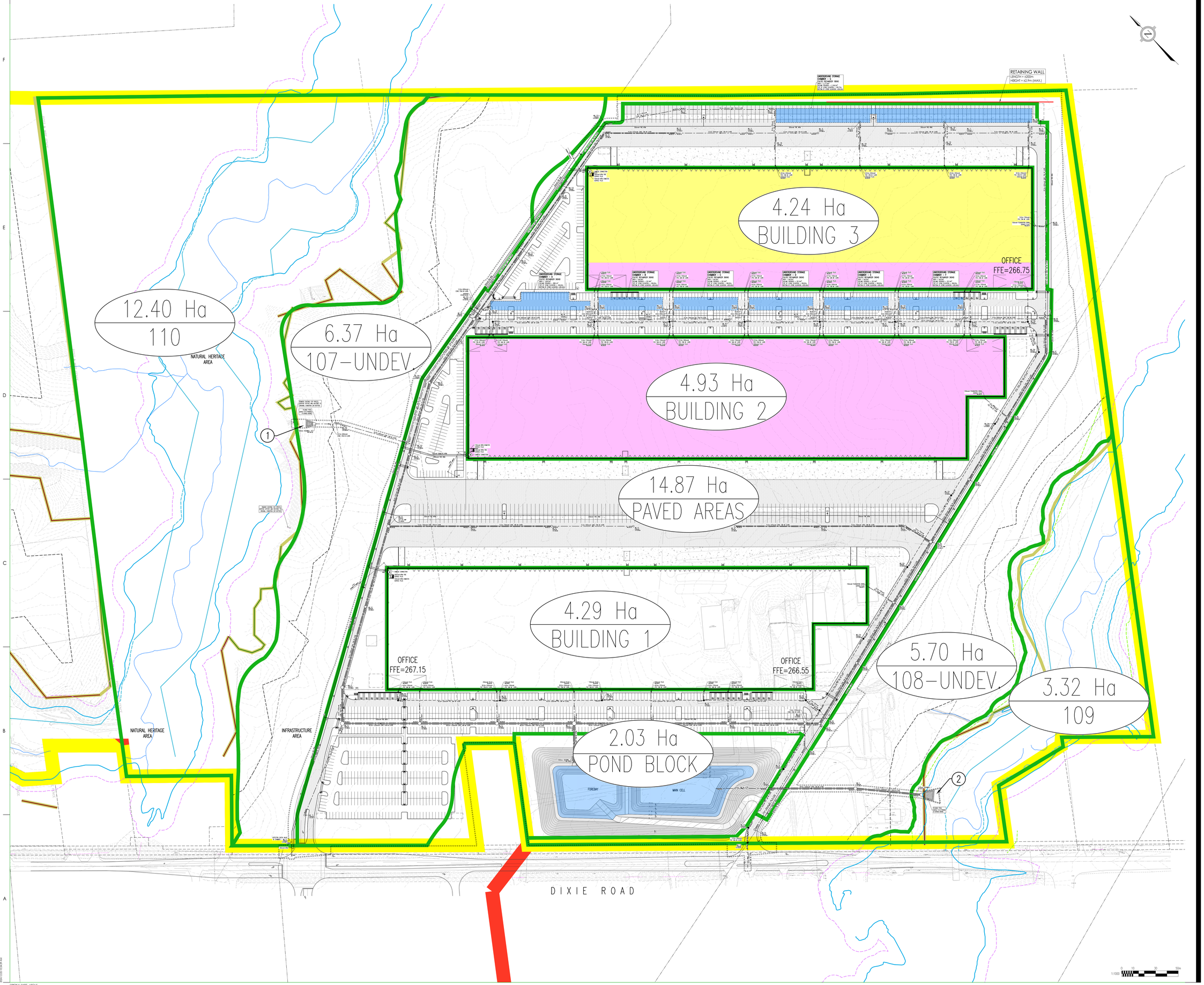
Title
NORTH PROPOSED STORMWATER DRAWING

Project No.	Scale
160623115	1:1000
Revision 0	Sheet of
Drawing No.	4.2N



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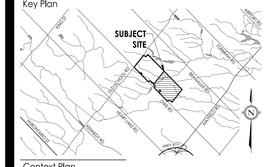
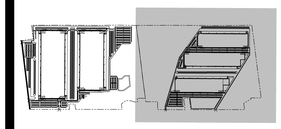
Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- AREA (Ha)
- CATCHMENT ID
- DRAINAGE BOUNDARY
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STAKED BY TRCA, AUGUST 24, 2023)
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- VALLEYLAND FEATURE LIMIT (STANTEC 2023)
- 10-30m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC 2023)
- PROPOSED STORM SEWER
- EXISTING CULVERT
- OVERLAND FLOW
- OUTLET ID
- STORM MANHOLE
- CATCH BASIN
- EXISTING CATCH BASIN
- HEADWALL
- PORTIONS OF ROOF DRAINING TO TANK G
- PORTIONS OF ROOF DRAINING TO TANKS A TO F
- PRIMARY STUDY AREA
- SECONDARY STUDY AREA

Notes

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Benchmark

1. SURVEY PREPARED BY J.D. BARNES, REFERENCE No. 22-30-952-00-B-TOPO, DATED APRIL 28, 2022.
2. ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF BRAMPTON BENCHMARK No. 043C0061, ELEVATION = 257.017m
No. 043C0096, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06

Issued	By	Appd	YYYY.MM.DD
File Name: 160623114_C-4-25WM	KB Dwn.	KB Dsgn.	RA 2024.12.06 Chkd. YYYY.MM.DD

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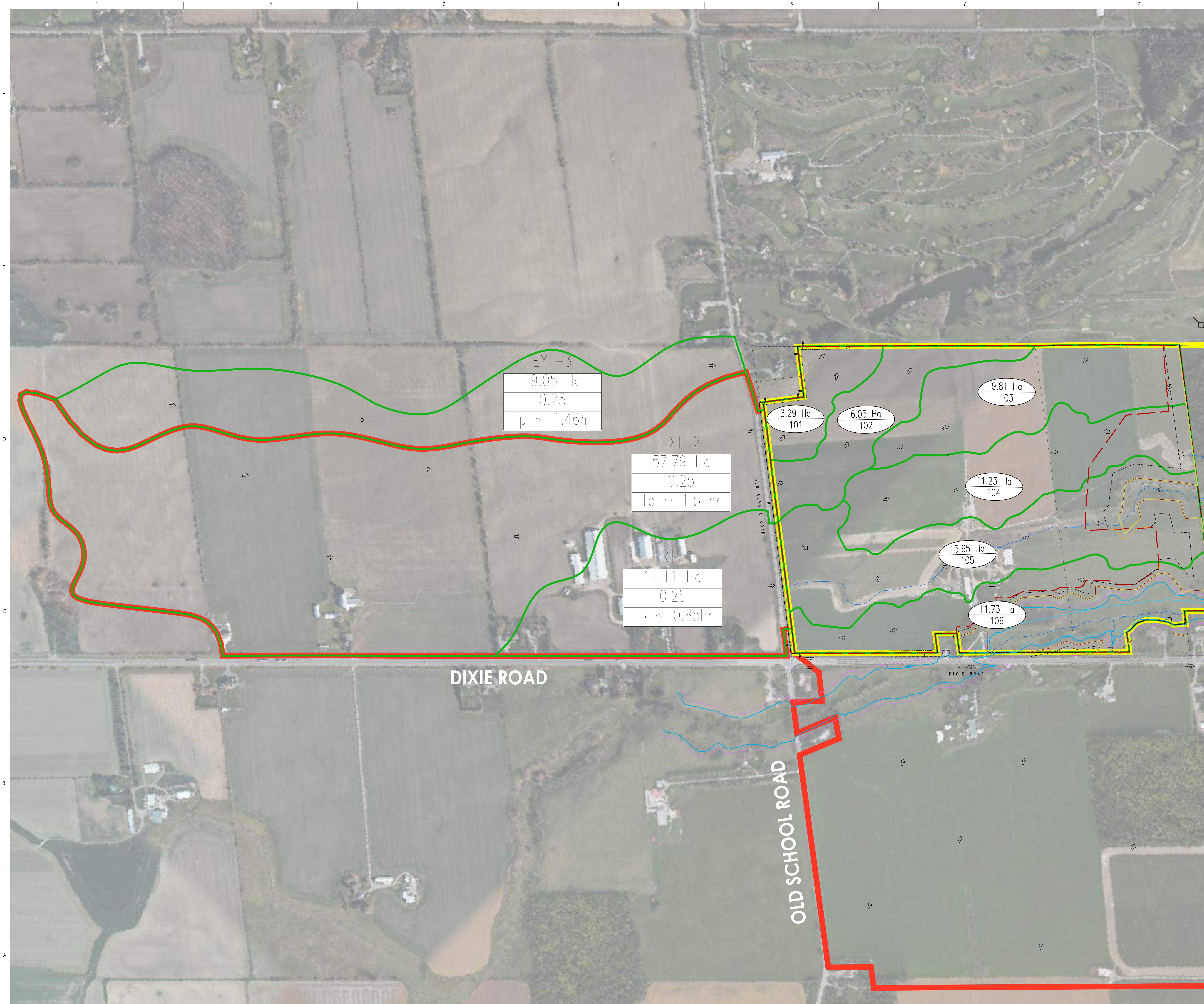
INDUSTRIAL DEVELOPMENT

12489 & 12861 Dixie Road, Caledon, ON

Title
SOUTH PROPOSED STORMWATER DRAWING

Project No.	Scale
1606 23114	1:1000
Revision 0	Sheet of
Drawing No.	4.2S



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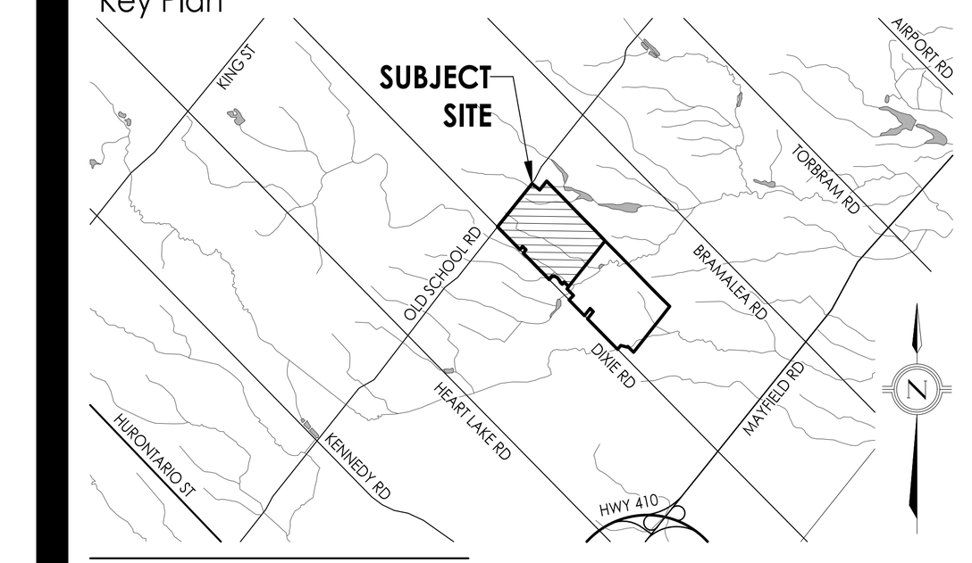
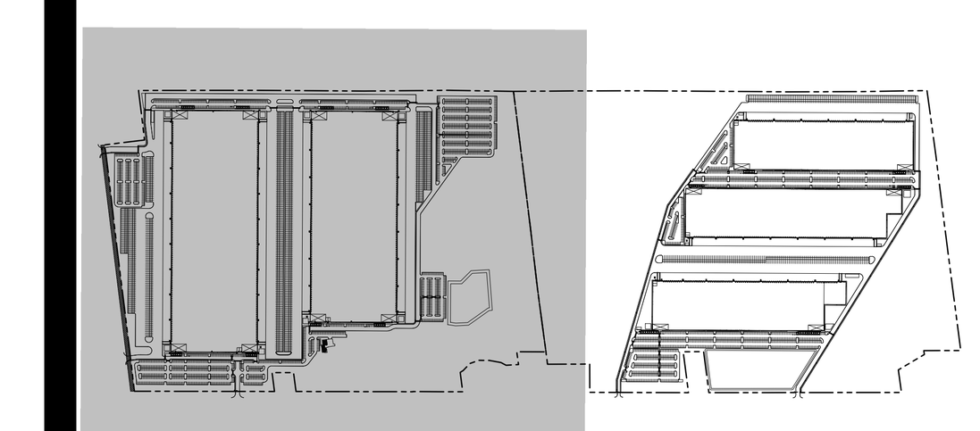
Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- EXT-2 — CATCHMENT; 57.79 Ha — AREA (Ha); 0.25 — RUNOFF COEFFICIENT; Tc ~ MIN — TIME TO PEAK
- 3.32 Ha — AREA (Ha); 109 — EXISTING CATCHMENT ID
- DRAINAGE BOUNDARY
- PROPOSED FUTURE DEVELOPMENT SPLIT
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STACKED BY TRCA, AUGUST 24, 2023)
- FLOODPLAN (TRCA)
- 10m SETBACK FROM REGIONAL FLOODLINE (STANTEC 2023)
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- EXISTING CULVERT
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Benchmark

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No. 042200367, ELEVATION = 257.317m
No. 042200366, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06
Issued	By	Appd	YYYY.MM.DD

File Name: 160623115_C-4.3	KB	KB	RA	2024.12.06
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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Client/Project Logo

Client/Project
QUADREAL PROPERTY GROUP

INDUSTRIAL DEVELOPMENT

12489 & 12861 Dixie Road, Caledon, ON

Title
NORTH EXTERNAL STORMWATER AREAS DRAWING

Project No. 1606 23115
Scale 1:2500
Revision 0
Sheet of
Drawing No. **4.3N**

EXT-3
19.05 Ha
0.25
Tp ~1.46 hr

EXT-2
57.79 Ha
0.25
Tp ~1.51 hr

EXT-1
14.11 Ha
0.25
Tp ~0.85 hr

3.29 Ha
101

6.05 Ha
102

9.81 Ha
103

11.23 Ha
104

15.65 Ha
105

11.73 Ha
106

OLD SCHOOL ROAD

DIXIE ROAD

HEADWATER DRAINAGE FEATURE OUTLET

1:2000 0 20 60 100m

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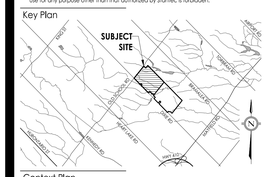
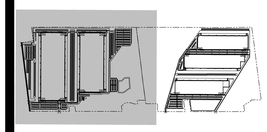
Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- EXT-2 / 57.79 Ha / 0.25 / Tc = MIN — CATCHMENT / AREA (Ha) / RUNOFF COEFFICIENT / TIME OF CONCENTRATION
- 3.32 Ha / 109 — AREA (Ha) / EXISTING CATCHMENT ID
- DRAINAGE BOUNDARY
- PROPOSED FUTURE DEVELOPMENT SPLIT
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STACKED BY TRCA, AUGUST 24, 2023)
- FLOODPLAIN (TRCA)
- 10m SETBACK FROM REGIONAL FLOODLINE (STANTEC 2023)
- VALLEYLAND FEATURE LIMIT (STANTEC 2023)
- 10-30m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC 2023)
- PROPOSED STORM SEWER
- EXISTING CULVERT
- OVERLAND FLOW
- STORM MANHOLE
- CATCH BASIN
- EXISTING CATCH BASIN
- CONTRIBUTING AREA TO HEADWATER DRAINAGE FEATURE
- PRIMARY STUDY AREA
- SECONDARY STUDY AREA

Notes

1. THE LOCATION OF ALL UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE LOCATION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED BY THE OWNER OR THE ENGINEER. THE CONTRACTOR SHALL DETERMINE THE LAYOUT OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
2. THIS DRAWING INDICATES SITE SERVICING AND GRADING INFORMATION ONLY. FOR BUILDING AND SITE LAYOUT DETAILS REFER TO ARCHITECTURAL DRAWINGS.
3. FOR NOTES, DETAILS, AND PROJECT REQUIREMENTS, REFER TO NOTES & DETAILS SHEETS ON DRAWING C-501

Benchmark

1. SURVEY PREPARED BY J.D. BARNES, REFERENCE No. 22-351-R02-100-B-TOPO, DATED APRIL 28, 2022.
2. ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF BRAMPTON BENCHMARKS:
   No. 042008D, ELEVATION = 257.317m
   No. 042009A, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06

Issued	By	Appd	YYYY.MM.DD
File Name: 160623115_C-4.4_FBWB	KB Dwn.	KB Dsgn.	RA 2024.12.06 Chkd. YYYY.MM.DD

Permit/Seal

PRELIMINARY NOT FOR CONSTRUCTION

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Client/Project Logo

Client/Project
QUADREAL PROPERTY GROUP

INDUSTRIAL DEVELOPMENT

12489 & 12861 Dixie Road, Caledon, ON

Title
FEATURE BASED WATER BALANCE - EXISTING CONDITONS

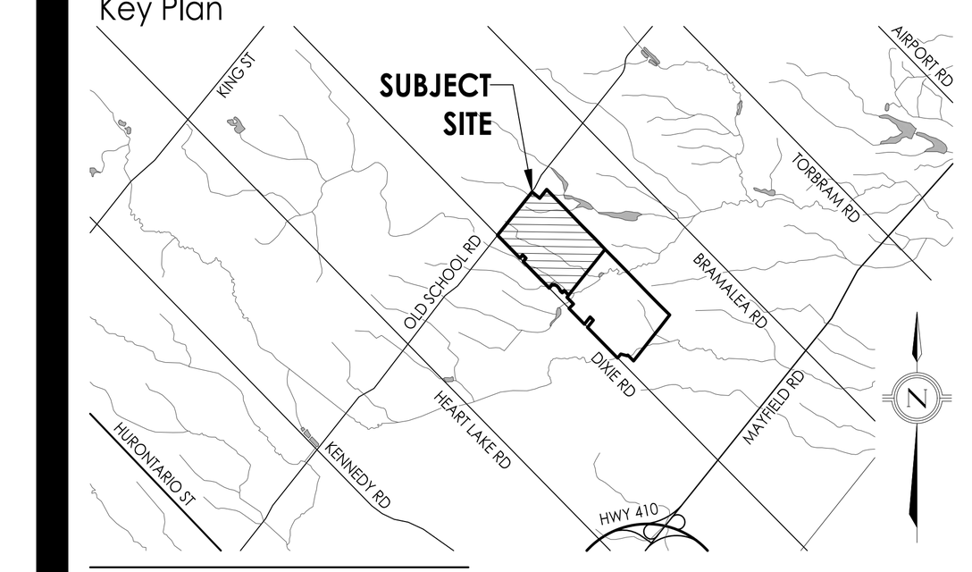
Project No.	Scale
160623115	1:2000

Revision	Sheet	Drawing No.
0	of	4.4N

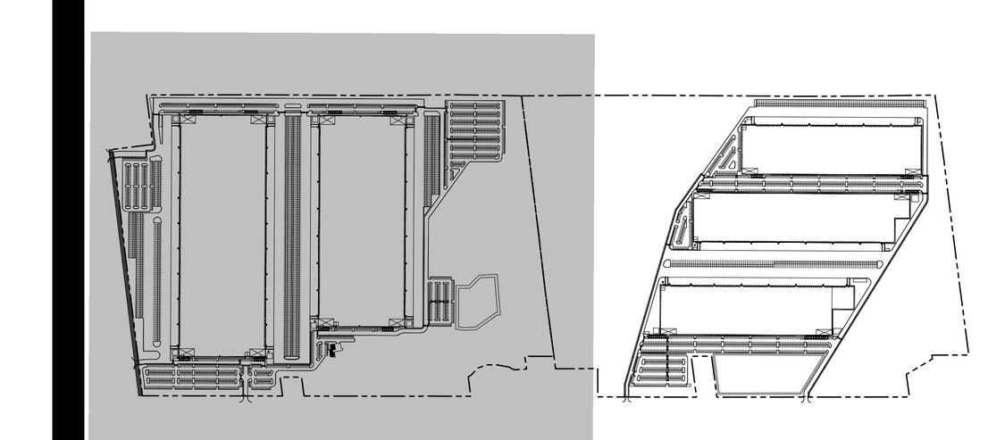
Stantec

Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham ON L3R 0B8
Tel: (905) 944-7777
www.stantec.com

Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- AREA (Ha) / CATCHMENT ID (3.32 Ha, 109)
- DRAINAGE BOUNDARY
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STACKED BY TRCA, AUGUST 24, 2023)
- FLOODPLAN (TRCA)
- 10m SETBACK FROM REGIONAL FLOODLINE (STANTEC 2023)
- VALLEYLAND FEATURE LIMIT (STANTEC 2023)
- 10–30m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC 2023)
- PROPOSED STORM SEWER
- EXISTING CULVERT
- OVERLAND FLOW
- OUTLET ID
- STORM MANHOLE
- CATCH BASIN
- EXISTING CATCH BASIN
- HEADWALL
- CONTRIBUTING DRAINAGE AREAS TO HEADWATER DRAINAGE FEATURE
- STORMWATER TANKS PROVIDING INFILTRATION TO HEADWATER DRAINAGE FEATURE
- PRIMARY STUDY AREA
- SECONDARY STUDY AREA

Notes

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Benchmark

1. SURVEY PREPARED BY J.D. BARNES, REFERENCE No. 22-30-852-00-B-TOPO, DATED APRIL 28, 2022.
2. ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF BRAMPTON BENCHMARKS:
No. 042200367, ELEVATION = 257.317m
No. 042200366, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD

Issued	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06

File Name: 160623115_C-4.5_FBWB_PROP	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	KB	KB	RA	2024.12.06

Permit/Seal

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Client/Project Logo

Client/Project
QUADREAL PROPERTY GROUP

INDUSTRIAL DEVELOPMENT

12489 & 12861 Dixie Road, Caledon, ON

Title
FEATURE BASED WATER BALANCE - PROPOSED CONDITONS

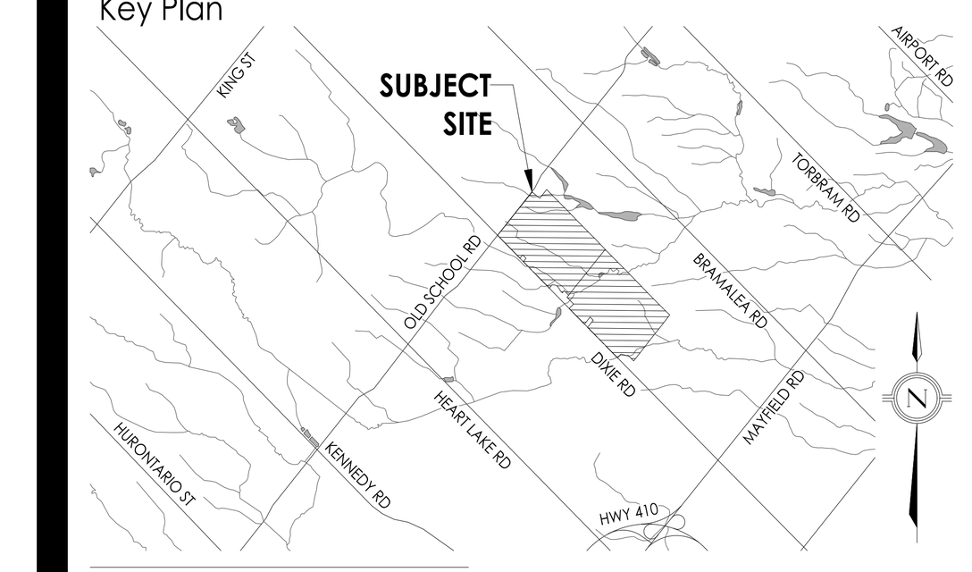
Project No.	Scale
1606 23115	1:2000

Revision	Sheet	Drawing No.
0	of	**4.5N**

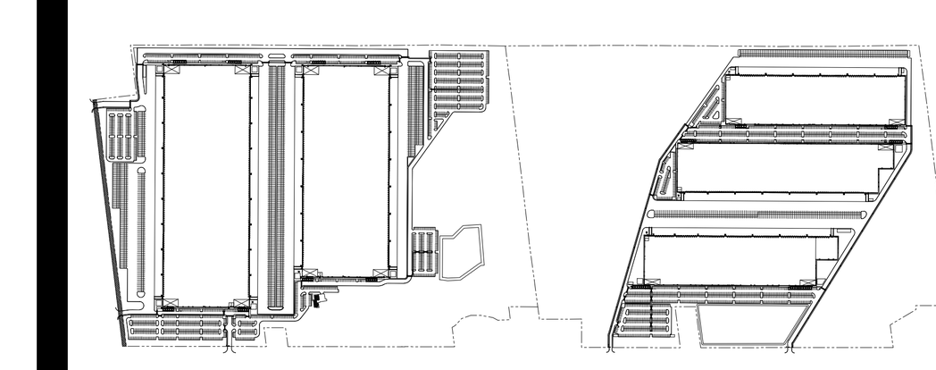
Stantec

Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham ON L3R 0B8
Tel: (905) 944-7777
www.stantec.com

Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- LIMIT OF CONSTRUCTION
- RETAINING WALL
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STAKED BY TRCA, AUGUST 24, 2023)
- WATERCOURSE
- FLOODPLAIN (TRCA)
- 10m SETBACK FROM REGIONAL FLOODLINE (STANTEC, 2023)
- VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
- 10m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
- 30m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
- MEANDERBELT WIDTH (GEOMORPHIX, OCTOBER 2023)
- MEANDERBELT WIDTH TRUNCATED AT TOE OF SLOPE (GEOMORPHIX, OCTOBER 2023)
- REDSIDE DACE HABITAT EXTENT (MEANDERBELT + 30m)
- HEAVY DUTY ASPHALT
- 266.80 PROPOSED ELEVATION
- T/C=266.95 TOP OF CURB ELEVATION
- TW=267.10 TOP OF WALL ELEVATION
- BW=266.20 BOTTOM OF WALL ELEVATION
- 266.09 (EX) EXISTING ELEVATIONS
- OVERLAND FLOW
- SANITARY MANHOLE
- STORM MANHOLE
- STORM HEADWALL
- SIAMESE CONNECTION
- V&B VALVE AND VALVE BOX
- PIV POST INDICATOR VALVE c/w SUPERVISORY SWITCH AND LOCK
- HYD HYDRANT
- M WATER METER
- B BACKFLOW PREVENTER

Notes

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3. FOR NOTES, DETAILS, AND PROJECT REQUIREMENTS, REFER TO NOTES & DETAILS SHEETS ON DRAWING C-501

Benchmark

1. SURVEY PREPARED BY J.D. BARNES, REFERENCE No. 22-30-852-00-B-TOPO, DATED APRIL 28, 2022.
2. ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF BRAMPTON BENCHMARKS:
No. 042200367, ELEVATION = 257.317m
No. 042200366, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD

Issued	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06

File Name: 160623114_COMB_C-111GP	BC	BC	RA	2024.12.04
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit/Seal

Client/Project Logo

Client/Project
QUADREAL PROPERTY GROUP

INDUSTRIAL DEVELOPMENT

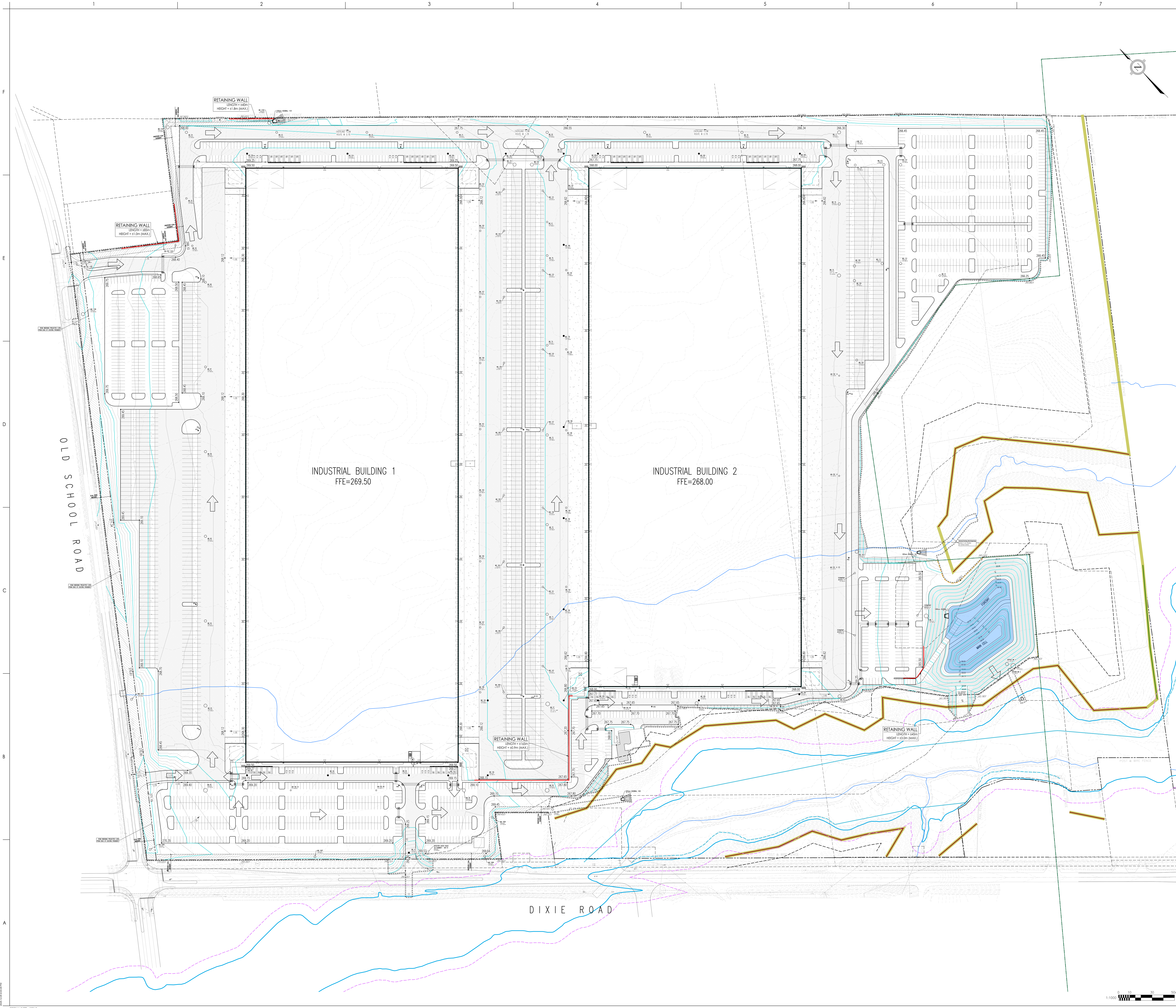
12489 & 12861 Dixie Road, Caledon, ON

Title

CONCEPTUAL GRADING PLAN
(OVERALL VIEW)

Project No.	Scale
1606 23114	1:2000

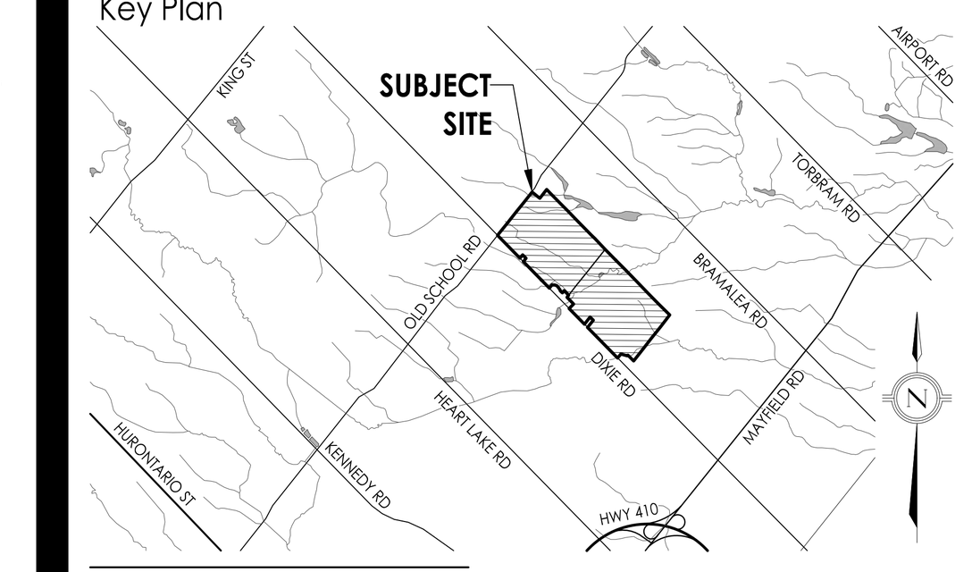
Revision	Sheet	Drawing No.
0	of	C-111



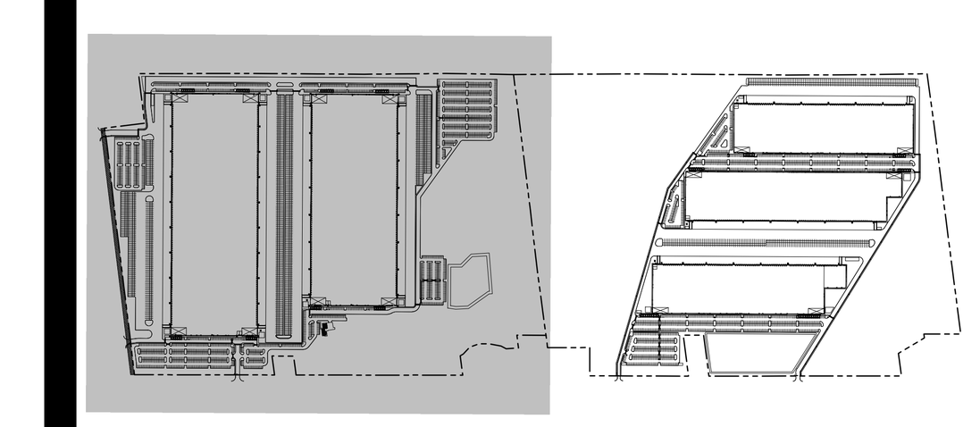
Stantec

Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham ON L3R 0B8
Tel: (905) 944-7777
www.stantec.com

Key Plan



Context Plan



Legend

	PROPERTY BOUNDARY
	LIMIT OF CONSTRUCTION
	RETAINING WALL
	DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
	TOP OF BANK (AS STAKED BY TRCA, AUGUST 24, 2023)
	WATERCOURSE
	FLOODPLAIN (TRCA)
	10m SETBACK FROM REGIONAL FLOODLINE (STANTEC, 2023)
	VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
	10m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
	30m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
	MEANDERBELT WIDTH (GEOMORPHIX, OCTOBER 2023)
	MEANDERBELT WIDTH TRUNCATED AT TOE OF SLOPE (GEOMORPHIX, OCTOBER 2023)
	REDSIDE DACE HABITAT EXTENT (MEANDERBELT + 30m)
	HEAVY DUTY ASPHALT
• 266.80	PROPOSED ELEVATION
• T/C=266.95	TOP OF CURB ELEVATION
• TW=267.10	TOP OF WALL ELEVATION
• BW=266.20	BOTTOM OF WALL ELEVATION
• 266.09 (EX)	EXISTING ELEVATIONS
	OVERLAND FLOW
	SANITARY MANHOLE
	STORM MANHOLE
	STORM HEADWALL
	SIAMESE CONNECTION
V&B	VALVE AND VALVE BOX
PIV	POST INDICATOR VALVE c/w SUPERVISORY SWITCH AND LOCK
HYD	HYDRANT
M	WATER METER
B	BACKFLOW PREVENTER

Notes

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Benchmark

1. SURVEY PREPARED BY J.D. BARNES, REFERENCE No. 22-30-852-00-B-TOPO, DATED APRIL 28, 2022.
2. ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF BRAMPTON BENCHMARKS:
   No. 042200367, ELEVATION = 257.317m
   No. 042200366, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD

Issued	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06

File Name: 160623114_COMB_C-111GP	BC	BC	RA	2024.12.04
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit/Seal

LICENSED PROFESSIONAL ENGINEER
R.AKHTAR
100124109
Dec 5, 2024
PROVINCE OF ONTARIO

Client/Project Logo

Client/Project
QUADREAL PROPERTY GROUP

INDUSTRIAL DEVELOPMENT

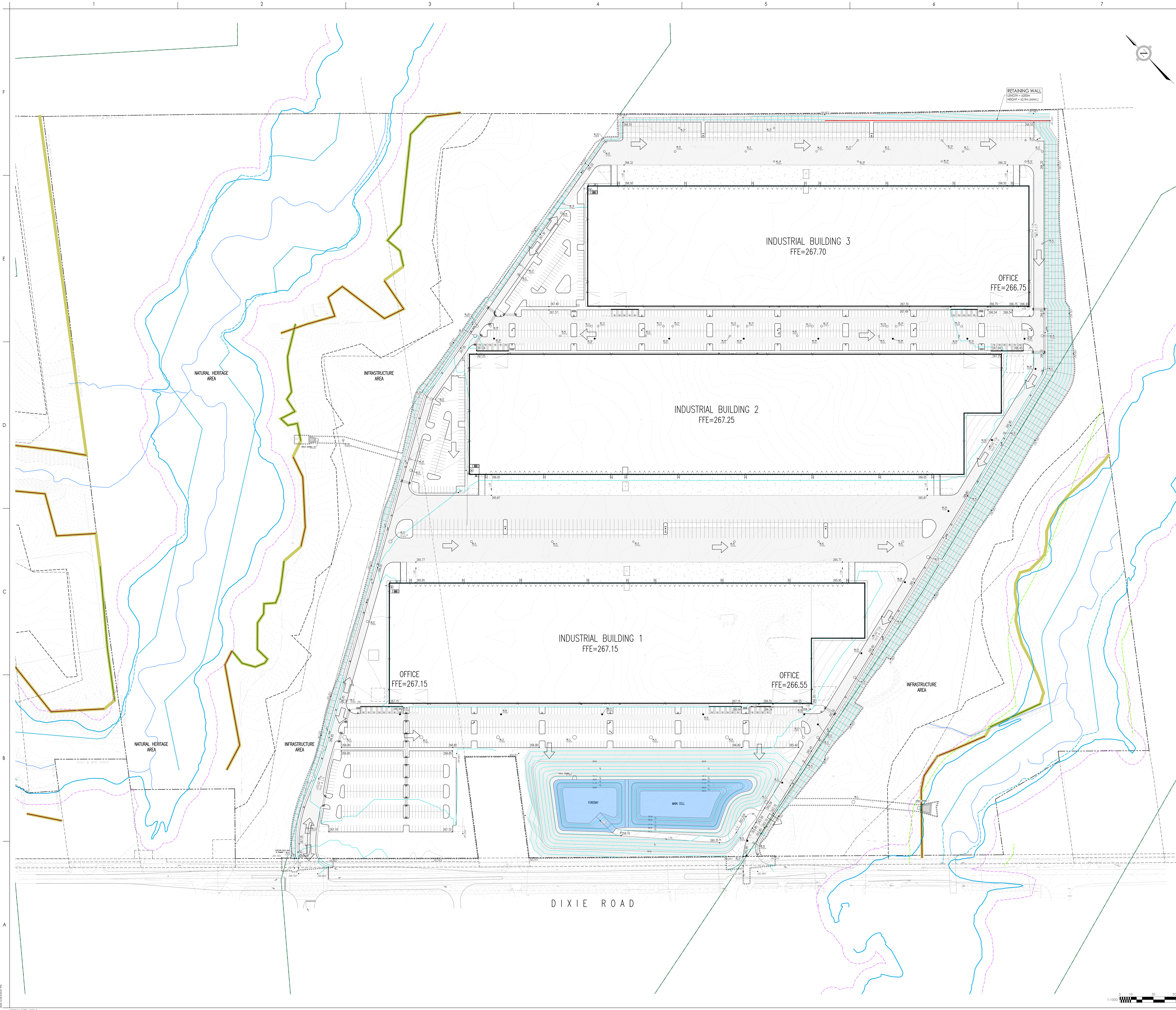
12489 & 12861 Dixie Road, Caledon, ON

Title

CONCEPTUAL GRADING PLAN
(1 OF 2)

Project No.	Scale
1606 23114	1:1000

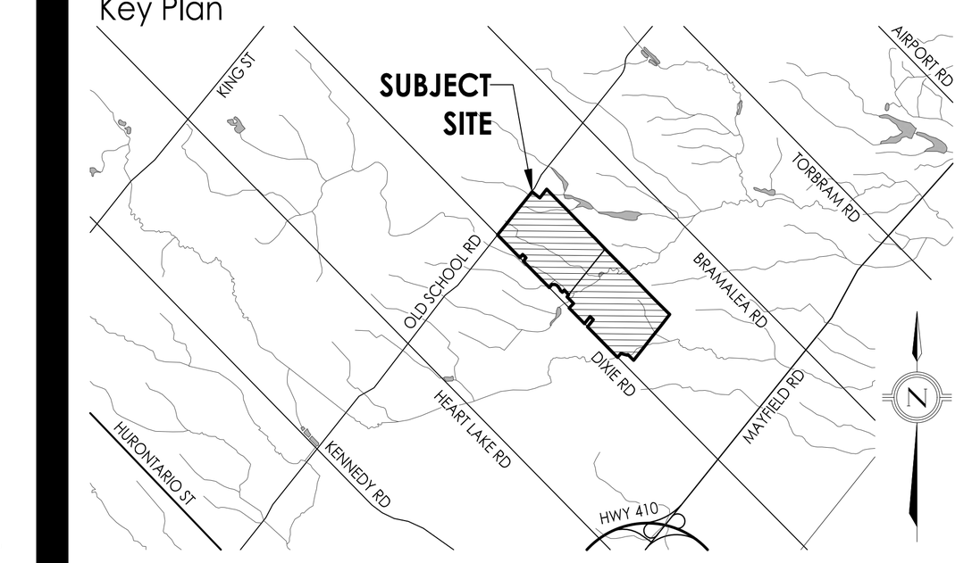
Revision	Sheet	Drawing No.
0	of	C-112



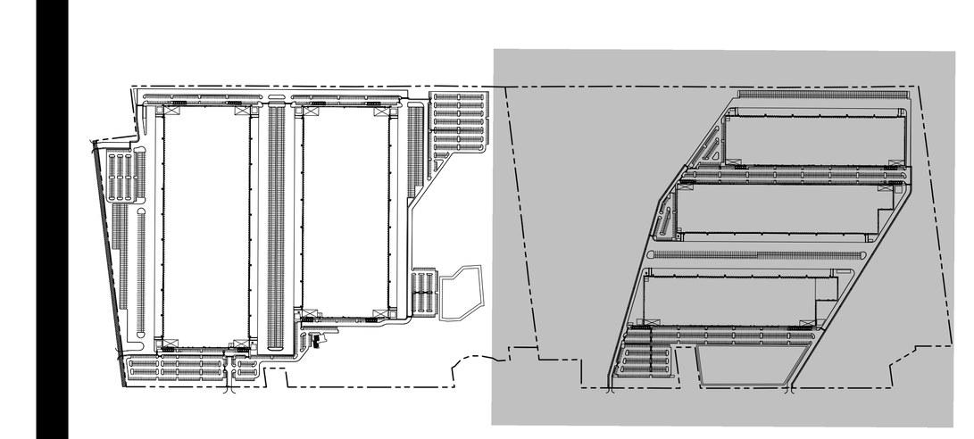
Stantec

Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham ON L3R 0B8
Tel: (905) 944-7777
www.stantec.com

Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- LIMIT OF CONSTRUCTION
- RETAINING WALL
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STAKED BY TRCA, AUGUST 24, 2023)
- WATERCOURSE
- FLOODPLAIN (TRCA)
- 10m SETBACK FROM REGIONAL FLOODLINE (STANTEC, 2023)
- VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
- 10m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
- 30m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
- MEANDERBELT WIDTH (GEOMORPHIX, OCTOBER 2023)
- MEANDERBELT WIDTH TRUNCATED AT TOE OF SLOPE (GEOMORPHIX, OCTOBER 2023)
- REDSIDE DACE HABITAT EXTENT (MEANDERBELT + 30m)
- HEAVY DUTY ASPHALT
- 266.80 PROPOSED ELEVATION
- T/C=266.95 TOP OF CURB ELEVATION
- TW=267.10 TOP OF WALL ELEVATION
- BW=266.20 BOTTOM OF WALL ELEVATION
- 266.09 (EX) EXISTING ELEVATIONS
- OVERLAND FLOW
- SANITARY MANHOLE
- STORM MANHOLE
- STORM HEADWALL
- SIAMESE CONNECTION
- V&B VALVE AND VALVE BOX
- PIV POST INDICATOR VALVE c/w SUPERVISORY SWITCH AND LOCK
- HYD HYDRANT
- M WATER METER
- B BACKFLOW PREVENTER

Notes

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3. FOR NOTES, DETAILS, AND PROJECT REQUIREMENTS, REFER TO NOTES & DETAILS SHEETS ON DRAWING C-501

Benchmark

1. SURVEY PREPARED BY J.D. BARNES, REFERENCE No. 22-30-852-00-B-TOPO, DATED APRIL 28, 2022.
2. ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE CITY OF BRAMPTON BENCHMARKS:
No. 042200367, ELEVATION = 257.317m
No. 042200366, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD

Issued	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06

File Name: 160623114_COMB_C-111GP	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	BC	BC	RA	2024.12.04

Permit/Seal

LICENSED PROFESSIONAL ENGINEER
R.AKHTAR
100124109
Dec 5, 2024
PROVINCE OF ONTARIO

Client/Project Logo

Client/Project
QUADREAL PROPERTY GROUP

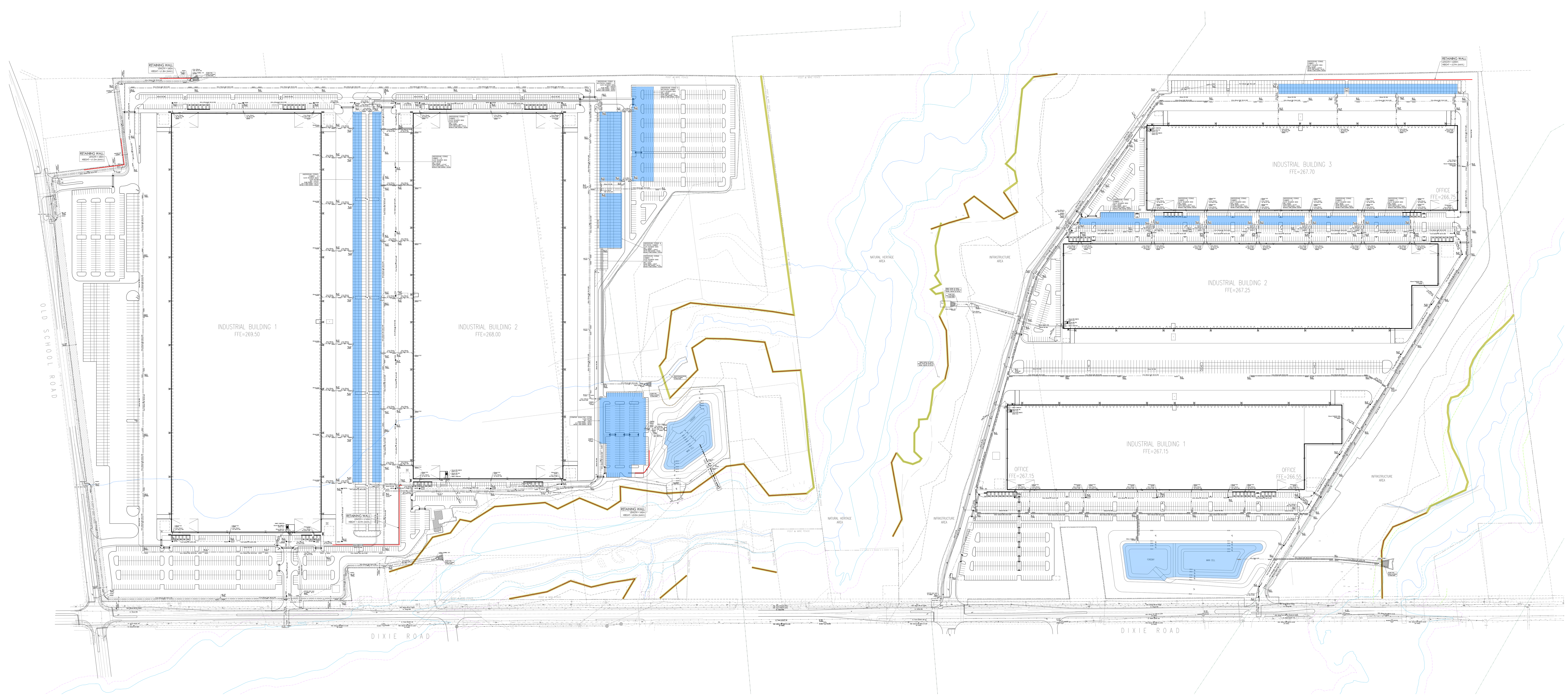
INDUSTRIAL DEVELOPMENT

12489 & 12861 Dixie Road, Caledon, ON

Title

CONCEPTUAL GRADING PLAN
(2 OF 2)

Project No. 1606 23114
Scale 1:1000
Revision 0
Sheet of
Drawing No. C-113



Stantec

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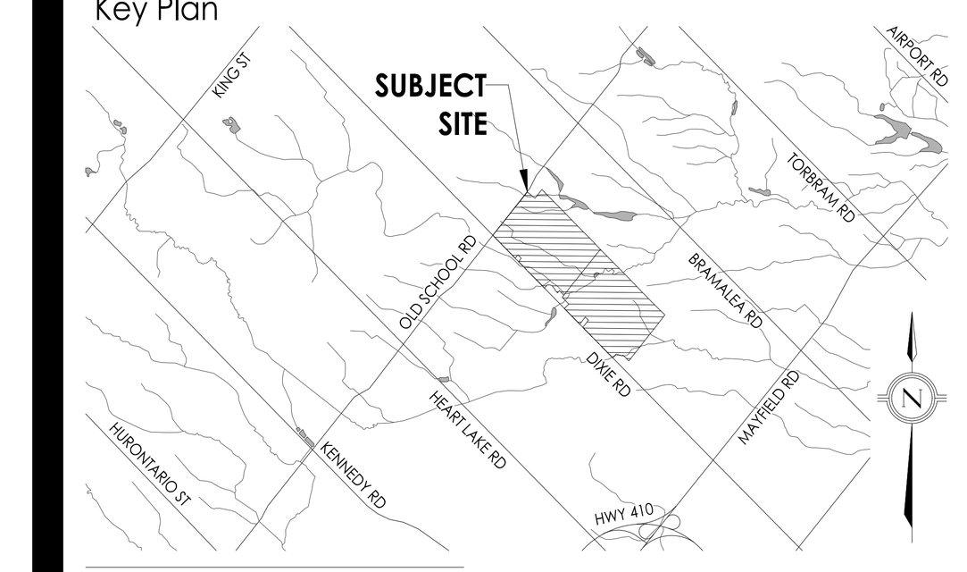
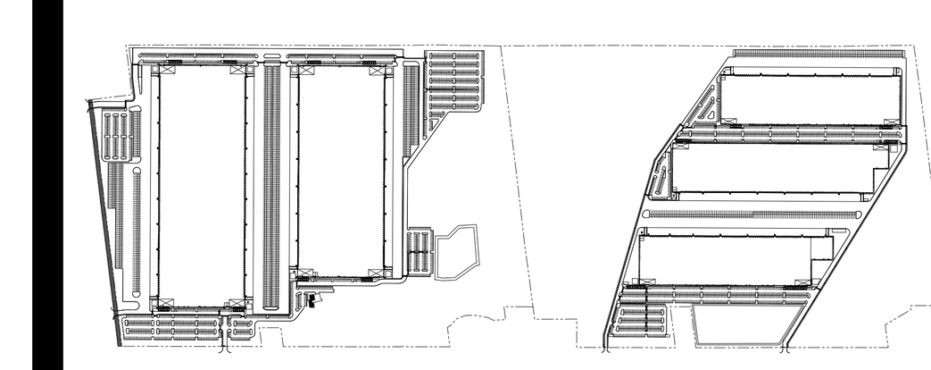
Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- LIMIT OF CONSTRUCTION
- WATERMAIN
- STORM SEWER
- STORM CULVERT
- SANITARY SEWER
- RETAINING WALL
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STAKED BY TRCA, AUGUST 24, 2023)
- WATERCOURSE
- FLOODPLAIN (TRCA)
- 10m SETBACK FROM REGIONAL FLOODLINE (STANTEC, 2023)
- VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
- 10m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
- 30m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
- MEANDERBELT WIDTH (GEOMORPHIX, OCTOBER 2023)
- MEANDERBELT WIDTH TRUNCATED AT TOE OF SLOPE (GEOMORPHIX, OCTOBER 2023)
- REDSIDE DACE HABITAT EXTENT (MEANDERBELT + 30m)
- SANITARY MANHOLE
- STORM MANHOLE
- STORM HEADWALL
- SIAMESE CONNECTION
- V&B VALVE AND VALVE BOX
- PIV POST INDICATOR VALVE c/w SUPERVISORY SWITCH AND LOCK
- HYD HYDRANT
- WATER METER
- BACKFLOW PREVENTER

Notes

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Benchmark

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No. 042200366, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD
A RE-ISSUED FOR ZBA	BC	RA	2024.12.06
Issued	By	Appd	YYYY.MM.DD

File Name: 160623114_COMB_C-121UG	BC	BC	RA	2024.12.06
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit/Seal

Client/Project Logo

Client/Project
QUADREAL PROPERTY GROUP

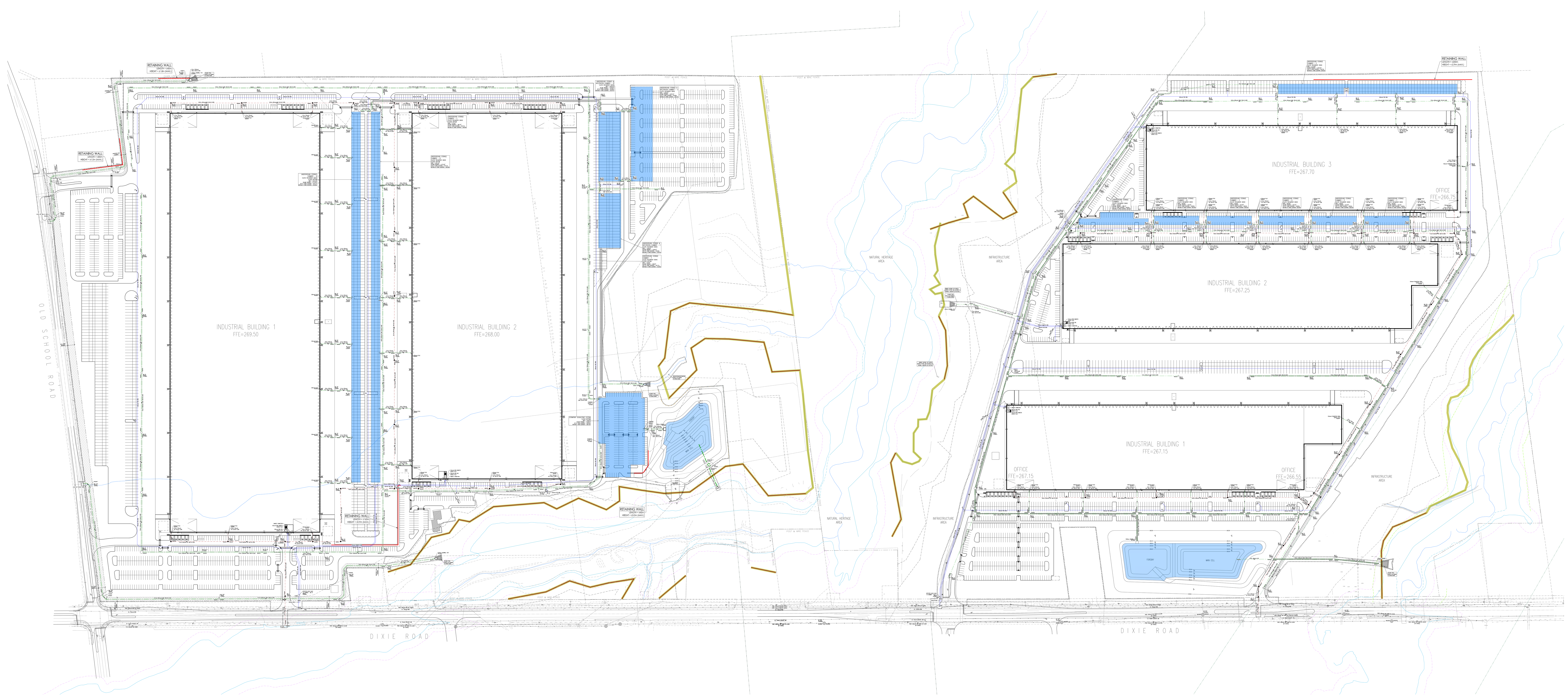
INDUSTRIAL DEVELOPMENT

12489 & 12861 Dixie Road, Caledon, ON

Title

CONCEPTUAL SERVICING PLAN (OVERALL VIEW)

Project No. 1606 23114
Scale 1:2000
Revision 0
Sheet of
Drawing No. C-121



Stantec

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Tel: (905) 944-7777
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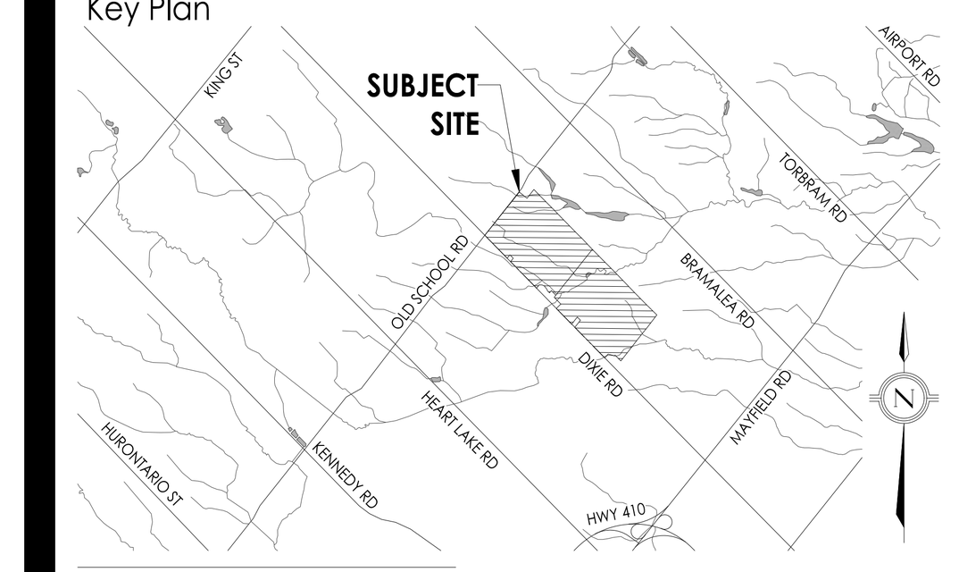
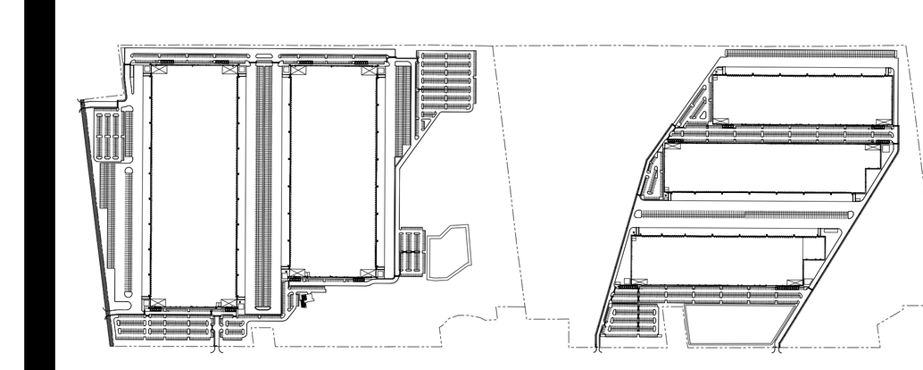
Key Plan



Context Plan



Legend

- PROPERTY BOUNDARY
- LIMIT OF CONSTRUCTION
- WATERMAIN
- STORM SEWER
- STORM CULVERT
- SANITARY SEWER
- RETAINING WALL
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STAKED BY TRCA, AUGUST 24, 2023)
- WATERCOURSE
- FLOODPLAIN (TRCA)
- 10m SETBACK FROM REGIONAL FLOODLINE (STANTEC, 2023)
- VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
- 10m SETBACK FROM VALLEYLAND FEATURE LIMIT (STANTEC, 2023)
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- V&B VALVE AND VALVE BOX
- PIV POST INDICATOR VALVE c/w SUPERVISORY SWITCH AND LOCK
- HYD HYDRANT
- WATER METER
- BACKFLOW PREVENTER

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   No. 042200366, ELEVATION = 251.500m

Revision	By	Appd	YYYY.MM.DD

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File Name: 160623114_COMB_C-121UG	BC	BC	RA	2024.12.06
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit/Seal

LICENSED PROFESSIONAL ENGINEER
R.AKHTAR
100124109
Dec 5, 2024
PROVINCE OF ONTARIO

Client/Project Logo

Client/Project
QUADREAL PROPERTY GROUP

INDUSTRIAL DEVELOPMENT

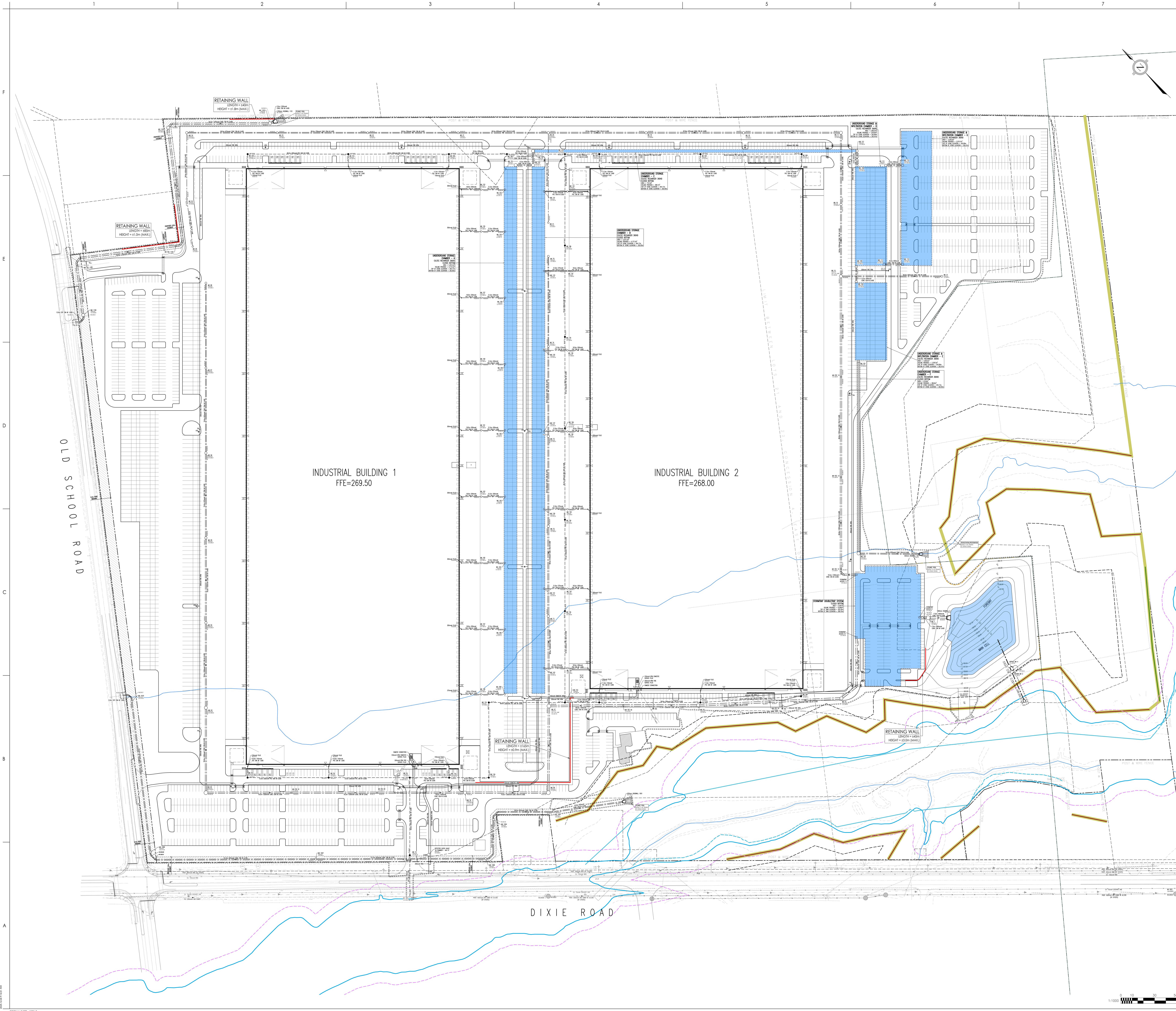
12489 & 12861 Dixie Road, Caledon, ON

Title

CONCEPTUAL SERVICING PLAN (OVERALL VIEW - COLOUR)

Project No.	Scale
1606 23114	1:2000

Revision	Sheet	of	Drawing No.
0			C-121c



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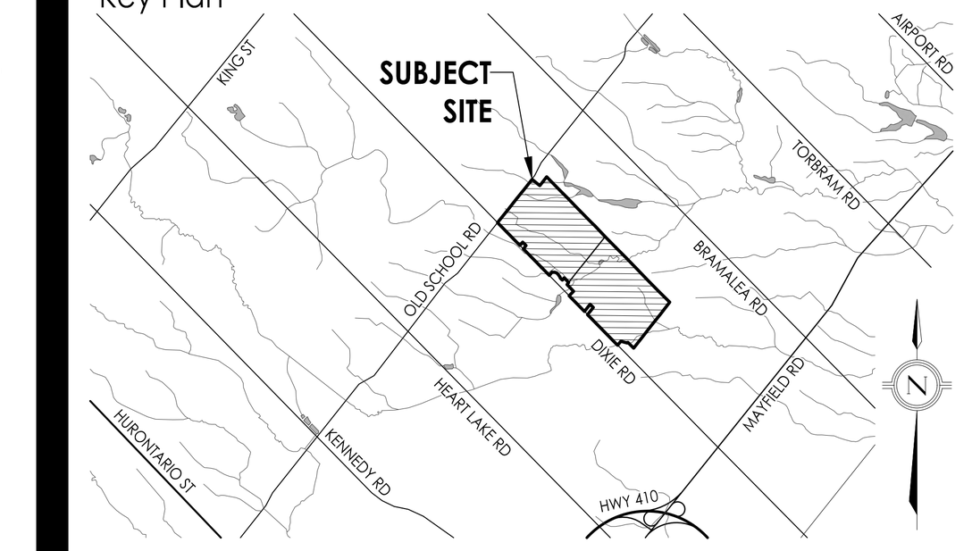
www.stantec.com

Key Plan



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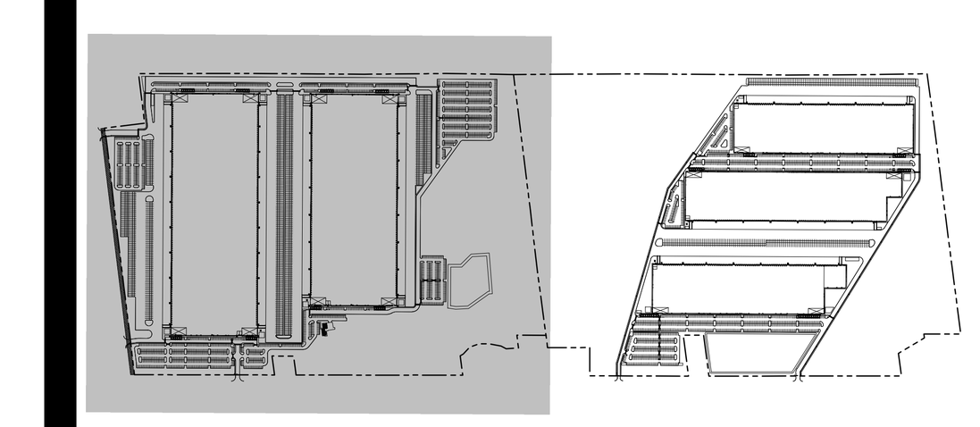

Legend

- PROPERTY BOUNDARY
- LIMIT OF CONSTRUCTION
- WATERMAIN
- STORM SEWER
- STORM CULVERT
- SANITARY SEWER
- RETAINING WALL
- DRIPLINE (AS STAKED BY TRCA, AUGUST 24, 2023)
- TOP OF BANK (AS STAKED BY TRCA, AUGUST 24, 2023)
- WATERCOURSE
- FLOODPLAIN (TRCA)
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LICENSED PROFESSIONAL ENGINEER
R.AKHTAR
100124109
Dec 5, 2024
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Client/Project Logo

Client/Project
QUADREAL PROPERTY GROUP

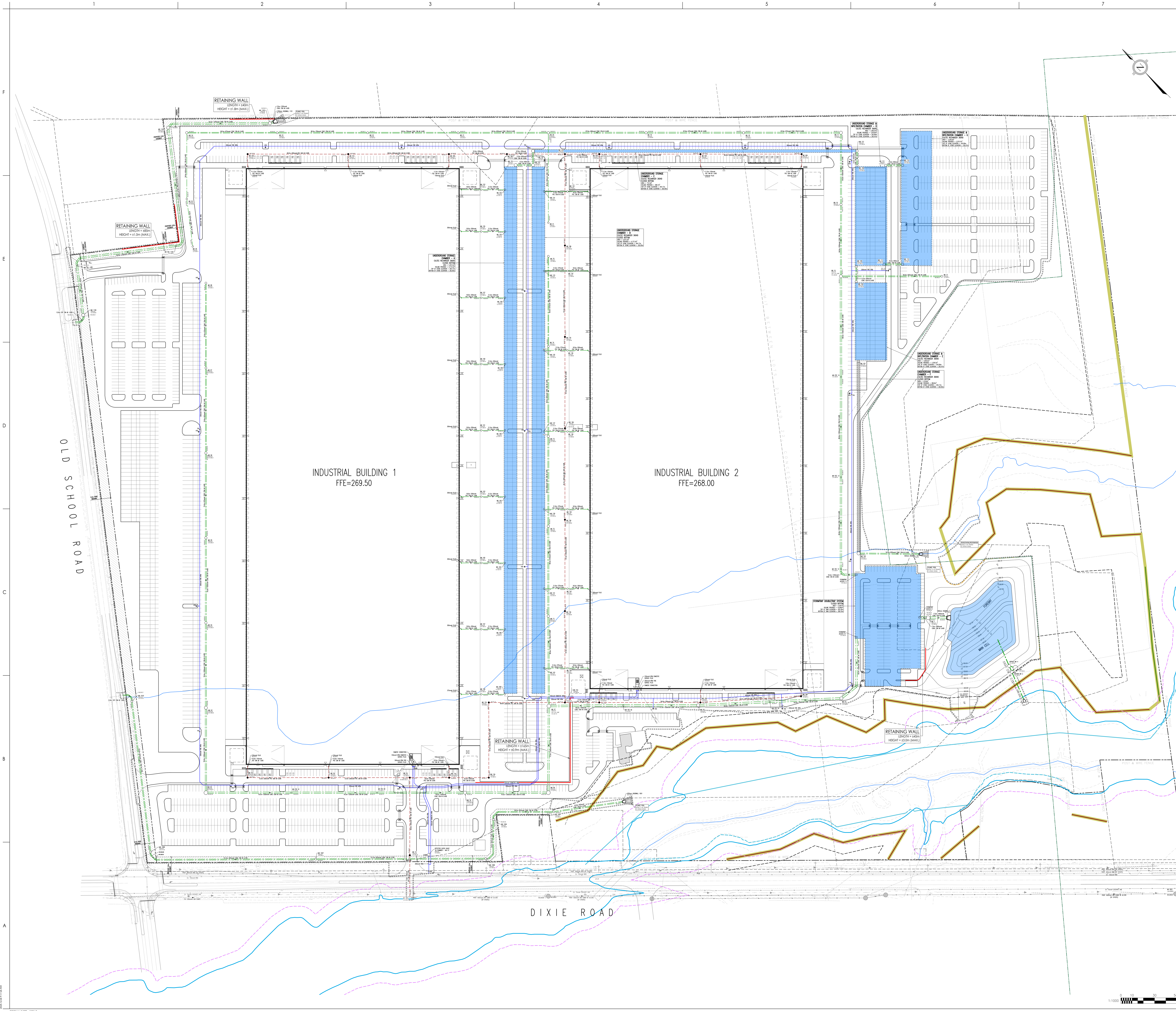
INDUSTRIAL DEVELOPMENT

12489 & 12861 Dixie Road, Caledon, ON

Title

CONCEPTUAL SERVICING PLAN
(1 OF 2)

Project No. 1606 23114
Scale 1:1000
Revision 0
Sheet of
Drawing No. C-122



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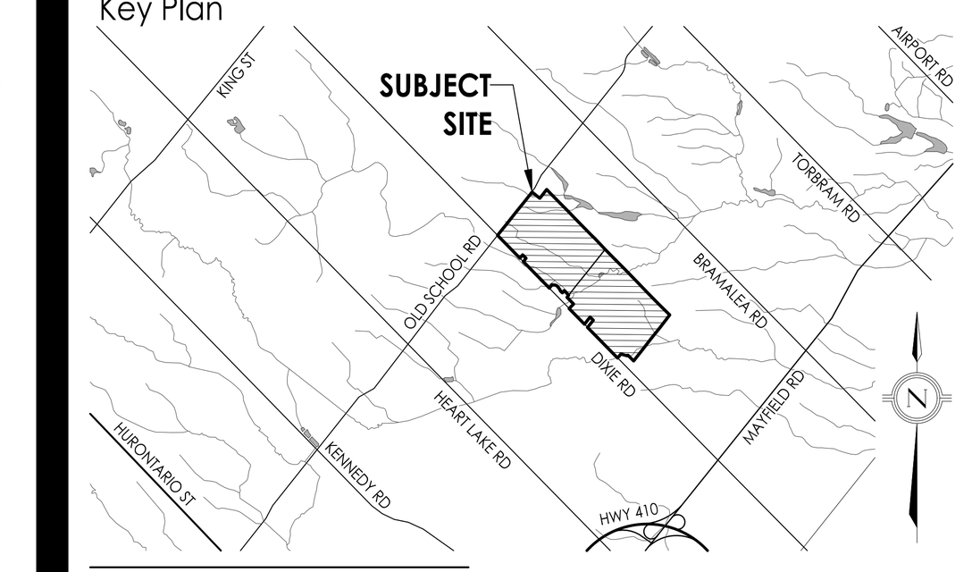
Key Plan



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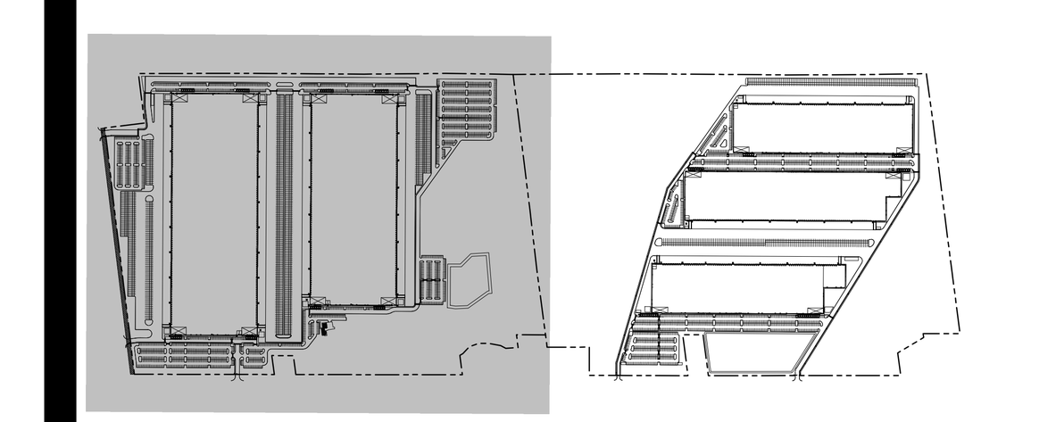

Legend

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1606 23114	1:1000

Revision	Sheet	Drawing No.
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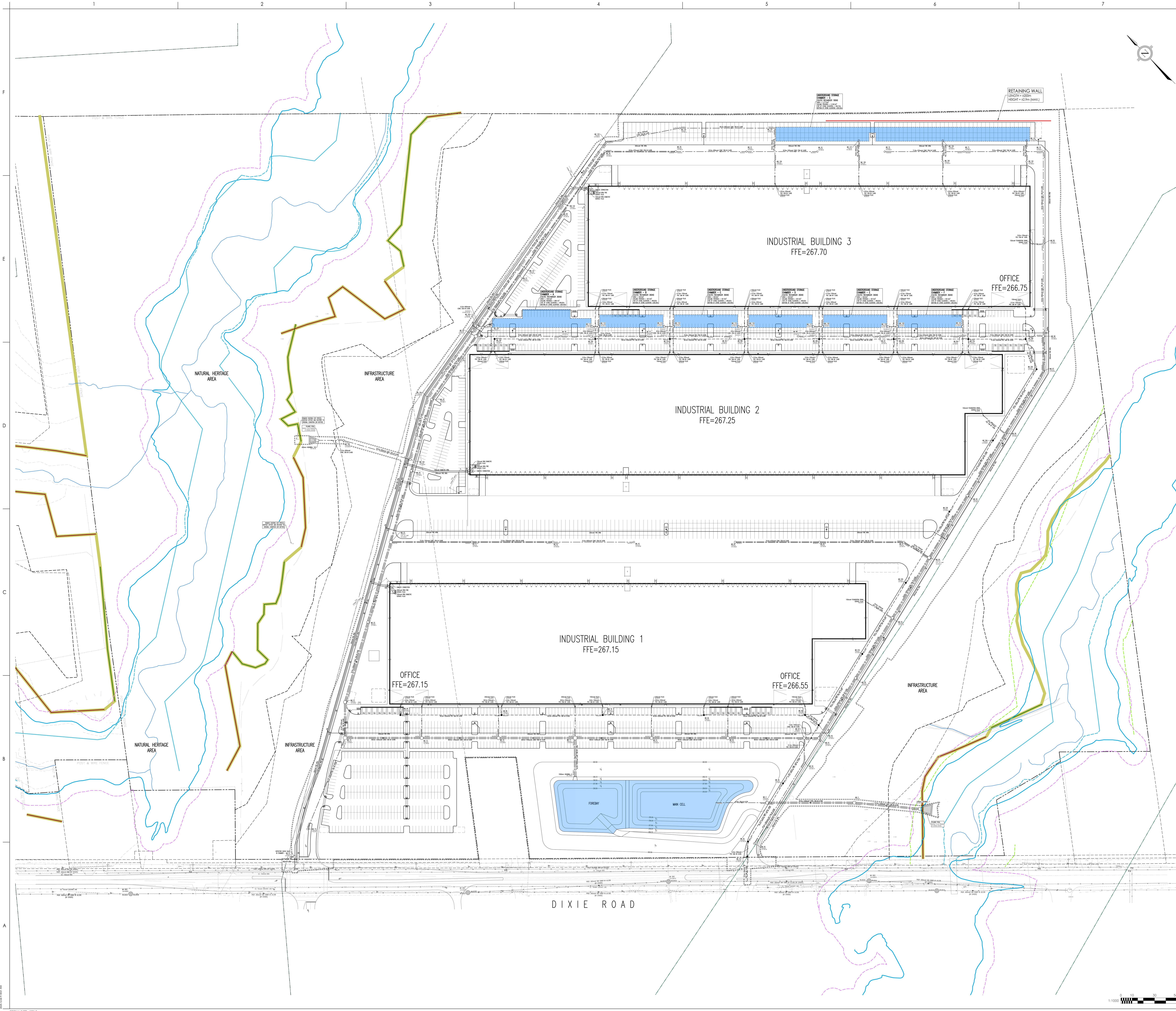

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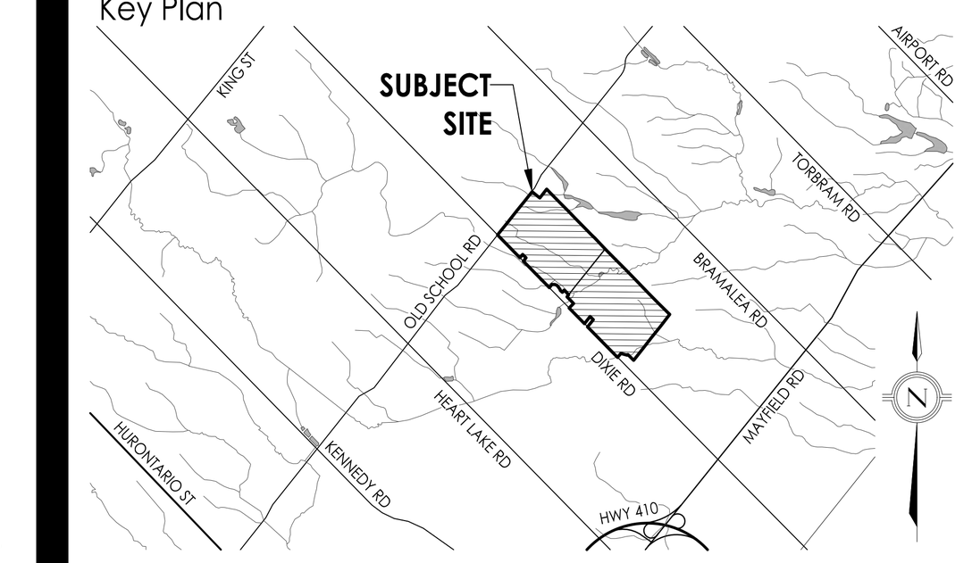

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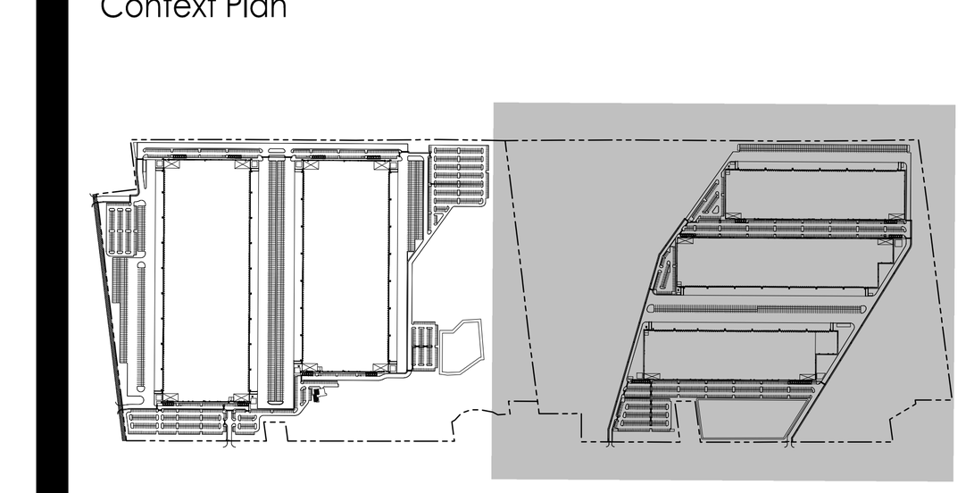

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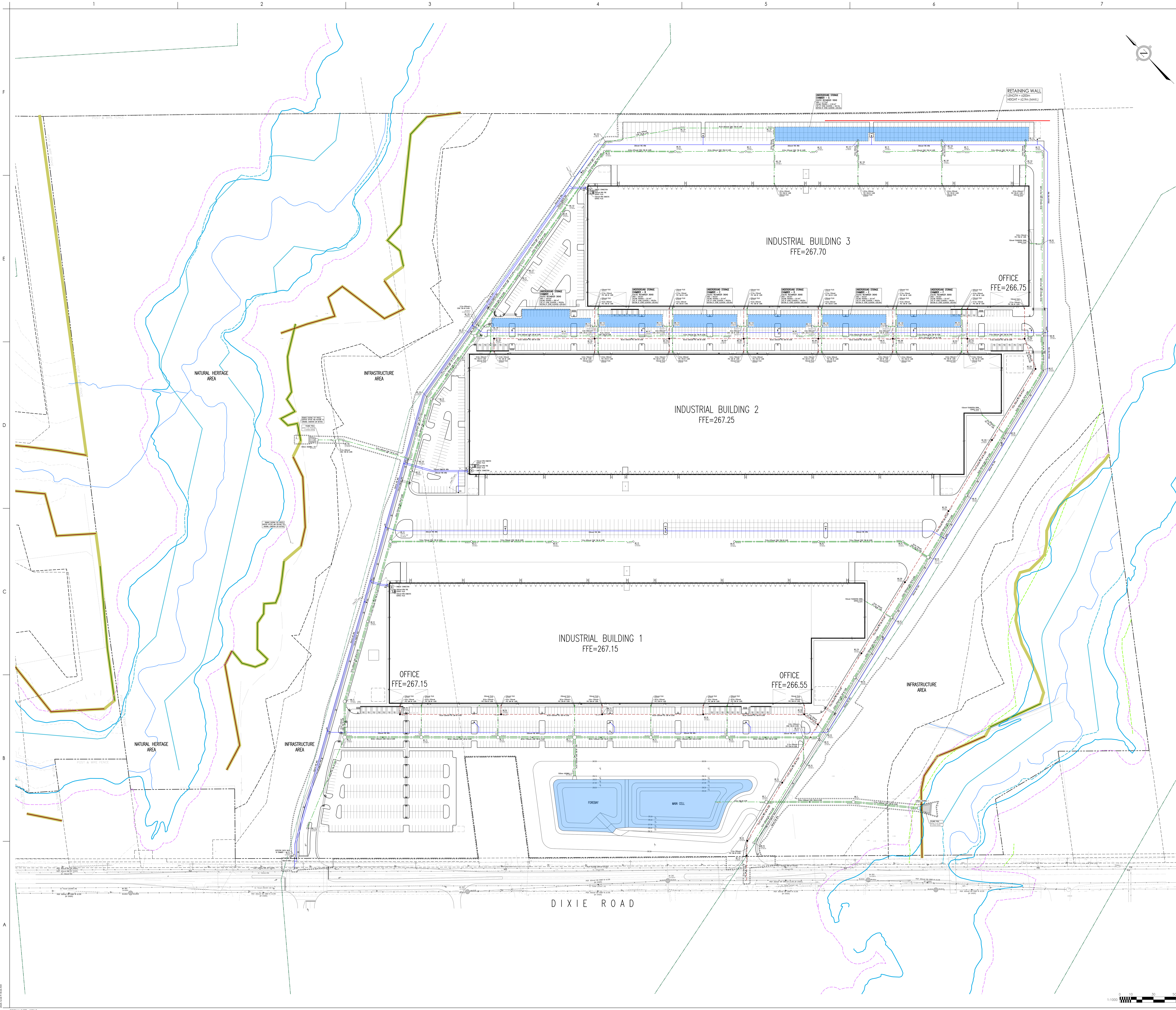
CONCEPTUAL SERVICING PLAN
(2 OF 2)

Project No.	Scale
1606 23114	1:1000

Revision	Sheet	Drawing No.
0	of	C-123



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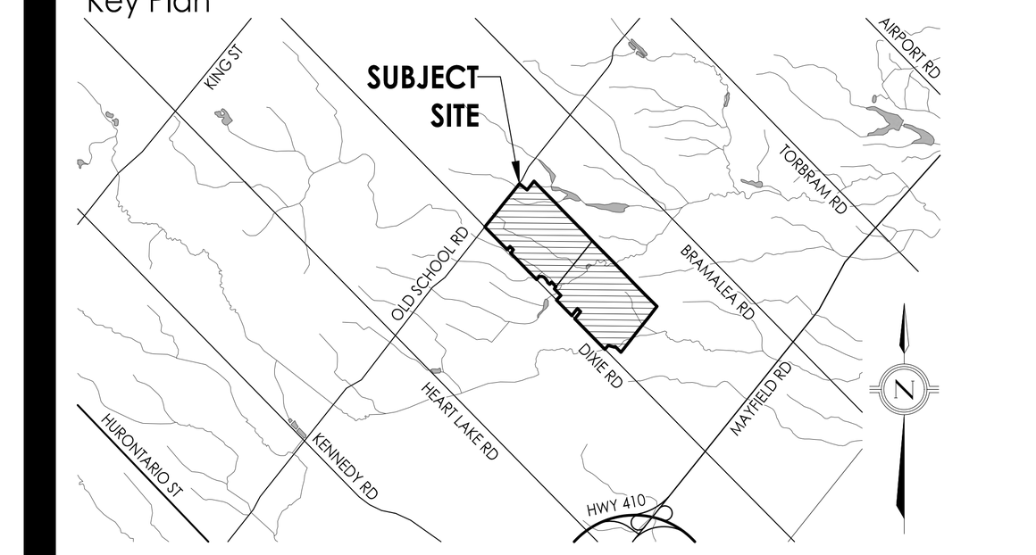

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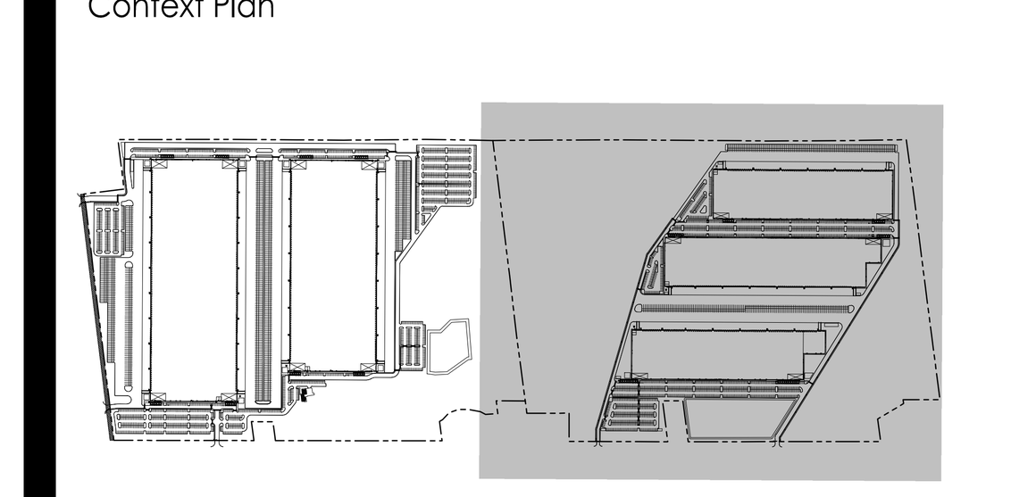

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0

Sheet
of

Drawing No.
C-123c

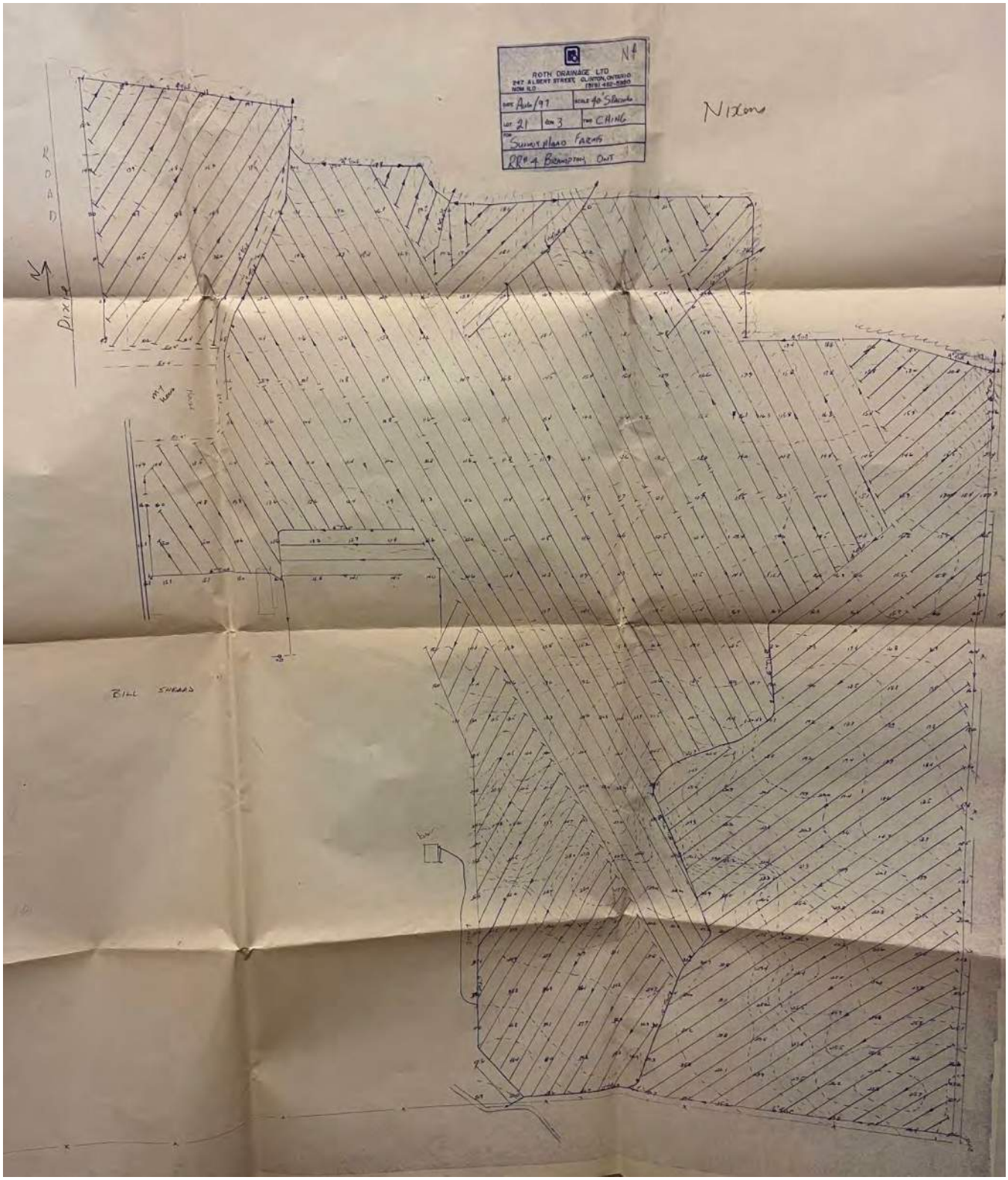
Appendix A Record Drawings

APPENDICES

Appendix A Record Drawings

SOUTH SITE

EXISTING DRAINAGE TILE LAYOUT



CON. 4 E.H.S. (CHING)

CON. 5 E.H.S. (CHING)

OLD SCHOOL RD

TORBRAM RD

DIXIE RD

BRAMALEA RD

MAYFIELD RD

LOT 22

LOT 21

LOT 20

LOT 19

LOT 18

A1 A2 EPA2 OS-411 A1-532 OS-416-E OS-416 OS A1-115 As per O.Reg 157/22 I

This copy is provided for convenience only. If necessary, the original may be referred to in the office of the Town Clerk.

INDEX MAP
Not to scale

A2 ZONE SYMBOL

A2-### ZONE SYMBOL
Note: Number of suffixes represent Exceptions which can be looked up in the Exceptions section of the By-law.

ZONE BOUNDARY

STRUCTURAL ENVELOPE MAP

NIAGARA ESCARPMENT DEVELOPMENT CONTROL AREA
Lands lying within the Development Control area pursuant to the Niagara Planning and Development Act are subject to permit requirements under Ontario Regulations 685/50, as amended.

OAK RIDGES MORAINE CONSERVATION PLAN AREA BOUNDARY

WELLHEAD PROTECTION AREA BOUNDARY
WP-2 WP-5 WP-10 WP-25
Zone Maps amended to indicate the 2, 5, 10, and 25 year Wellhead Protection Areas.

BY-LAW 2006-50

ZONE MAP 5

SCHEDULE "A"

0 140 280 560 m

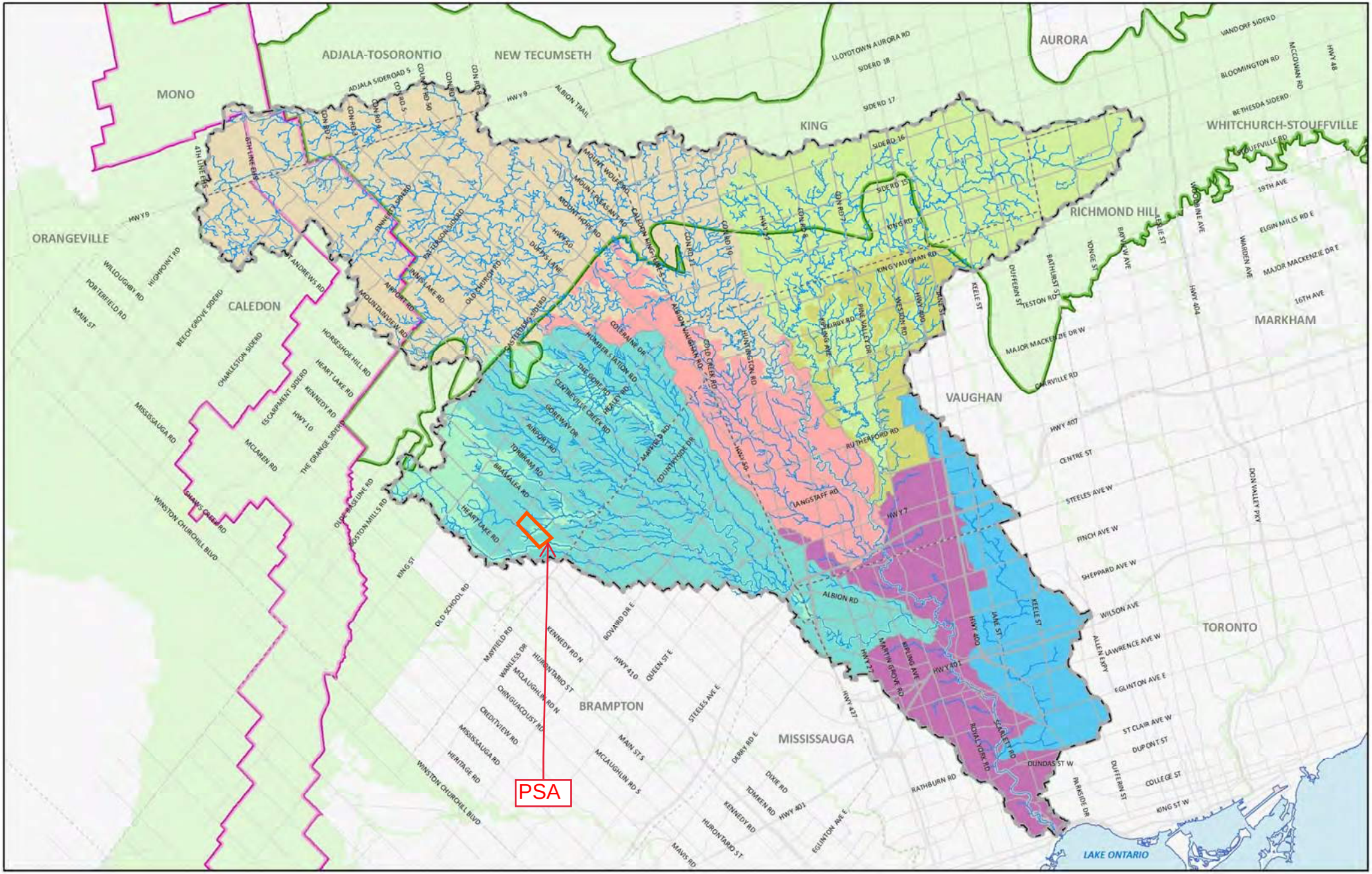
TOWN OF CALEDON

Date: 3 April 2006

Revised: June 22, 2022

File: S:\POLICY SECTION\GIS\zoning_bylaw\2015_mxd

5



Toronto and Region Conservation Authority

N

Created by: TRCA Information Technology and Records Management
Date: Friday, December 17, 2021
Disclaimer:
The data used to create this map was compiled from a variety sources & dates. The TRCA takes no responsibility for errors or omissions in the data and retains the right to make changes & corrections at anytime without notice. For further information about the data on this map, please contact the TRCA GIS Department. (416) 661-6600.

Humber River Subwatersheds

0 1 2 4 6 8 10 KM

- Humber River Watershed Plan Boundary
- Municipal Boundary
- Watercourse
- Shoreline
- Niagara Escarpment Plan
- Oak Ridges Moraine Conservation Plan
- Greenbelt
- Black Creek
- East Humber
- Lower Humber
- Main Humber
- West Humber

Schedule A

TOWN OF CALEDON LAND USE PLAN

The Town of Orangeville has undertaken studies, which have not been supported by the Region of Peel and the Town of Caledon, relating to the possibility of an expansion of the Orangeville settlement area into its neighbouring municipalities, including the Town of Caledon

Refer to OPA #150
Refer to Explanatory Notes of the Official Plan
Refer to OPA #161/124
Refer to OPA #122
Refer to OPA #241
Refer to OPA #156
See Section 5.2.3.2
See Section 5.2.3.7
Refer to OPA #163
Refer to OPA #133
See Section 3.2.4.16
For details of this area refer to the Caledon Village Land Use Plan Schedule "E"
Refer to OPA #171
Refer to OPA #210
Refer to OPA #98
Reddington Retirement Community
For details of this area refer to the applicable Palgrave Estate Residential Community Schedules "G, H, & I"
Refer to OPA #217
Bolton Golf Course Estate Residential
For details of this area refer to the Caledon East Land Use Plan Schedule "D"
Refer to OPA #234
Refer to OPA #195
Refer to OPA #65
For details of this area refer to Inglewood & Area Land Use Plan Schedule "M"
For details of this area refer to Sandhill Secondary Plan Schedule "T"
Refer to OPA #227
Terra Cotta Special Residential Area
PSA
For details of this area refer to Victoria Business Park Land Use Plan Schedule "R"
See Section 5.1.3.1.5
Refer to OPA #148
Refer to OPA #2
For details of this area refer to Tullamore Secondary Plan Schedule "N"
For details of this area refer to Bolton Land Use Plan Schedule "C"
Refer to OPA #101 and OPA #232
For details of this area refer to Schedule B-2 Mayfield West Phase 2 Secondary Plan Land Use Plan
For details of this area refer to Mayfield West Land Use Plan Schedule "B"

Alton
Melville
Mono Mills
Caledon Village
Cataract
Belfountain
Inglewood
CALEDON EAST
Mono Road
Claude
Cheltenham
Campbells Cross
Victoria
Terra Cotta
Sandhill
Albion
Palgrave
Tullamore
Wildfield
BOLTON
MAYFIELD WEST
Tottenham
Nobleton
Erin

- General Agricultural Area
- Prime Agricultural Area
- Rural Lands
- Extractive Industrial Area
- Waste Management Area
- Open Space Policy Area
- Environmental Policy Area
- Estate Residential Area
- Retirement Community Area
- Settlement Area
- Mayfield West Study Area Boundary
- Boundary of Greenbelt Plan Area
- Oak Ridges Moraine Conservation Plan Area
- Niagara Escarpment Plan Area

- Provincial Road
- Regional Road
- Local Road
- Railway
- Caledon Trailway

Base Data Source: Town of Caledon

0 0.5 1 2 3 4 5 km

SAVED: 2 April 2018

FILE: S:\POLICY SECTIONGIS\official_plan\mxd\9-april_2018

SAVED BY: bloverock

April 2018 Office Consolidation

Schedule A1

TOWN OF CALEDON TOWN STRUCTURE

Greenbelt Designations

- Greenbelt Plan Area
- Greenbelt Plan Protected Countryside Designation
- Niagara Escarpment Plan Area
- Oak Ridges Moraine Conservation Plan Area

- Agricultural and Rural Area of the Growth Plan
- Mayfield West Study Area Boundary
- Coulterville Special Study Area
- Palgrave Estate Residential Community
- Lake Simcoe Protection Plan Area

- Rural Service Centre
- Village
- Hamlet
- Industrial/Commercial Centre

- Provincial Road
- Regional Road
- Local Road
- Railway

PSA

Base Data Source: Town of Caledon

0 0.5 1 2 3 4 5 km

Greenbelt Plan - MNR 28 February 2005 (retroactive 16 December 2004)

April 2018 Office Consolidation

SAVED: 2 April 2018

FILE: S:\POLICY SECTION\GIS\official_plan\mxd\9-april_2018

SAVED BY: bloverock

TOWN OF CALEDON

Schedule O

WELLHEAD PROTECTION AREAS

- 2 Year Protection Area
- 10 Year Protection Area
- 25 Year Protection Area
- 5 Year Protection Area
- 10 Year Protection Area

Wellhead Protection Areas in Oak Ridges Moraine

- 2 Year Protection Area
- 10 Year Protection Area
- 25 Year Protection Area

- Oak Ridges Moraine Conservation Plan Area
- Settlement Area

- Provincial Road
- Regional Road
- Local Road
- Railway

Base Data Source: Town of Caledon, Greenbelt Plan 2005

NOTE:
Within the Oak Ridges Moraine Conservation Plan Area 2 year, 10 year, and 25 year wellhead protection areas are designated. Off the Oak Ridges Moraine 5 year and 10 year wellhead protection areas are designated for all other municipal wells.

0 0.5 1 2 3 4 5 km

PSA

DUFFERIN COUNTY
TOWNSHIP OF EAST GARAFRAXA
CALEDON/EAST GARAFRAXA TOWN LINE
ORANGEVILLE
DUFFERIN COUNTY
TOWN OF MONO
SIMCOE COUNTY
TOWNSHIP OF ADJALA-TOSORONTIO
TOWN OF NEW TECUMSETH
WELLINGTON COUNTY
TOWN OF ERIN
HALTON REGION
TOWN OF HALTON HILLS
YORK REGION
CITY OF VAUGHAN
TOWNSHIP OF KING
CITY OF BRAMPTON

Alton
Melville
Mono Mills
Tottenham
Caledon Village
Cataract
Erin
Palgrave
Albion
Belfountain
CALEDON EAST
Inglewood
Mono Road
Claude
Cheltenham
Sandhill
Campbells Cross
Victoria
Terra Cotta
BOLTON
Nobleton
Tullamore
Wildfield
MAYFIELD WEST

HIGHPOINT SIDE RD
PORTERFIELD RD
MAIN ST
WILLOUGHBY RD
HORSESHOE HILL RD
ST ANDREW'S RD
BEECH GROVE SIDE RD
COOLIHANS SIDE RD
HIGHWAY 9
MOUNTAINVIEW RD
SHAWS CREEK RD
CHARLESTON SIDE RD
FINNERTY SIDE RD
THE GORE RD
PATTERSON SIDE RD
MOUNT PLEASANT RD
MOUNT WOLFE RD
ESCARPMENT SIDE RD
HURONTARIO ST
AIRPORT RD
THE GRANGE SIDE RD
OLD CHURCH RD
DUFFYS LN
HIGHWAY 50
MOUNT HOPE RD
CASTLEDERG SIDE RD
OLD BASE LINE RD
BOSTON MILLS RD
CALEDON KING TOWN LINE S
KING ST
HUMBER STATION RD
LAKE RD
QUEEN ST
ALBION VAUGHAN RD
WINSTON CHURCHILL BLVD
MISSISSAUGA RD
HERITAGE RD
CREDITVIEW RD
CHINGUACOUSY RD
MCLAUGHLIN RD
KENNEDY RD
HEART LAKE RD
DIXIE RD
BRAMALEA RD
TORBRAM RD
OLD SCHOOL RD
MAYFIELD RD

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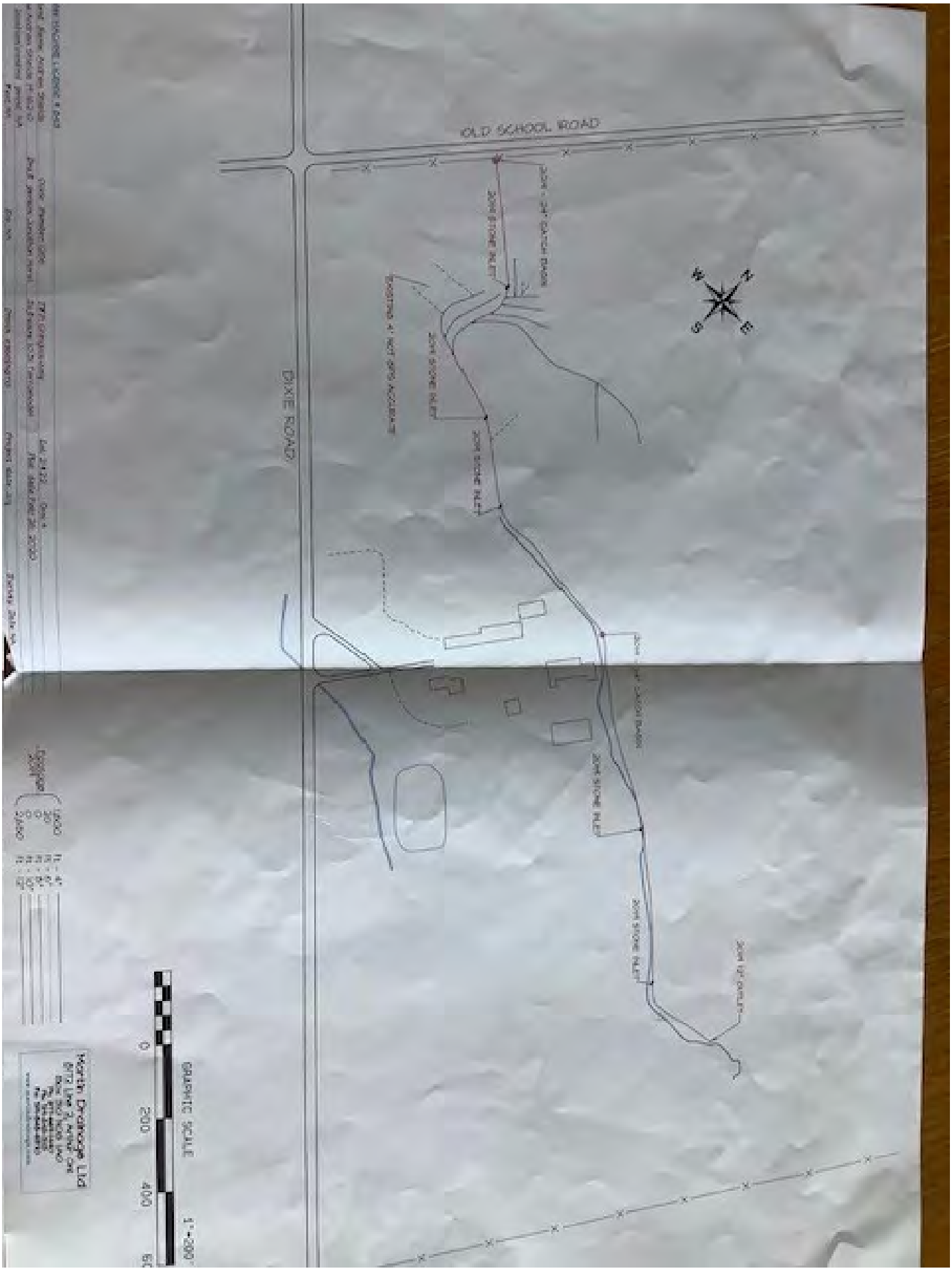
April 2018 Office Consolidation

Appendix A Record Drawings

NORTH SITE

EXISTING DRAINAGE TILE LAYOUT



Appendix B Stormwater Detention and Retention Calculations

SOUTH SITE

EXISTING CONDITIONS

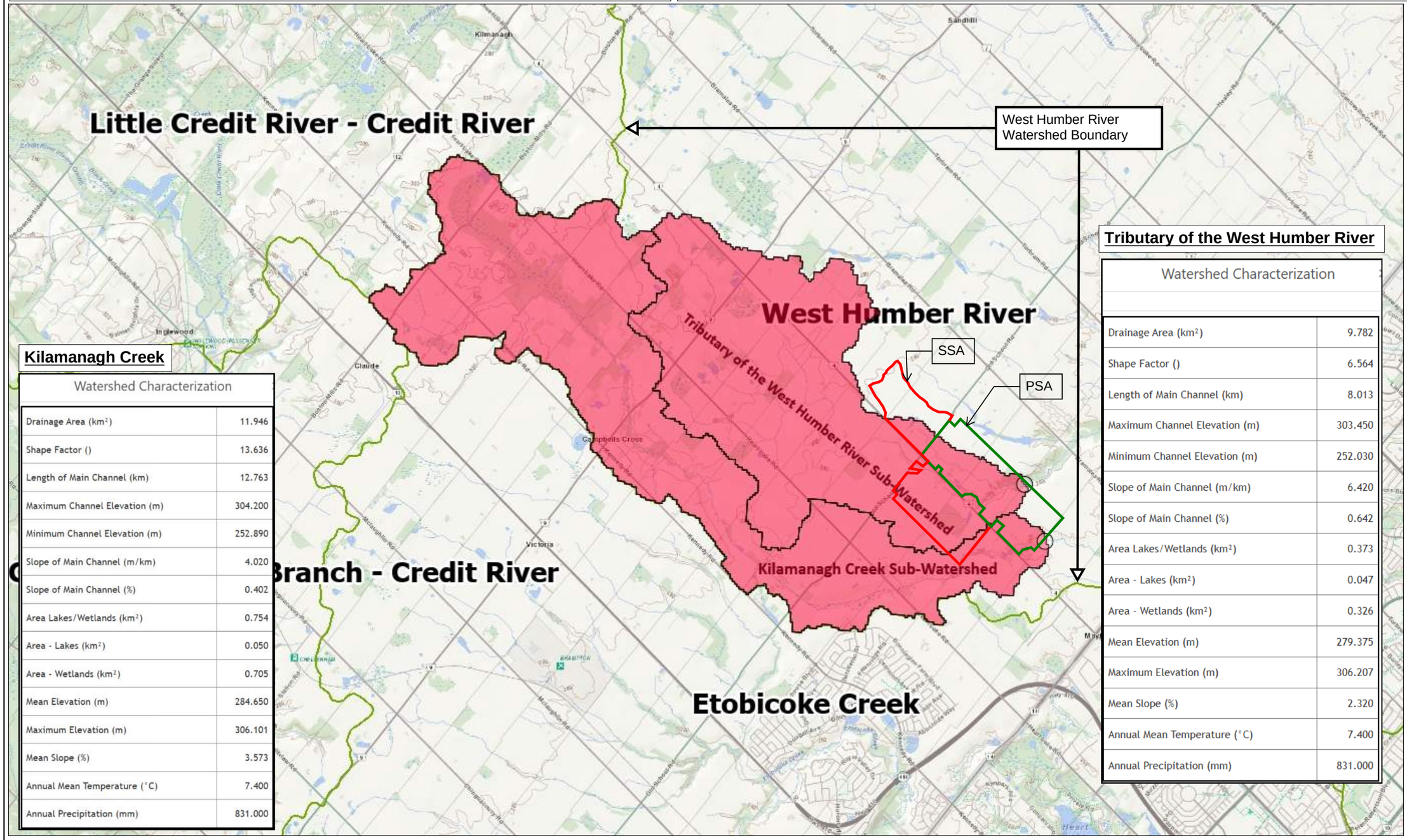
Ontario

Ministry of Natural Resources

Ontario Watershed Information Tool

Watershed Mapping

Notes:



Kilamanagh Creek

Watershed Characterization

Drainage Area (km²)	11.946
Shape Factor ()	13.636
Length of Main Channel (km)	12.763
Maximum Channel Elevation (m)	304.200
Minimum Channel Elevation (m)	252.890
Slope of Main Channel (m/km)	4.020
Slope of Main Channel (%)	0.402
Area Lakes/Wetlands (km²)	0.754
Area - Lakes (km²)	0.050
Area - Wetlands (km²)	0.705
Mean Elevation (m)	284.650
Maximum Elevation (m)	306.101
Mean Slope (%)	3.573
Annual Mean Temperature (°C)	7.400
Annual Precipitation (mm)	831.000

Tributary of the West Humber River

Watershed Characterization

Drainage Area (km²)	9.782
Shape Factor ()	6.564
Length of Main Channel (km)	8.013
Maximum Channel Elevation (m)	303.450
Minimum Channel Elevation (m)	252.030
Slope of Main Channel (m/km)	6.420
Slope of Main Channel (%)	0.642
Area Lakes/Wetlands (km²)	0.373
Area - Lakes (km²)	0.047
Area - Wetlands (km²)	0.326
Mean Elevation (m)	279.375
Maximum Elevation (m)	306.207
Mean Slope (%)	2.320
Annual Mean Temperature (°C)	7.400
Annual Precipitation (mm)	831.000

Legend

- Assessment Parcel
- Secondary Watershed
- Tertiary Watershed
- Quaternary Watershed
- Great Lakes - St. Lawrence Basin
- Hudson - James Bay Basin
- Nelson River Basin
- Hydrometric Monitoring Station
- Diversions
- Waterbody Outlet
- Conservation Authority Dam
- Provincial Dam
- Federal Dam
- OPG Dam
- Other Dam
- Virtual Flow Segment

Land Cover Compilation

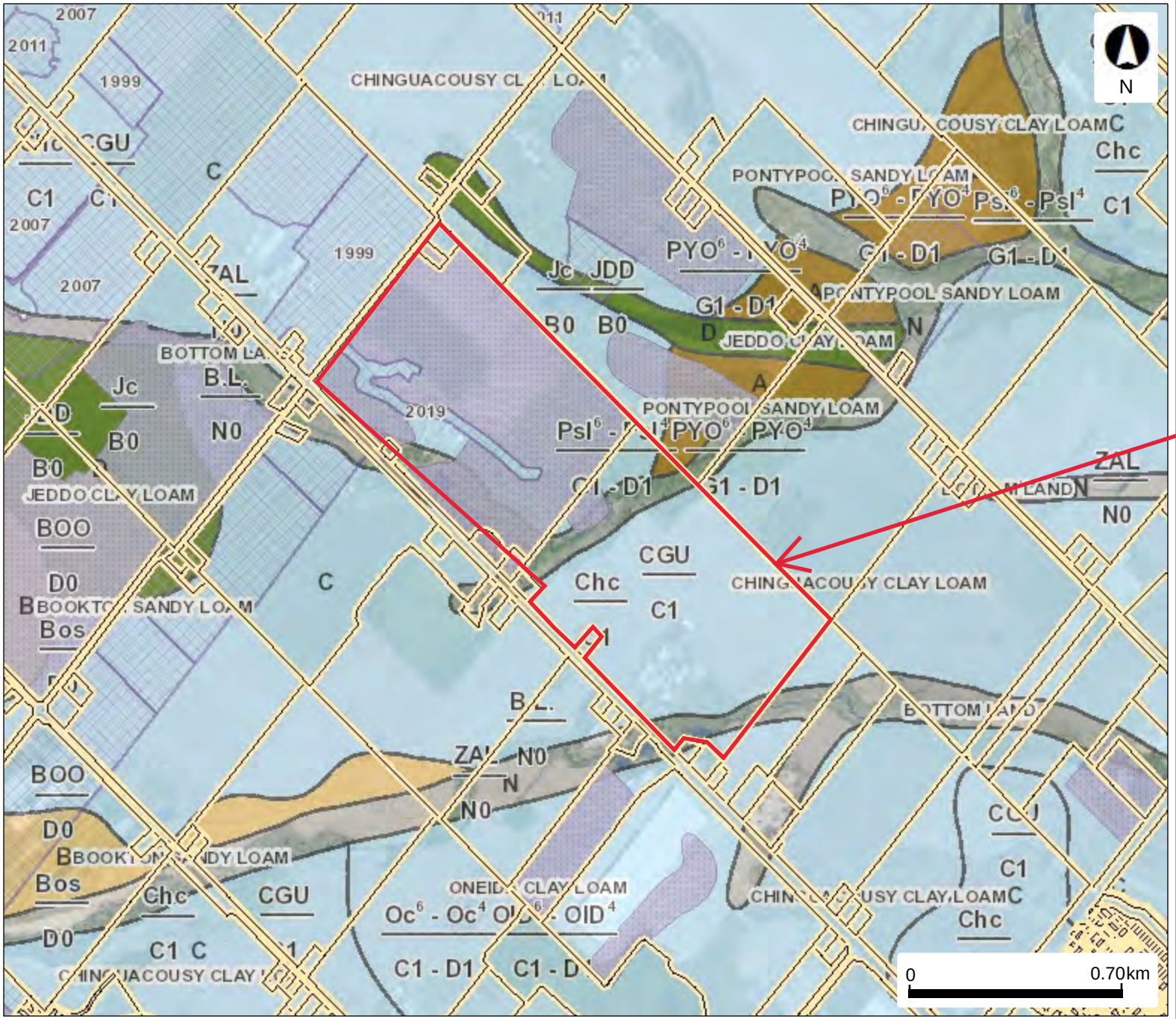
- Other
- Cloud/Shadow
- Clear Open Water
- Turbid Water
- Shoreline
- Mudflats
- Marsh
- Swamp
- Fen
- Bog
- Heath
- Sparse Treed
- Treed Upland
- Deciduous Treed
- Mixed Treed
- Coniferous Treed
- Plantations - Treed Cultivated
- Hedge Rows
- Disturbance
- Open Cliff and Talus
- Alvar
- Sand Barren and Dune
- Open Tallgrass Prairie
- Tallgrass Savannah
- Tallgrass Woodland
- Sand/Gravel/Mine Tailings/Extraction
- Bedrock
- Community/Infrastructure
- Agriculture and Undifferentiated Rural Land Use

2.4 0 km 1.19 2.4

Scale: 1 : 46,709

Projection: Web Mercator

-Caledon-Quadreal-



Legend

- Assessment Parcel
- Agricultural Tile Drainage
  - Random
  - Systematic
- Soil Name Label
- Soil Code
- Soil Symbol
- Hydrologic Soil Group
  - A - High
  - B - Moderate
  - C - Slow
  - D - Very Slow

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Map Created: 11/10/2023
Map Center: 43.77852 N, -79.80791 W

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Existing Conditions

Site Soils: Ontario Ministry of Agriculture Food and Rural Affiars **Hydrologic Soil Group**
Soil Type C
Sandy Lean Clay Per Hydro-G Report Stantec (Dec. 2023)

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

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. Chin (2000), Water-Resources Engineering, Table 6.13-Curve Numbers for Various Urban Land Uses

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
107					100			100
108					100			100

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
107	0	0	0	0	0	100	0	0	0	100.00
108	0	0	0	0	0	77	0	23	0	100.00

CURVE NUMBER (CN) - Existing Conditions												
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Weighted CN	IA	Manning's 'n'
107	0.0	0.0	0.0	0.0	0.0	82.0	0.0	0.0	0.0	82	11.15	0.13
108	0.0	0.0	0.0	0.0	0.0	63.3	0.0	18.5	0.0	82	11.15	0.16

Stantec

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Existing Conditions
NRSC (SCS) Modified Curve Number Calculation: Existing Conditions

Step	Input Values				
	Subcatchment:	107		107	108
1	**CN (AMC II):**	**82**		**82**	**82**
2	CN (AMC III) =	92		92	92
3	100 Year Precipitation, P =	89.87	mm	89.87	89.87

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

$$CN = \frac{25400}{S + 254} \qquad S = \frac{25400}{CN} - 254$$

CN* = modified SCS curve # that better reflects Ia conditions in Ontario

	Subcatchment:	107		107	108
	S_{III} =	22.09	mm	22.09	22.09
	SCS Assumption of 0.2 S = Ia =	4.42	mm	4.42	4.42
4	Q_{III} =	67.90	mm	67.90	67.90
	Preferred Initial Abstraction, Ia =	1.5	mm	1.5	1.5
5	S^*_{III} =	26.64	mm	26.64	26.64
6	CN^*_{III} =	90.51	mm	90.51	90.51
	CN^*_{III}=	**91**	Rounded	**91**	**91**
7	**CN^*_{II}=**	**80**	convert	**80**	**80**
	CN^*_{II}=	**82**	0.9 CN^*_{III}	**82**	**82**

Explanation of Procedure

1 Determine CN based on typical AMC II conditions (from our normal spreadsheet).
2 Convert CN from AMC II to AMC III conditions (standard SCS tables, as shown at side)
3 Get precipitation depth P for 100 year storm
4 Using CN_{III} with Ia = 0.2S, compute Q_{III} for 100 year precipitation
5 For the same Q_{III}, compute S^*_{III} using Ia=1.5mm (or otherwise determined from studies)
6 Compute CN^*_{III} using S^*_{III}
7 Calculate CN^*_{II} using standard SCS conversion table

Stantec

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Peak Time Calculations

									Calculations											
									C> 0.40	C < 0.40			Uplands Method							
									Bransby Williams	Airport Equation	Hyns Equation	Kirpish Equation	Forest & Meadow	Woodland	Pasture	Straight Row	Bare Soil	Grassed Waterway	Paved Areas
Catchment Number	Area (ha)	Runoff Coefficient C	Flow Path Length (m)	High Point (m)	Low Point (m)	Slope (%)	Height (m)	Log Slope (%)	Time to C (min)	Time to C (min)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)
107A	12.69	0.25	287.29	266.94	260.78	2.1	6.2	0.3	10.90	36.52	0.23	0.19	0.48	0.25	*0.17*	*0.14*	0.12	0.08	0.06
108A	29.56	0.25	629.70	266.68	257.20	1.5	9.5	0.2	23.57	60.75	0.37	0.42	1.27	0.64	*0.45*	*0.36*	0.33	0.21	0.16

Governing Time to Peak					
Catchment Number	Time to C (min)	Time to C (hr)	Time of P (min)	Time of P (hr)	Method
107A	36.52	0.61	24.47	0.41	Airport
108A	60.75	1.01	40.70	0.68	Airport

Time to Peak should be calculated as tp = 0.67 tc, where tc is Time of Concentration.

Stantec

Existing Conditions

		Existing Conditions Peak Flow (m^3/s)							
Catchment	Area	Hazel	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year	**Receiver**
107	12.69	1.637	1.440	1.196	0.980	0.695	0.495	0.249	Tributary of West Humber River
108	29.56	3.344	2.351	1.955	1.604	1.136	0.816	0.408	Kilamanagh Creek

PROPOSED CONDITIONS

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Unit Flow Relationships as per the TRCA Humber River Watershed

Return Period	Equation F Sub-Basin 36
100-Year	Q=29.912-2-316 * ln(A)
50-Year	Q=26.566-2.082 * ln(A)
25-Year	Q=22.639-1.741 * ln(A)
10-Year	Q=17.957-1.373 * ln(A)
5-Year	Q=14.652-1.136 * ln(A)
2-Year	Q= 9.506-0.719 * ln(A)

Q = L/s/ha, A = Area (ha)

		Release Rate as per Equation F Sub-Basin 36 (L/s/ha)					
Catchment	Area (ha)	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
107	12.69	24.027	21.275	18.215	14.468	11.765	7.679
108	29.56	22.069	19.516	16.743	13.307	10.805	7.071

		Release Rate as per Equation F Sub-Basin 36 (m^3/s/ha)					
Catchment	Area	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
107	12.69	0.024	0.021	0.018	0.014	0.012	0.008
108	29.56	0.022	0.020	0.017	0.013	0.011	0.007

		Allowable Release Rate (m^3/s)					
Catchment	Area (ha)	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
107	12.69	0.305	0.270	0.231	0.184	0.149	0.097
108	29.56	0.652	0.577	0.495	0.393	0.319	0.209

Allowable Release Rates

Catchment	Area (ha)	Allowable Release Rate (m^3/s)						
		Hazel Existing	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
107	12.69	1.637	0.305	0.270	0.231	0.184	0.149	0.097
108	29.56	3.344	0.652	0.577	0.495	0.393	0.319	0.209
Total	42.25	4.981	0.957	0.847	0.726	0.577	0.469	0.306

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Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Allowable Release Rates

Development Areas

Catchment	Area (ha)	% of Developed Cathment	Notes	Reciever
Building 1	4.29	14%	Roof Control discharges to Pond, Roof overflows to Pond	Outlet 2 to Kilamanagh Creek
Building 2	4.93	16%	Roof Controls discharge to Tanks, Roof overflows to Pond	Controlled Tank Flows to Outlet 1 to Tributary of West Humber River Roof overflows to Pond and Outlet 2 to Kilamanagh Creek
Building 3	4.24	14%	Roof Controls discharge to Tanks, Roof overflows to Pond	
Paved Areas	14.87	49%	Drains to Pond	Outlet 2 to Kilamanagh Creek
Pond Block	2.03	7%	Drains to Pond	Outlet 2 to Kilamanagh Creek
Total	30.36			

Outlet 1 to the Tributary of West Humber River				
Catchment	107	107 Developed Area	Tank G Drainage Area	Tanks A to F Drainage Area
Area (ha)	12.69	6.32	1.65	6.58

Outlet 1 to the Tributary of West Humber River			
Catchment	Area (ha)	% of Catchment 107	Notes
107 Developed	6.32	50%	Outlet 1 to the Tributary of West Humber River
107 Undeveloped	6.37	50%	Natural drainage regime remains to the Tributary of West Humber River
Tank G	1.65	20%	Area consists of half of Building 3
Tanks A to F	6.58	80%	Area consists of half of Building 3 & Buidling 2

Outlet 1 Allowable Flow (cms)		
Storm	C-107	C-107 Developed Area
Example Calc: Hazel Storm		= 1.64 x 50%(C-107 Developed) = 0.815
Hazel Existing	1.64	0.815
100-Year	0.30	0.152
50-Year	0.27	0.135
25-Year	0.23	0.115
10-Year	0.18	0.091
5-Year	0.15	0.074
2-Year	0.10	0.049

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Allowable Release Rates

Outlet 2 to Kilamanagh Creek

Outlet 2 to Kilamanagh Creek				
Catchment	108	108 Developed	Pond Minor Drainage Area	Pond Major Drainage Area
Area (ha)	29.56	23.86	21.14	30.36

Outlet 2 to Kilamanagh Creek			
Catchment	Area (ha)	% of Catchment 108	Reciever
108 Developed	23.86	81%	Outlet 2 to Kilamanagh Creek
108 Undeveloped	5.70	19%	Natural drainage regime remains to Kilamanagh Creek

Outlet 2 Allowable Flow (cms)		
Example Calc: Hazel Storm		= 3.34 x 81%(C-108 Developed) = 2.7
Hazel Existing	3.344	2.700
100-Year	0.652	0.527
50-Year	0.577	0.466
25-Year	0.495	0.400
10-Year	0.393	0.318
5-Year	0.319	0.258
2-Year	0.209	0.169

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Proposed Conditions

Outlet 1 to the Tributary of West Humber River

Outlet 1						
Storm	Tanks A to F Controlled Outflow (m^3/s)	Tanks A to F Overflow (m^3/s)	TankG Controlled Outflow (m^3/s)	Tank G Overflow (m^3/s)	**Total Outlet 1 Outflow (m^3/s)**	**Allowable Flow (m^3/s)**
Hazel Existing	0.176	0.070	0.036	0.103	**0.385**	**0.815**
100-Year	0.076	0.000	0.036	0.000	**0.112**	**0.152**
50-Year	0.070	0.000	0.035	0.000	**0.105**	**0.135**
25-Year	0.066	0.000	0.034	0.000	**0.100**	**0.115**
10-Year	0.053	0.000	0.031	0.000	**0.084**	**0.091**
5-Year	0.042	0.000	0.024	0.000	**0.066**	**0.074**
2-Year	0.026	0.000	0.016	0.000	**0.042**	**0.049**

Outlet 2 to Kilamanagh Creek

Outlet 2 Allowable Flow (cms)		
Storm	**Controlled Pond Flow (m^3/s)**	**Allowable Flow (m^3/s)**
Hazel Existing	**2.694**	**2.700**
100-Year	**0.527**	**0.527**
50-Year	**0.465**	**0.466**
25-Year	**0.392**	**0.400**
10-Year	**0.269**	**0.318**
5-Year	**0.199**	**0.258**
2-Year	**0.074**	**0.169**
Extended Det.	**0.024**	**0.042**

WATER QUALITY

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Water Quality

Catchment	Area (ha)	Initial Treatment Train Approach and Effectiveness	Secondary Treatment Train Approach and Effectiveness	Total TSS Removal
Building 1	4.29	Clean roof flow TSS removal is 80%	Infiltration Galleries TSS removal is 25%	85%
Building 2	4.93	Clean roof flow TSS removal is 80%	Infiltration Galleries TSS removal is 25%	85%
Building 3	4.24	Pond TSS removal is 80%	N/A 0%	80%
Paved Areas	14.87	Pond TSS removal is 80%	N/A 0%	80%
Pond Block	2.03	Pond TSS removal is 80%	N/A 0%	80%
	30.36		**Total**	**82%**

WATER QUANTITY

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Roof Control

Catchment	Area (ha)	Ponding Depth (m)	Volume (m^3)	Max Release at 42 L/s/ha (m^3/s)	Notes	Reciever
Building 1	4.29	0.04	1716	0.180	Roof Controls discharge to Pond, Roof overflows to Pond	Outlet 2 to Kilamanagh Creek
Building 2	4.93	0.04	1972	0.207	Roof Controls discharge to Tanks A to F, Roof overflows to Pond	Controlled Tank Flows to Outlet 1 to the Tributary of West Humber River, Roof overflows to Outlet 2 to Kilamanagh Creek
Building 3 North	3.30	0.04	1320	0.139		
Building 3 South	0.94	0.04	376	0.039	Roof Controls discharge to Tanks G, Roof overflows to Pond	Outlet 2 to Kilamanagh Creek

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Tank Summary

Tanks A to F	Volume (m^3)	Elevation (m)
Total Volume	3,315	266.62
Volume required for Water Balance	712	265.68
Active Storage Volume Required	2,603	265.68 - 266.62
Top of Stone	3,315	266.62
Top of Tank	3,054	266.47
Bottom of Tank	261	265.55
Bottom of Stone	0	265.40

Footprint (m^2)	4,280

Tank G	Volume (m^3)	Elevation (m)
Total Volume	2,168	265.72
Volume required for Water Balance	825	264.93
Active Storage Volume Required	1,343	264.93 - 265.72
Top of Stone	2,168	265.72
Top of Tank	1,998	265.57
Bottom of Tank	169	264.65
Bottom of Stone	0	264.50

Footprint (m^2)	2,778

WATER BALANCE

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Erosion and Water Balance Control Summary
(5mm on-site retention)

Volume Requirements

Development Zone	Area (ha)	Retention Depth (mm)	Required Retention Volume (m^3)
Building 1	4.29	5	215
Building 2	4.93	5	247
Building 3	4.24	5	212
Pond Block	2.03	5	102
Remaining Paved Area	14.73	5	736
Total	30.22	5	1511

Proposed Strategy and Volume Provided

Development Zone	Area (ha)	Provided Retention Volume (m^3)	%Target
Tanks A to F	5.87	712	47%
Tank G	3.30	825	55%
Total	**9.17**	**1537**	**102%**

Equivalent Retention Across All Roofs: **16.8 mm**

Stantec

INFILTRATION GALLERY

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Erosion and Water Balance Control Strategy - (5mm on-site retention)

Zone	Area (ha)	Retention Depth (mm)	Available Retention Volume (m^3)	Total Retention Target (m^3)
Building 2 Roof and Half of Buidling 3 Roof	5.87	12.1	712	1511
Total	5.87	12.1	712	

Stone Infiltration Gallery Calculations

Existing Soil Type =	Sandy Lean Clay	Per Hydro-G Report Stantec (Dec. 2023)	
Infiltration Rate i =	15.0	mm/hr	
Infiltration Rate (with FS 3.5) = i =	4.3	mm/hr	
Drawdown Time = t =	72	hrs	
Porosity of Storage Media = n =	0.4		
Building 2			
Gallery Details			
Surface Area of Infiltration Gallery = A =	4279	m^2	
Max Depth of Water for Infiltration = $d_{c\,max}$ = I x (ts - dp/i) /n =	771	mm	Source: LID SWM Planning and Design Guide, p 4-87
Infiltration Gallery Volume			
Porosity of Storage Media = n =	0.4		
Surface Area of Infiltration Gallery = A =	4279	m^2	
Depth of Stone below underdrain =	0.152	m	
Void Space Available in Gallery = n x A x d =	261	m^3	
Drawdown Time = $d_{c\,max}$ * n / i =	14.2	hr	

Open Chamber Infiltration Gallery Calculations

Existing Soil Type =	Sandy Lean Clay	Per Hydro-G Report Stantec (Dec. 2023)	
Infiltration Rate (with FS 3.5) = i =	4.3	mm/hr	
Drawdown Time = t =	72	hrs	
Porosity of Storage Media = n =	0.85		
Gallery Details			
Surface Area of Infiltration Gallery = A =	4279	m	
Max Depth of Water for Infiltration = $d_{c\,max}$ = I x (ts - dp/i) /n =	363	mm	Source: LID SWM Planning and Design Guide, p 4-87
Infiltration Gallery Volume			
Porosity of Storage Media = n =	0.85		
Surface Area of Infiltration Gallery = A =	4279	m^2	
Depth of Stone below underdrain =	0.130	m	
Void Space Available in Gallery = n x A x d =	451	m^3	
Drawdown Time = $d_{c\,max}$ * n / i =	25.8	hr	
Total Volume =	**712**	**m^3**	
Percentage of Required Storage Volume =	**47%**		
Drawdown Time =	**40**	**hr**	
Drainage Area	**5.87**	**ha**	
Equivalent Event Across Infiltration Drainage Area=	**12.1**	**mm**	

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Erosion and Water Balance Control Strategy - (5mm on-site retention)

Zone	Area (ha)	Retention Depth (mm)	Available Retention Volume (m^3)	Total Retention Target (m^3)
Building 2 and 3 Roof	3.30	25.0	825	1511
Total	3.30	25.0	825	

Stone Infiltration Gallery Calculations

	Existing Soil Type =	Sandy Lean Clay	Per Hydro-G Report Stantec (Dec. 2023)	
	Infiltration Rate i =	15.0	mm/hr	
	Infiltration Rate (with FS 3.5) = i =	4.3	mm/hr	
	Drawdown Time = t =	72	hrs	
	Porosity of Storage Media = n =	0.4		
	Gallery Details			
Building 2	Surface Area of infiltration gallery = A =	2778	m^2	
	Max Depth of water for infiltration = $d_{c\ max}$ = I x (ts - dp/i) /n =	771	mm	Source: LID SWM Planning and Design Guide, p 4-87
	Infiltration Gallery Volume			
	Porosity of Storage Media = n =	0.4		
	Surface Area of infiltration gallery = A =	2778	m^2	
	Depth of Stone below underdrain =	0.152	m	
	Void Space Available in Gallery = n x A x d =	169	m^3	
	Drawdown Time = $d_{c\ max}$ * n / i =	14.2	hr	

Open Chamber Infiltration Gallery Calculations

	Existing Soil Type =	Sandy Lean Clay	Per Hydro-G Report Stantec (Dec. 2023)	
	Infiltration Rate (with FS 3.5) = i =	4.3	mm/hr	
	Drawdown Time = t =	57.8	hrs	
	Porosity of Storage Media = n =	0.85		
	Surface Area of infiltration gallery = A =	2778	m	
	Average Gallery Width = w =	1	m	
	Max Depth of water for infiltration = $d_{c\ max}$ = I x (ts - dp/i) /n =	291	mm	Source: LID SWM Planning and Design Guide, p 4-87
	Infiltration Gallery Volume			
	Porosity of Storage Media = n =	0.85		
	Surface Area of infiltration gallery = A =	2778	m^2	
	Depth of Stone below underdrain =	0.290	m	
	Void Space Available in Gallery = n x A x d =	656	m^3	
	Drawdown Time = $d_{c\ max}$ * n / i =	57.5	hr	
	Total Volume =	**825**	**m^3**	
	Percentage of Required Storage Volume =	**55%**		
	Drawdown Time =	**72**	**hr**	
	Drainage Area	**3.30**	**ha**	
	Equivalent Event Across Infiltration Drainage Area=	**25.0**	**mm**	

POND DETAILS AND STAGE STORAGE CURVE

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Permanent Pool and Extended Detention Sizing Calculations

Minor Drainage Area

Landuse	Area (ha)	C (Runoff Coef.)**	C (Weighted Value)	Imperviousness (%)***	Imperviousness (Weighted Value)
Buidling 1	4.29	0.95	4.08	100	429
Paved Areas	14.87	0.95	14.13	100	1487
Pond Block	2.03	0.70	1.42	72	147
Total	21.19		**0.93**		**97%**

** Assumed C values

*** Assumed percent impervious (I) converted from C values based on Simple Method, C = 0.05 + 0.009(I); (Schueler, 1987)

Protection Level	Enhanced	Choose Level Enhanced (80%), Normal (70%) or Basic (60%)
Pond Type	Wet Pond	Choose Infiltration, Wet Pond, Wetland, Hybrid, or Dry Pond (Basic Only)
Imperviousness %	97	
MOECC 2003 Table 3.2 Volume	250	m^3/ha
	210	m^3/ha Less 40 m^3/ha for active storage

Protection and Pond Type	Permanent Pool	Active Pond *		Est. Release Rate
	Wet Pond	MOE Guideline	Extended Detention	
	(m^3)	(m^3)		(m^3/s)
Enhanced Wet Pond	4450	848	4867	0.042

* The greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume

The extended detention volume has been calculated using:

RV** = 22.97 mm >>>> (For minimum of 48 hr extended detention)

** Runoff volume obtained from VO modeling

Major Drainage Areas

Landuse	Area (ha)	C (Runoff Coef.)**	C (Weighted Value)	Imperviousness (%)***	Imperviousness (Weighted Value)
Building 1	4.29	0.95	4.08	100	429
Building 2	4.93	0.95	4.68	100	493
Building 3	4.24	0.95	4.03	100	424
Paved Areas	14.87	0.95	14.13	100	1487
Pond Block	2.03	0.70	1.42	72	147
Total	30.36		**0.93**		**98%**

** Assumed C values

*** Assumed percent impervious (I) converted from C values based on Simple Method, C = 0.05 + 0.009(I); (Schueler, 1987)

Stantec

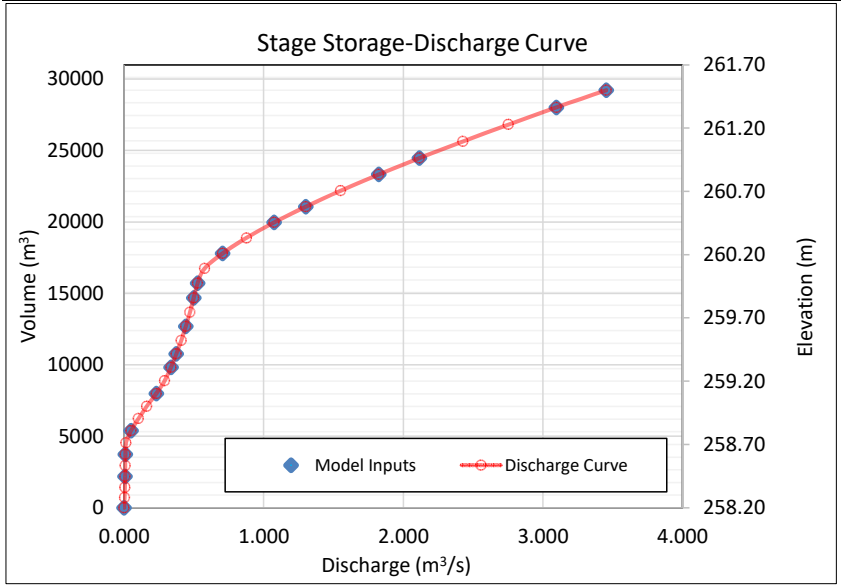
Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Stage Storage Discharge Curve - West Storm Pond

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Orifice/Weir 3 Outflow (m^3/s)	Weir 2 Outflow m^3/s	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)
258.50	0.000	0.000	0.00	0.000	258.50	0.000	0	0.0
258.60	0.003	0.000	0.00	0.000	258.60	0.003	708	0.0
258.70	0.006	0.000	0.00	0.000	258.70	0.006	1,436	45.4
258.80	0.007	0.000	0.00	0.000	258.80	0.007	2,185	78.6
258.90	0.008	0.000	0.00	0.000	258.90	0.008	2,954	106.5
259.00	0.009	0.000	0.00	0.000	259.00	0.009	3,744	131.3
259.10	0.010	0.000	0.00	0.000	259.10	0.013	4,554	151.1
259.20	0.011	0.022	0.02	0.000	259.20	0.049	5,385	158.4
259.30	0.012	0.061	0.03	0.000	259.30	0.102	6,237	161.6
259.40	0.013	0.113	0.04	0.000	259.40	0.162	7,107	163.4
259.50	0.014	0.174	0.04	0.000	259.50	0.230	7,995	164.7
259.60	0.014	0.229	0.05	0.000	259.60	0.291	8,900	165.6
259.70	0.015	0.267	0.05	0.000	259.70	0.335	9,822	166.4
259.80	0.015	0.301	0.06	0.000	259.80	0.374	10,761	167.2
259.90	0.016	0.331	0.06	0.000	259.90	0.409	11,718	167.8
260.00	0.017	0.359	0.07	0.000	260.00	0.441	12,692	168.5
260.10	0.017	0.385	0.07	0.000	260.10	0.471	13,684	169.1
260.20	0.018	0.409	0.07	0.000	260.20	0.499	14,692	169.7
260.30	0.018	0.431	0.08	0.000	260.30	0.526	15,717	170.2
260.40	0.019	0.453	0.08	0.026	260.40	0.577	16,758	170.7
260.50	0.019	0.473	0.08	0.131	260.50	0.707	17,814	171.2
260.60	0.020	0.493	0.09	0.278	260.60	0.877	18,885	171.6
260.70	0.020	0.512	0.09	0.453	260.70	1.074	19,972	171.9
260.80	0.021	0.530	0.09	0.659	260.80	1.301	21,075	172.1
260.90	0.021	0.548	0.09	0.889	260.90	1.552	22,193	172.4
261.00	0.022	0.565	0.10	1.141	261.00	1.824	23,326	172.6
261.10	0.022	0.582	0.10	1.414	261.10	2.116	24,475	172.7
261.20	0.023	0.598	0.10	1.705	261.20	2.426	25,640	172.9
261.30	0.023	0.614	0.10	2.013	261.30	2.753	26,821	173.0
261.40	0.023	0.629	0.11	2.338	261.40	3.096	28,018	173.1
261.50	0.024	0.644	0.11	2.679	261.50	3.455	29,232	173.2

*Highlighted cells used in VO model

Return Storm (Years)	Actual Outflow (cms)	Target Outlfow (cms)	Storage (m^3)	Elevation (m)	Detention Time (hrs)
Hazel Existing	2.694	2.700	26607	261.28	173.0
100-Year	0.527	0.527	15745	260.30	170.2
50-Year	0.465	0.466	13485	260.08	169.0
25-Year	0.392	0.400	11253	259.85	167.5
10-Year	0.269	0.318	8569	259.56	165.3
5-Year	0.199	0.258	7590	259.45	164.1
2-Year	0.074	0.169	5781	259.25	159.9
Extended Det.	0.024	0.042	4799	259.13	153.3



Stantec

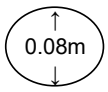
Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

MH 3 - Pond Outlet Control Structure Design Details

Control Structure Location: MH3

Orifice 1 (Round Only)

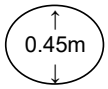
Invert =	258.50	m
Size =	0.080	m
C=	0.62	
Obvert =	258.58	m



Inv. = 258.50m

Orifice 2 (Round Only)

Invert =	259.10	m
Size =	0.45	m
C =	0.62	
Obvert =	259.55	m



Inv. = 259.10m

Orifice 3 Square

Invert =	259.05	m
Length =	0.16	m
C =	0.62	
Obvert =	259.21	m
Midpoint =	259.13	
Height =	0.16	m
Number of Contractions =	2.00	
P =	0.7	m
B =	50	m

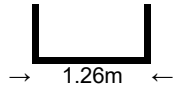
Inv. = 259.05m

sharp crested constricted rectangular weir until it is submerged (from the invert to the obvert). Above the obvert the outlet structure acts as an orifice.

Note this is the number of end contractions.
Note P is the distance from the orifice invert to the normal water level.
Note B is the approximate pond block width at the face of the outlet structure.

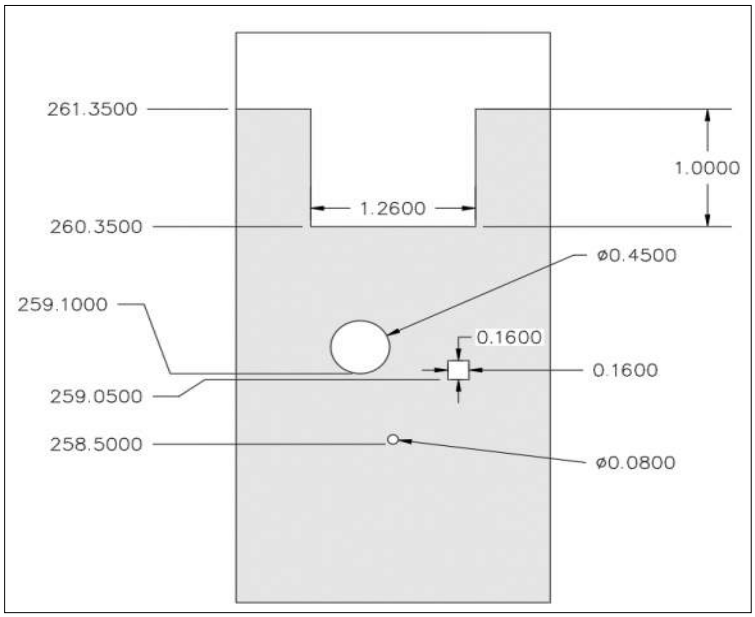
Sharp Crested Weir 2

Length =	1.26	m
Elevation =	260.35	m
Side Slp =	0.00	
Breadth =	0.45	m
Number of Contractions =	2.00	
P =	0.7	m
B =	50	m



Inv. = 260.35m

Note this is the number of end contractions.
Note P is the distance from the orifice invert to the normal water level.
Note B is the approximate pond block width at the face of the outlet structure.



Stantec

TANK OUTLET DETAILS AND STAGE STORAGE CURVE

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

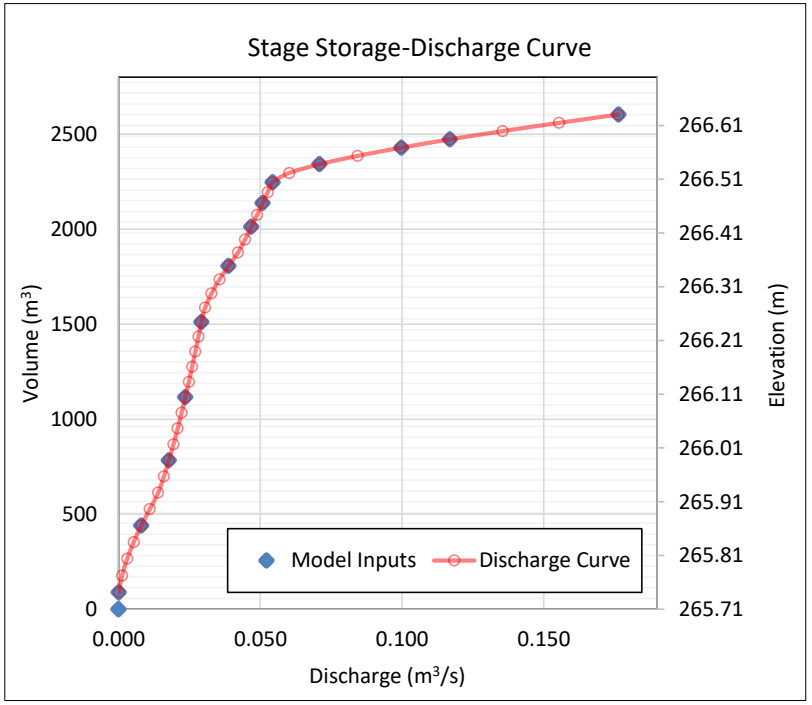
Stage Storage Discharge Curve - Tank A to F

Control Structure Location: MH106

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Orifice/Weir 3 Outflow (m^3/s)	Weir 2 Outflow m^3/s	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)
265.71	0.000	0.000	0.000	0.000	0.000	89	0.0
265.73	0.001	0.000	0.000	0.000	0.001	178	37.1
265.76	0.003	0.000	0.000	0.000	0.003	266	48.5
265.78	0.005	0.000	0.000	0.000	0.005	353	54.3
265.81	0.008	0.000	0.000	0.000	0.008	440	57.9
265.83	0.011	0.000	0.000	0.000	0.011	527	60.5
265.86	0.014	0.000	0.000	0.000	0.014	613	62.4
265.88	0.016	0.000	0.000	0.000	0.016	699	64.0
265.91	0.018	0.000	0.000	0.000	0.018	783	65.4
265.93	0.019	0.000	0.000	0.000	0.019	867	66.6
265.96	0.021	0.000	0.000	0.000	0.021	951	67.8
265.98	0.022	0.000	0.000	0.000	0.022	1,033	68.8
266.01	0.024	0.000	0.000	0.000	0.024	1,115	69.8
266.04	0.025	0.000	0.000	0.000	0.025	1,196	70.8
266.06	0.026	0.000	0.000	0.000	0.026	1,277	71.6
266.09	0.027	0.000	0.000	0.000	0.027	1,356	72.5
266.11	0.028	0.000	0.000	0.000	0.028	1,434	73.3
266.14	0.029	0.000	0.000	0.000	0.029	1,511	74.0
266.16	0.030	0.000	0.000	0.000	0.031	1,587	74.7
266.19	0.031	0.002	0.000	0.000	0.033	1,662	75.4
266.21	0.032	0.003	0.000	0.000	0.036	1,735	76.0
266.24	0.033	0.006	0.000	0.000	0.039	1,807	76.5
266.26	0.034	0.008	0.000	0.000	0.042	1,877	77.0
266.29	0.035	0.010	0.000	0.000	0.045	1,945	77.4
266.32	0.036	0.011	0.000	0.000	0.047	2,012	77.8
266.34	0.036	0.012	0.000	0.000	0.049	2,076	78.2
266.37	0.037	0.014	0.000	0.000	0.051	2,137	78.5
266.39	0.038	0.015	0.000	0.000	0.053	2,195	78.8
266.42	0.039	0.015	0.000	0.000	0.054	2,247	79.1
266.44	0.040	0.016	0.000	0.004	0.060	2,296	79.4
266.47	0.040	0.017	0.000	0.013	0.071	2,342	79.5
266.49	0.041	0.018	0.000	0.025	0.084	2,385	79.7
266.52	0.042	0.019	0.000	0.039	0.100	2,429	79.8
266.54	0.043	0.020	0.000	0.055	0.117	2,472	79.9
266.57	0.043	0.020	0.000	0.072	0.136	2,516	80.0
266.59	0.044	0.021	0.000	0.090	0.155	2,559	80.1
266.62	0.045	0.022	0.000	0.110	0.176	2,603	80.2

*Highlighted cells used in VO model

Return Storm	Actual Outflow	Outlet 1 Target Flow	Storage	Elevation	Detention
(Years)	(cms)	(cms)	(m^3)	(m)	Time (hrs)
Hazel Existing	0.176	0.815	2,602	266.62	80.2
100-Year	0.076	0.152	2,358	266.48	79.6
50-Year	0.070	0.135	2,338	266.47	79.5
25-Year	0.066	0.115	2,321	266.46	79.5
10-Year	0.053	0.091	2,206	266.40	78.9
5-Year	0.042	0.074	1,874	266.26	77.0
2-Year	0.026	0.049	1,280	266.06	71.7



Stantec

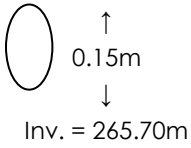
Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Control Structure Design Details - Tank G

Control Structure Location: MH106

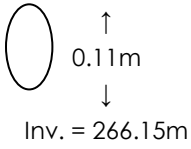
Orifice 1 (Round Only)

Invert =	265.70	m
Size =	0.150	m
C =	0.62	
Obvert =	265.85	m



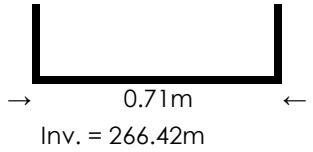
Orifice 2 (Round Only)

Invert =	266.15	m
Size =	0.110	m
C =	0.80	
Obvert =	266.26	m



Sharp Crested Weir 2

Length =	0.71	m
Elevation =	266.42	m
Side Slp =	0.00	
Breadth =	0.20	m
Number of Contractions =	2.00	
P =	0.7	m
B =	50	m



Note this is the number of end contractions.

Note P is the distance from the orifice invert to the normal water level.

Note B is the approximate pond block width at the face of the outlet structure.

Project: Quadreal-Caledon
Project No: 160623114
Date: Nov-23
Author: KB

Stage Storage Discharge Curve - Tank G

Upstream Elevation (m)	Inlet Control Device Ipex - Tempest MHF-D Outflow (cms)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)
264.93	0.000	0.000	0	0.0
264.96	0.001	0.001	56	0.0
264.98	0.002	0.002	112	8.9
265.01	0.004	0.004	168	14.2
265.03	0.005	0.005	223	17.9
265.06	0.006	0.006	278	20.8
265.08	0.007	0.007	332	23.1
265.11	0.008	0.008	386	25.1
265.13	0.009	0.009	439	26.8
265.16	0.011	0.011	491	28.3
265.18	0.012	0.012	543	29.6
265.21	0.013	0.013	595	30.7
265.23	0.014	0.014	645	31.8
265.26	0.015	0.015	695	32.7
265.29	0.016	0.016	744	33.6
265.31	0.018	0.018	792	34.4
265.34	0.019	0.019	839	35.1
265.36	0.020	0.020	885	35.7
265.39	0.021	0.021	930	36.4
265.41	0.022	0.022	973	36.9
265.44	0.023	0.023	1,015	37.4
265.46	0.025	0.025	1,055	37.9
265.49	0.026	0.026	1,092	38.3
265.51	0.027	0.027	1,126	38.7
265.54	0.028	0.028	1,158	39.0
265.57	0.029	0.029	1,188	39.3
265.59	0.030	0.030	1,216	39.5
265.62	0.032	0.032	1,245	39.8
265.64	0.033	0.033	1,273	40.0
265.67	0.034	0.034	1,301	40.3
265.69	0.035	0.035	1,329	40.5
265.72	0.036	0.036	1,357	40.7

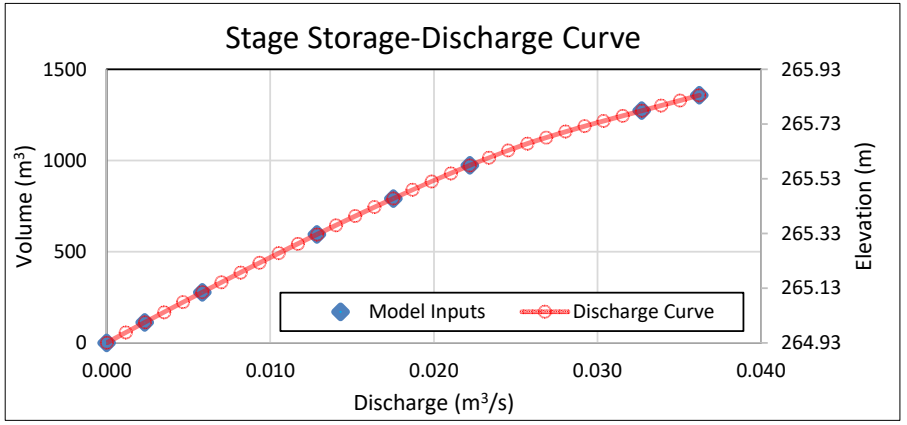
Highlighted cells used for VO6 modeling inputs

Return Storm	Actual Outflow	Outlet 1 Target Flow	Storage	Elevation	Detention
(Years)	(cms)	(cms)	(m^3)	(m)	Time (hrs)
Hazel Existing	0.036	0.815	1,357	265.72	40.7
100-Year	0.036	0.152	1,341	265.70	40.6
50-Year	0.035	0.13	1,319	265.68	40.4
25-Year	0.034	0.115	1,296	265.66	40.2
10-Year	0.031	0.091	1,214	265.59	39.5
5-Year	0.024	0.074	1,037	265.45	37.7
2-Year	0.016	0.049	715	265.27	33.1

Control Structure Location: MH135

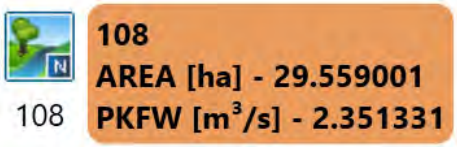
Inlet Control Device Ipex - Tempest MHF-D	
Stage (m)	Discharge (m^3/s)
0.0	0
1.0	0.046
2.0	0.065
3.0	0.08
4.0	0.093
5.0	0.105

Ipex rating curve as per manufacturers specifications



Stantec

EXISTING AND PROPOSED STORMWATER MODELING



EXISTING CONDITIONS SCHEMATIC

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
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db11-448c-8cf2-15749cc398f5\sce


DATE: 12/12/2023                          TIME: 03:00:15

USER:



COMMENTS: ____________________________________________________________
****************************************
** SIMULATION:A_2yr 4hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1070.000
| Ptotal= 34.22 mm |                          B=   7.850
--------------------                          C=   0.876
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    1.53 |  1.00   19.60 |  2.00    4.48 |  3.00    1.89
               0.17    1.81 |  1.17   85.72 |  2.17    3.65 |  3.17    1.73
               0.33    2.22 |  1.33   26.59 |  2.33    3.08 |  3.33    1.59
               0.50    2.87 |  1.50   12.64 |  2.50    2.66 |  3.50    1.47
               0.67    4.06 |  1.67    7.99 |  2.67    2.34 |  3.67    1.37
               0.83    6.86 |  1.83    5.76 |  2.83    2.10 |  3.83    1.29


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0107)|   Area    (ha)=  12.69   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

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


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.53 | 1.083   19.60 | 2.083    4.48 |  3.08    1.89
               0.167    1.53 | 1.167   19.60 | 2.167    4.48 |  3.17    1.89
               0.250    1.81 | 1.250   85.72 | 2.250    3.65 |  3.25    1.73
               0.333    1.81 | 1.333   85.72 | 2.333    3.65 |  3.33    1.73
               0.417    2.22 | 1.417   26.59 | 2.417    3.08 |  3.42    1.59
               0.500    2.22 | 1.500   26.59 | 2.500    3.08 |  3.50    1.59
               0.583    2.87 | 1.583   12.64 | 2.583    2.66 |  3.58    1.47
               0.667    2.87 | 1.667   12.64 | 2.667    2.66 |  3.67    1.47
               0.750    4.06 | 1.750    7.99 | 2.750    2.34 |  3.75    1.37
               0.833    4.06 | 1.833    7.99 | 2.833    2.34 |  3.83    1.37
               0.917    6.86 | 1.917    5.76 | 2.917    2.10 |  3.92    1.29
               1.000    6.86 | 2.000    5.76 | 3.000    2.10 |  4.00    1.29

     Unit Hyd Qpeak  (cms)=   1.183

     PEAK FLOW       (cms)=   0.249 (i)
     TIME TO PEAK    (hrs)=   1.833
     RUNOFF VOLUME    (mm)=   9.206
     TOTAL RAINFALL   (mm)=  34.218
     RUNOFF COEFFICIENT   =   0.269

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0108)|   Area    (ha)=  29.56   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.68

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


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.53 | 1.083   19.60 | 2.083    4.48 |  3.08    1.89
               0.167    1.53 | 1.167   19.60 | 2.167    4.48 |  3.17    1.89
               0.250    1.81 | 1.250   85.72 | 2.250    3.65 |  3.25    1.73
               0.333    1.81 | 1.333   85.72 | 2.333    3.65 |  3.33    1.73
               0.417    2.22 | 1.417   26.59 | 2.417    3.08 |  3.42    1.59
               0.500    2.22 | 1.500   26.59 | 2.500    3.08 |  3.50    1.59
               0.583    2.87 | 1.583   12.64 | 2.583    2.66 |  3.58    1.47
               0.667    2.87 | 1.667   12.64 | 2.667    2.66 |  3.67    1.47
               0.750    4.06 | 1.750    7.99 | 2.750    2.34 |  3.75    1.37
               0.833    4.06 | 1.833    7.99 | 2.833    2.34 |  3.83    1.37
               0.917    6.86 | 1.917    5.76 | 2.917    2.10 |  3.92    1.29
               1.000    6.86 | 2.000    5.76 | 3.000    2.10 |  4.00    1.29

     Unit Hyd Qpeak  (cms)=   1.660

     PEAK FLOW       (cms)=   0.408 (i)
     TIME TO PEAK    (hrs)=   2.167
     RUNOFF VOLUME    (mm)=   9.207
     TOTAL RAINFALL   (mm)=  34.218
     RUNOFF COEFFICIENT   =   0.269

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------------------------------------------------------------------
****************************************
** SIMULATION:B_5yr 4hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1593.000
| Ptotal= 49.55 mm |                          B=  11.000
--------------------                          C=   0.879
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.35 |  1.00   30.47 |  2.00    7.17 |  3.00    2.93
                0.17    2.80 |  1.17  109.68 |  2.17    5.81 |  3.17    2.67
                0.33    3.46 |  1.33   40.71 |  2.33    4.87 |  3.33    2.45
                0.50    4.52 |  1.50   20.28 |  2.50    4.19 |  3.50    2.26
                0.67    6.48 |  1.67   12.91 |  2.67    3.67 |  3.67    2.10
                0.83   11.07 |  1.83    9.28 |  2.83    3.26 |  3.83    1.96


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0107)|   Area    (ha)=  12.69   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

        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    2.35 | 1.083   30.47 | 2.083    7.17 |  3.08    2.93
               0.167    2.35 | 1.167   30.47 | 2.167    7.17 |  3.17    2.93
               0.250    2.80 | 1.250  109.68 | 2.250    5.81 |  3.25    2.67
               0.333    2.80 | 1.333  109.68 | 2.333    5.81 |  3.33    2.67
               0.417    3.46 | 1.417   40.71 | 2.417    4.87 |  3.42    2.45
               0.500    3.46 | 1.500   40.71 | 2.500    4.87 |  3.50    2.45
               0.583    4.52 | 1.583   20.28 | 2.583    4.19 |  3.58    2.26
               0.667    4.52 | 1.667   20.28 | 2.667    4.19 |  3.67    2.26
               0.750    6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
               0.833    6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
               0.917   11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
               1.000   11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

    Unit Hyd Qpeak  (cms)=   1.183

    PEAK FLOW       (cms)=   0.495 (i)
    TIME TO PEAK    (hrs)=   1.833
    RUNOFF VOLUME    (mm)=  18.368
    TOTAL RAINFALL   (mm)=  49.553
    RUNOFF COEFFICIENT   =   0.371

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0108)|   Area    (ha)=  29.56   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.68

        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    2.35 | 1.083   30.47 | 2.083    7.17 |  3.08    2.93
               0.167    2.35 | 1.167   30.47 | 2.167    7.17 |  3.17    2.93
```



```
               0.250    2.80 | 1.250  109.68 | 2.250    5.81 |  3.25    2.67
               0.333    2.80 | 1.333  109.68 | 2.333    5.81 |  3.33    2.67
               0.417    3.46 | 1.417   40.71 | 2.417    4.87 |  3.42    2.45
               0.500    3.46 | 1.500   40.71 | 2.500    4.87 |  3.50    2.45
               0.583    4.52 | 1.583   20.28 | 2.583    4.19 |  3.58    2.26
               0.667    4.52 | 1.667   20.28 | 2.667    4.19 |  3.67    2.26
               0.750    6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
               0.833    6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
               0.917   11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
               1.000   11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

    Unit Hyd Qpeak  (cms)=   1.660

    PEAK FLOW       (cms)=   0.816 (i)
    TIME TO PEAK    (hrs)=   2.167
    RUNOFF VOLUME    (mm)=  18.370
    TOTAL RAINFALL   (mm)=  49.553
    RUNOFF COEFFICIENT   =   0.371

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

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--------------------------------------------------------------------------------
****************************************
** SIMULATION:C_10yr 4hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=2221.000
| Ptotal= 58.62 mm |                          B=  12.000
--------------------                          C=   0.908
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.39 |  1.00   37.17 |  2.00    8.06 |  3.00    3.05
                0.17    2.89 |  1.17  134.16 |  2.17    6.42 |  3.17    2.75
                0.33    3.65 |  1.33   50.03 |  2.33    5.30 |  3.33    2.50
                0.50    4.89 |  1.50   24.37 |  2.50    4.50 |  3.50    2.29
                0.67    7.23 |  1.67   15.14 |  2.67    3.89 |  3.67    2.11
                0.83   12.87 |  1.83   10.64 |  2.83    3.42 |  3.83    1.96


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0107)|   Area    (ha)=  12.69   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

        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    2.39 | 1.083   37.17 | 2.083    8.06 |  3.08    3.05
               0.167    2.39 | 1.167   37.17 | 2.167    8.06 |  3.17    3.05
               0.250    2.89 | 1.250  134.16 | 2.250    6.42 |  3.25    2.75
               0.333    2.89 | 1.333  134.16 | 2.333    6.42 |  3.33    2.75
               0.417    3.65 | 1.417   50.03 | 2.417    5.30 |  3.42    2.50
               0.500    3.65 | 1.500   50.03 | 2.500    5.30 |  3.50    2.50
               0.583    4.89 | 1.583   24.37 | 2.583    4.50 |  3.58    2.29
               0.667    4.89 | 1.667   24.37 | 2.667    4.50 |  3.67    2.29
               0.750    7.23 | 1.750   15.14 | 2.750    3.89 |  3.75    2.11
               0.833    7.23 | 1.833   15.14 | 2.833    3.89 |  3.83    2.11
               0.917   12.87 | 1.917   10.64 | 2.917    3.42 |  3.92    1.96
               1.000   12.87 | 2.000   10.64 | 3.000    3.42 |  4.00    1.96

    Unit Hyd Qpeak  (cms)=   1.183

    PEAK FLOW       (cms)=   0.695 (i)
    TIME TO PEAK    (hrs)=   1.833
    RUNOFF VOLUME    (mm)=  24.543
    TOTAL RAINFALL   (mm)=  58.616
    RUNOFF COEFFICIENT   =   0.419

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0108)|   Area    (ha)=  29.56   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.68

        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    2.39 | 1.083   37.17 | 2.083    8.06 |  3.08    3.05
               0.167    2.39 | 1.167   37.17 | 2.167    8.06 |  3.17    3.05
```



```
               0.250    2.89 | 1.250  134.16 | 2.250    6.42 |  3.25    2.75
               0.333    2.89 | 1.333  134.16 | 2.333    6.42 |  3.33    2.75
               0.417    3.65 | 1.417   50.03 | 2.417    5.30 |  3.42    2.50
               0.500    3.65 | 1.500   50.03 | 2.500    5.30 |  3.50    2.50
               0.583    4.89 | 1.583   24.37 | 2.583    4.50 |  3.58    2.29
               0.667    4.89 | 1.667   24.37 | 2.667    4.50 |  3.67    2.29
               0.750    7.23 | 1.750   15.14 | 2.750    3.89 |  3.75    2.11
               0.833    7.23 | 1.833   15.14 | 2.833    3.89 |  3.83    2.11
               0.917   12.87 | 1.917   10.64 | 2.917    3.42 |  3.92    1.96
               1.000   12.87 | 2.000   10.64 | 3.000    3.42 |  4.00    1.96

    Unit Hyd Qpeak  (cms)=   1.660

    PEAK FLOW       (cms)=   1.136 (i)
    TIME TO PEAK    (hrs)=   2.167
    RUNOFF VOLUME    (mm)=  24.545
    TOTAL RAINFALL   (mm)=  58.616
    RUNOFF COEFFICIENT   =   0.419

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

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--------------------------------------------------------------------------------
****************************************
** SIMULATION:D_25yr 4hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=3158.000
| Ptotal= 71.59 mm |                          B=  15.000
--------------------                          C=   0.933
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.68 |  1.00   47.76 |  2.00   10.11 |  3.00    3.51
                0.17    3.31 |  1.17  156.47 |  2.17    7.92 |  3.17    3.13
                0.33    4.28 |  1.33   63.86 |  2.33    6.44 |  3.33    2.81
                0.50    5.90 |  1.50   31.72 |  2.50    5.38 |  3.50    2.55
                0.67    9.00 |  1.67   19.56 |  2.67    4.59 |  3.67    2.33
                0.83   16.53 |  1.83   13.56 |  2.83    3.99 |  3.83    2.15


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0107)|   Area    (ha)=  12.69   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

        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    2.68 | 1.083   47.76 | 2.083   10.11 |  3.08    3.51
               0.167    2.68 | 1.167   47.76 | 2.167   10.11 |  3.17    3.51
               0.250    3.31 | 1.250  156.47 | 2.250    7.92 |  3.25    3.13
               0.333    3.31 | 1.333  156.47 | 2.333    7.92 |  3.33    3.13
               0.417    4.28 | 1.417   63.86 | 2.417    6.44 |  3.42    2.81
               0.500    4.28 | 1.500   63.86 | 2.500    6.44 |  3.50    2.81
               0.583    5.90 | 1.583   31.72 | 2.583    5.38 |  3.58    2.55
               0.667    5.90 | 1.667   31.72 | 2.667    5.38 |  3.67    2.55
               0.750    9.00 | 1.750   19.56 | 2.750    4.59 |  3.75    2.33
               0.833    9.00 | 1.833   19.56 | 2.833    4.59 |  3.83    2.33
               0.917   16.53 | 1.917   13.56 | 2.917    3.99 |  3.92    2.15
               1.000   16.53 | 2.000   13.56 | 3.000    3.99 |  4.00    2.15

    Unit Hyd Qpeak  (cms)=   1.183

    PEAK FLOW       (cms)=   0.980 (i)
    TIME TO PEAK    (hrs)=   1.833
    RUNOFF VOLUME    (mm)=  34.081
    TOTAL RAINFALL   (mm)=  71.589
    RUNOFF COEFFICIENT   =   0.476

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0108)|   Area    (ha)=  29.56   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.68

        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    2.68 | 1.083   47.76 | 2.083   10.11 |  3.08    3.51
               0.167    2.68 | 1.167   47.76 | 2.167   10.11 |  3.17    3.51
```



```
               0.250    3.31 | 1.250  156.47 | 2.250    7.92 |  3.25    3.13
               0.333    3.31 | 1.333  156.47 | 2.333    7.92 |  3.33    3.13
               0.417    4.28 | 1.417   63.86 | 2.417    6.44 |  3.42    2.81
               0.500    4.28 | 1.500   63.86 | 2.500    6.44 |  3.50    2.81
               0.583    5.90 | 1.583   31.72 | 2.583    5.38 |  3.58    2.55
               0.667    5.90 | 1.667   31.72 | 2.667    5.38 |  3.67    2.55
               0.750    9.00 | 1.750   19.56 | 2.750    4.59 |  3.75    2.33
               0.833    9.00 | 1.833   19.56 | 2.833    4.59 |  3.83    2.33
               0.917   16.53 | 1.917   13.56 | 2.917    3.99 |  3.92    2.15
               1.000   16.53 | 2.000   13.56 | 3.000    3.99 |  4.00    2.15

    Unit Hyd Qpeak  (cms)=   1.660

    PEAK FLOW       (cms)=   1.604 (i)
    TIME TO PEAK    (hrs)=   2.167
    RUNOFF VOLUME    (mm)=  34.084
    TOTAL RAINFALL   (mm)=  71.589
    RUNOFF COEFFICIENT   =   0.476

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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****************************************
** SIMULATION:E_50yr 4hr 10min Chicago **
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--------------------
| CHICAGO STORM    |    IDF curve parameters: A=3886.000
| Ptotal= 80.32 mm |                          B=  16.000
--------------------                          C=   0.950
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.76 |  1.00   54.62 |  2.00   11.20 |  3.00    3.68
                0.17    3.46 |  1.17  176.19 |  2.17    8.68 |  3.17    3.25
                0.33    4.54 |  1.33   73.10 |  2.33    6.99 |  3.33    2.91
                0.50    6.37 |  1.50   36.22 |  2.50    5.78 |  3.50    2.62
                0.67    9.92 |  1.67   22.14 |  2.67    4.89 |  3.67    2.38
                0.83   18.63 |  1.83   15.18 |  2.83    4.21 |  3.83    2.18


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--------------------
| CALIB            |
| NASHYD   (  0107)|   Area    (ha)=  12.69   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

        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    2.76 | 1.083   54.62 | 2.083   11.20 |  3.08    3.68
               0.167    2.76 | 1.167   54.62 | 2.167   11.20 |  3.17    3.68
               0.250    3.46 | 1.250  176.19 | 2.250    8.68 |  3.25    3.25
               0.333    3.46 | 1.333  176.19 | 2.333    8.68 |  3.33    3.25
               0.417    4.54 | 1.417   73.10 | 2.417    6.99 |  3.42    2.91
               0.500    4.54 | 1.500   73.10 | 2.500    6.99 |  3.50    2.91
               0.583    6.37 | 1.583   36.22 | 2.583    5.78 |  3.58    2.62
               0.667    6.37 | 1.667   36.22 | 2.667    5.78 |  3.67    2.62
               0.750    9.92 | 1.750   22.14 | 2.750    4.89 |  3.75    2.38
               0.833    9.92 | 1.833   22.14 | 2.833    4.89 |  3.83    2.38
               0.917   18.63 | 1.917   15.18 | 2.917    4.21 |  3.92    2.18
               1.000   18.63 | 2.000   15.18 | 3.000    4.21 |  4.00    2.18

    Unit Hyd Qpeak  (cms)=   1.183

    PEAK FLOW       (cms)=   1.196 (i)
    TIME TO PEAK    (hrs)=   1.833
    RUNOFF VOLUME    (mm)=  40.862
    TOTAL RAINFALL   (mm)=  80.320
    RUNOFF COEFFICIENT   =   0.509

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

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--------------------
| CALIB            |
| NASHYD   (  0108)|   Area    (ha)=  29.56   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.68

        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    2.76 | 1.083   54.62 | 2.083   11.20 |  3.08    3.68
               0.167    2.76 | 1.167   54.62 | 2.167   11.20 |  3.17    3.68
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               0.250    3.46 | 1.250  176.19 | 2.250    8.68 |  3.25    3.25
               0.333    3.46 | 1.333  176.19 | 2.333    8.68 |  3.33    3.25
               0.417    4.54 | 1.417   73.10 | 2.417    6.99 |  3.42    2.91
               0.500    4.54 | 1.500   73.10 | 2.500    6.99 |  3.50    2.91
               0.583    6.37 | 1.583   36.22 | 2.583    5.78 |  3.58    2.62
               0.667    6.37 | 1.667   36.22 | 2.667    5.78 |  3.67    2.62
               0.750    9.92 | 1.750   22.14 | 2.750    4.89 |  3.75    2.38
               0.833    9.92 | 1.833   22.14 | 2.833    4.89 |  3.83    2.38
               0.917   18.63 | 1.917   15.18 | 2.917    4.21 |  3.92    2.18
               1.000   18.63 | 2.000   15.18 | 3.000    4.21 |  4.00    2.18

    Unit Hyd Qpeak  (cms)=   1.660

    PEAK FLOW       (cms)=   1.955 (i)
    TIME TO PEAK    (hrs)=   2.083
    RUNOFF VOLUME    (mm)=  40.866
    TOTAL RAINFALL   (mm)=  80.320
    RUNOFF COEFFICIENT   =   0.509

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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****************************************
** SIMULATION:F_100yr 4hr 10min Chicago **
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--------------------
| CHICAGO STORM    |    IDF curve parameters: A=4688.000
| Ptotal= 89.87 mm |                          B=  17.000
--------------------                          C=   0.962
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.89 |  1.00   62.12 |  2.00   12.48 |  3.00    3.91
                0.17    3.67 |  1.17  196.54 |  2.17    9.60 |  3.17    3.44
                0.33    4.88 |  1.33   83.09 |  2.33    7.66 |  3.33    3.05
                0.50    6.96 |  1.50   41.25 |  2.50    6.29 |  3.50    2.73
                0.67   11.02 |  1.67   25.07 |  2.67    5.28 |  3.67    2.47
                0.83   21.03 |  1.83   17.06 |  2.83    4.51 |  3.83    2.24


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--------------------
| CALIB            |
| NASHYD   (  0107)|   Area    (ha)=  12.69   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

        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    2.89 | 1.083   62.12 | 2.083   12.48 |  3.08    3.91
               0.167    2.89 | 1.167   62.12 | 2.167   12.48 |  3.17    3.91
               0.250    3.67 | 1.250  196.54 | 2.250    9.60 |  3.25    3.44
               0.333    3.67 | 1.333  196.54 | 2.333    9.60 |  3.33    3.44
               0.417    4.88 | 1.417   83.09 | 2.417    7.66 |  3.42    3.05
               0.500    4.88 | 1.500   83.09 | 2.500    7.66 |  3.50    3.05
               0.583    6.96 | 1.583   41.25 | 2.583    6.29 |  3.58    2.73
               0.667    6.96 | 1.667   41.25 | 2.667    6.29 |  3.67    2.73
               0.750   11.02 | 1.750   25.07 | 2.750    5.28 |  3.75    2.47
               0.833   11.02 | 1.833   25.07 | 2.833    5.28 |  3.83    2.47
               0.917   21.03 | 1.917   17.06 | 2.917    4.51 |  3.92    2.24
               1.000   21.03 | 2.000   17.06 | 3.000    4.51 |  4.00    2.24

    Unit Hyd Qpeak  (cms)=   1.183

    PEAK FLOW       (cms)=   1.440 (i)
    TIME TO PEAK    (hrs)=   1.750
    RUNOFF VOLUME    (mm)=  48.541
    TOTAL RAINFALL   (mm)=  89.870
    RUNOFF COEFFICIENT   =   0.540

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

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--------------------
| CALIB            |
| NASHYD   (  0108)|   Area    (ha)=  29.56   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.68

        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    2.89 | 1.083   62.12 | 2.083   12.48 |  3.08    3.91
               0.167    2.89 | 1.167   62.12 | 2.167   12.48 |  3.17    3.91
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```
               0.250    3.67 | 1.250  196.54 | 2.250    9.60 |  3.25    3.44
               0.333    3.67 | 1.333  196.54 | 2.333    9.60 |  3.33    3.44
               0.417    4.88 | 1.417   83.09 | 2.417    7.66 |  3.42    3.05
               0.500    4.88 | 1.500   83.09 | 2.500    7.66 |  3.50    3.05
               0.583    6.96 | 1.583   41.25 | 2.583    6.29 |  3.58    2.73
               0.667    6.96 | 1.667   41.25 | 2.667    6.29 |  3.67    2.73
               0.750   11.02 | 1.750   25.07 | 2.750    5.28 |  3.75    2.47
               0.833   11.02 | 1.833   25.07 | 2.833    5.28 |  3.83    2.47
               0.917   21.03 | 1.917   17.06 | 2.917    4.51 |  3.92    2.24
               1.000   21.03 | 2.000   17.06 | 3.000    4.51 |  4.00    2.24

    Unit Hyd Qpeak  (cms)=   1.660

    PEAK FLOW       (cms)=   2.351 (i)
    TIME TO PEAK    (hrs)=   2.083
    RUNOFF VOLUME    (mm)=  48.546
    TOTAL RAINFALL   (mm)=  89.870
    RUNOFF COEFFICIENT   =   0.540

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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*********************************
** SIMULATION:Hzl48h15        **
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|    READ STORM    |    Filename: C:\Users\kbobinac\AppD
|                  |              ata\Local\Temp\
|                  |              a1a19623-6c98-4494-89bb-372e92644e74\39ccfdd4
| Ptotal=285.00 mm |    Comments: Hzl48h15
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```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.00	12.00	2.00	24.00	2.00	36.00	6.00
0.25	2.00	12.25	2.00	24.25	2.00	36.25	6.00
0.50	2.00	12.50	2.00	24.50	2.00	36.50	6.00
0.75	2.00	12.75	2.00	24.75	2.00	36.75	6.00
1.00	2.00	13.00	2.00	25.00	2.00	37.00	4.00
1.25	2.00	13.25	2.00	25.25	2.00	37.25	4.00
1.50	2.00	13.50	2.00	25.50	2.00	37.50	4.00
1.75	2.00	13.75	2.00	25.75	2.00	37.75	4.00
2.00	2.00	14.00	2.00	26.00	2.00	38.00	6.00
2.25	2.00	14.25	2.00	26.25	2.00	38.25	6.00
2.50	2.00	14.50	2.00	26.50	2.00	38.50	6.00
2.75	2.00	14.75	2.00	26.75	2.00	38.75	6.00
3.00	2.00	15.00	2.00	27.00	2.00	39.00	13.00
3.25	2.00	15.25	2.00	27.25	2.00	39.25	13.00
3.50	2.00	15.50	2.00	27.50	2.00	39.50	13.00
3.75	2.00	15.75	2.00	27.75	2.00	39.75	13.00
4.00	2.00	16.00	2.00	28.00	2.00	40.00	17.00
4.25	2.00	16.25	2.00	28.25	2.00	40.25	17.00
4.50	2.00	16.50	2.00	28.50	2.00	40.50	17.00
4.75	2.00	16.75	2.00	28.75	2.00	40.75	17.00
5.00	2.00	17.00	2.00	29.00	2.00	41.00	13.00
5.25	2.00	17.25	2.00	29.25	2.00	41.25	13.00
5.50	2.00	17.50	2.00	29.50	2.00	41.50	13.00
5.75	2.00	17.75	2.00	29.75	2.00	41.75	13.00
6.00	2.00	18.00	2.00	30.00	2.00	42.00	23.00
6.25	2.00	18.25	2.00	30.25	2.00	42.25	23.00
6.50	2.00	18.50	2.00	30.50	2.00	42.50	23.00
6.75	2.00	18.75	2.00	30.75	2.00	42.75	23.00
7.00	2.00	19.00	2.00	31.00	2.00	43.00	13.00
7.25	2.00	19.25	2.00	31.25	2.00	43.25	13.00
7.50	2.00	19.50	2.00	31.50	2.00	43.50	13.00
7.75	2.00	19.75	2.00	31.75	2.00	43.75	13.00
8.00	2.00	20.00	2.00	32.00	2.00	44.00	13.00
8.25	2.00	20.25	2.00	32.25	2.00	44.25	13.00
8.50	2.00	20.50	2.00	32.50	2.00	44.50	13.00
8.75	2.00	20.75	2.00	32.75	2.00	44.75	13.00
9.00	2.00	21.00	2.00	33.00	2.00	45.00	53.00
9.25	2.00	21.25	2.00	33.25	2.00	45.25	53.00
9.50	2.00	21.50	2.00	33.50	2.00	45.50	53.00
9.75	2.00	21.75	2.00	33.75	2.00	45.75	53.00
10.00	2.00	22.00	2.00	34.00	2.00	46.00	38.00
10.25	2.00	22.25	2.00	34.25	2.00	46.25	38.00
10.50	2.00	22.50	2.00	34.50	2.00	46.50	38.00
10.75	2.00	22.75	2.00	34.75	2.00	46.75	38.00
11.00	2.00	23.00	2.00	35.00	3.00	47.00	13.00
11.25	2.00	23.25	2.00	35.25	3.00	47.25	13.00
11.50	2.00	23.50	2.00	35.50	3.00	47.50	13.00
11.75	2.00	23.75	2.00	35.75	3.00	47.75	13.00

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| CALIB            |
| NASHYD   (  0107)|   Area    (ha)=  12.69   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

        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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00

6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 1.183

PEAK FLOW (cms)= 1.637 (i)
TIME TO PEAK (hrs)= 46.167

RUNOFF VOLUME (mm)= 228.213
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.801

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

CALIB					
NASHYD (0108)	Area (ha)= 29.56	Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.68	

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00

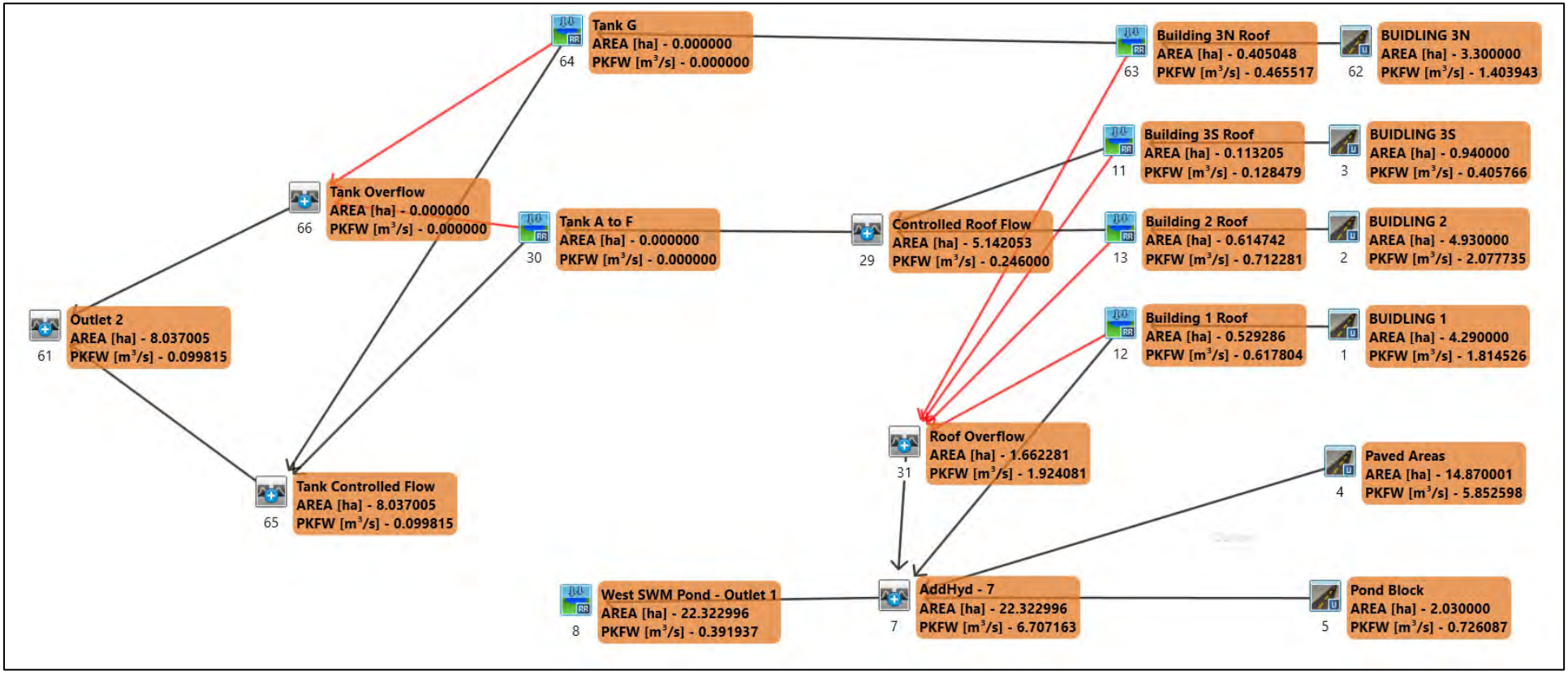
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00

11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 1.660

PEAK FLOW (cms)= 3.344 (i)
TIME TO PEAK (hrs)= 46.583
RUNOFF VOLUME (mm)= 228.235
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.801

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



Proposed Conditions Schematic

25mm 4HR SIMULATION STORM

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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```

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

```
  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\a8f96fe6-
834f-4b63-bf55-feb5c8813e2e\sce
  Summary filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\a8f96fe6-
834f-4b63-bf55-feb5c8813e2e\sce

DATE: 11/30/2023                          TIME: 05:04:17

USER:


COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 0A_25MM4HR                    **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\kbobinac\AppD
|                  |              ata\Local\Temp\
|                  |              9a966027-3062-4799-96eb-a80cf3166d02\30ab2661
| Ptotal= 25.00 mm |    Comments: 25MM4HR
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    2.07 |  1.00    5.70 |  2.00    5.19 |  3.00    2.80
               0.17    2.27 |  1.17   10.78 |  2.17    4.47 |  3.17    2.62
               0.33    2.52 |  1.33   50.21 |  2.33    3.95 |  3.33    2.48
               0.50    2.88 |  1.50   13.37 |  2.50    3.56 |  3.50    2.35
               0.67    3.38 |  1.67    8.29 |  2.67    3.25 |  3.67    2.23
               0.83    4.18 |  1.83    6.30 |  2.83    3.01 |  3.83    2.14

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

--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=   4.93
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.88         0.05
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     181.29        40.00
     Mannings n           =      0.013        0.250

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



```
                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
               0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
               0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
               0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
               0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
               0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
               0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
               0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
               0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
               0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
               0.917    4.18 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
               1.000    4.18 | 2.000    6.30 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21        14.26
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       4.81 (ii)    6.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.22         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.61         0.00          0.614 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.58           1.50
     RUNOFF VOLUME    (mm)=      24.00         8.08          23.84
     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =       0.96         0.32           0.95

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. 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(  0013)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.2070      0.1970

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      4.930      0.614      1.50      23.84
   OUTFLOW: ID= 1 (  0013)      4.930      0.072      2.17      23.79
   OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.78
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0688

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   4.29
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.25         0.04
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.12        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
```

```
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
               0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
               0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
               0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
               0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
               0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
               0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
               0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
               0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
               0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
               0.917    4.18 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
               1.000    4.18 | 2.000    6.30 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21        14.26
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       4.61 (ii)    6.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.22         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.54         0.00          0.539 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.58          1.50
     RUNOFF VOLUME    (mm)=      24.00         8.08         23.84
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.32          0.95

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. 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(  0012)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.1800     0.1720

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0001)     4.290     0.539      1.50      23.84
   OUTFLOW: ID= 1 (  0012)     4.290     0.063      2.17      23.78
   OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.63
                  TIME SHIFT OF PEAK FLOW        (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0600

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0003)|   Area    (ha)=   0.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.93         0.01
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      79.16        40.00
     Mannings n            =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
               0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
               0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
               0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
               0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
               0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
               0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
               0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
               0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
               0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
               0.917    4.18 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
               1.000    4.18 | 2.000    6.30 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21        14.26
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.92 (ii)    4.40 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.28         0.23
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.13         0.00          0.127 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.50          1.50
     RUNOFF VOLUME    (mm)=      24.00         8.08         23.84
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.32          0.95

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. 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(  0011)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0390     0.0380

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0003)     0.940     0.127      1.50      23.84
   OUTFLOW: ID= 1 (  0011)     0.940     0.014      2.17      23.58
   OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.69
                  TIME SHIFT OF PEAK FLOW        (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0132

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0062)|   Area    (ha)=   3.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.27         0.03
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     148.32        40.00
     Mannings n            =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
```

```
                0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
                0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
                0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
                0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
                0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
                0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
                0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
                0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
                0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
                0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
                0.917    4.18 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
                1.000    4.18 | 2.000    6.30 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21        14.26
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       4.26 (ii)    5.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.23         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.42         0.00          0.422 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.58          1.50
     RUNOFF VOLUME    (mm)=      24.00         8.08         23.84
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.32          0.95

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. 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(  0063)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.1390     0.1320

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0062)     3.300     0.422      1.50      23.84
   OUTFLOW: ID= 1 (  0063)     3.300     0.049      2.17      23.77
   OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.50
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0461

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

--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0011 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0012 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0031)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 3> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0013 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 1> IS ALSO DRY
--------------------------------------------------------------------------------
```



```
--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0063 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.46         0.57
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.33        40.00
     Mannings n            =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
               0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
               0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
               0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
               0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
               0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
               0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
               0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
               0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
               0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
               0.917    4.18 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
               1.000    4.18 | 2.000    6.30 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21         9.88
               over (min)        5.00        25.00
     Storage Coeff.  (min)=       3.68 (ii)   21.50 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=       0.25         0.05
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.19         0.01          0.196 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.83          1.50
     RUNOFF VOLUME    (mm)=      24.00         8.08         19.53
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.32          0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=  14.87
|ID= 1 DT= 5.0 min |   Total Imp(%)=  95.00   Dir. Conn.(%)=  95.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.13         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     314.85        40.00
     Mannings n            =      0.013        0.250

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

```
                    ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
 0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
 0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
 0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
 0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
 0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
 0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
 0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
 0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
 0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
 0.917    4.18 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
 1.000    4.18 | 2.000    6.30 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21        14.26
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      6.70 (ii)    9.56 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.18         0.11
                                              *TOTALS*
     PEAK FLOW       (cms)=      1.61         0.02          1.627 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.58           1.50
     RUNOFF VOLUME    (mm)=     24.00         8.08          23.20
     TOTAL RAINFALL   (mm)=     25.00        25.00          25.00
     RUNOFF COEFFICIENT   =      0.96         0.32           0.93


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
        ID1= 1 (  0012):     4.29   0.063     2.17    23.78
      + ID2= 2 (  0031):     0.00   0.000     0.00     0.00
        ==================================================
        ID = 3 (  0007):     4.29   0.063     2.17    23.78

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

--------------------
| ADD HYD  (  0007)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0007):     4.29   0.063     2.17    23.78
      + ID2= 2 (  0004):    14.87   1.627     1.50    23.20
        ==================================================
        ID = 1 (  0007):    19.16   1.664     1.50    23.33

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

--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0007):    19.16   1.664     1.50    23.33
      + ID2= 2 (  0005):     2.03   0.196     1.50    19.53
        ==================================================
        ID = 3 (  0007):    21.19   1.860     1.50    22.97

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



```
| RESERVOIR(  0008)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |  0.4990      1.4692
                          0.0070     0.2185   |  0.5260      1.5717
                          0.0090     0.3744   |  0.7070      1.7814
                          0.0490     0.5385   |  1.0740      1.9972
                          0.2300     0.7995   |  1.3010      2.1075
                          0.3350     0.9822   |  1.8240      2.3326
                          0.3740     1.0761   |  2.1160      2.4475
                          0.4410     1.2692   |  3.0960      2.8018

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)     21.190      1.860      1.50      22.97
   OUTFLOW: ID= 1 (  0008)     21.190      0.024      5.92      19.40

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.31
                TIME SHIFT OF PEAK FLOW          (min)=265.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.4374

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0011):     0.94   0.014     2.17    23.58
      + ID2= 2 (  0013):     4.93   0.072     2.17    23.79
        ==================================================
        ID = 3 (  0029):     5.87   0.086     2.17    23.76

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                          0.0001     0.0089   |  0.0468      0.2012
                          0.0080     0.0440   |  0.0508      0.2137
                          0.0177     0.0783   |  0.0544      0.2247
                          0.0235     0.1115   |  0.0709      0.2342
                          0.0292     0.1511   |  0.0998      0.2429
                          0.0388     0.1807   |  0.1169      0.2472

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)     5.870      0.086      2.17      23.76
   OUTFLOW: ID= 1 (  0030)     5.870      0.020      7.25      22.12
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 23.47
                TIME SHIFT OF PEAK FLOW          (min)=305.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.0923

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0064)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |  0.0175      0.0792
                          0.0023     0.0112   |  0.0222      0.0973
                          0.0058     0.0278   |  0.0327      0.1273
                          0.0129     0.0595   |  0.0362      0.1357

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

```
   INFLOW : ID= 2 (  0063)      3.300      0.049      2.17      23.77
   OUTFLOW: ID= 1 (  0064)      3.300      0.011      7.25      23.40
   OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 23.03
                  TIME SHIFT OF PEAK FLOW         (min)=305.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0519

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

-------------------
| ADD HYD  (  0065)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):     5.87   0.020     7.25    22.12
     + ID2= 2 (  0064):     3.30   0.011     7.25    23.40
       ================================================
       ID = 3 (  0065):     9.17   0.031     7.25    22.58

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

-------------------
| ADD HYD  (  0066)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0030 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0064 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0065):     9.17   0.031     7.25    22.58
     + ID2= 2 (  0066):     0.00   0.000     0.00    22.58
       ================================================
       ID = 3 (  0061):     9.17   0.031     7.25    22.58

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

 FINISH
```


2YR 4HR CHICAGO STORM SIMULATION

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

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\80d6d6c3-
6637-4fe1-b2e8-c4420b8fef8b\sce
  Summary filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\80d6d6c3-
6637-4fe1-b2e8-c4420b8fef8b\sce


DATE: 11/30/2023                          TIME: 05:04:16

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : A_2yr 4hr 10min Chicago       **
  ************************************************

-------------------
| CHICAGO STORM    |    IDF curve parameters: A=1070.000
| Ptotal= 34.22 mm |                          B=   7.850
-------------------                          C=   0.876
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs  mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    1.53 |  1.00   19.60 |  2.00    4.48 |  3.00    1.89
                0.17    1.81 |  1.17   85.72 |  2.17    3.65 |  3.17    1.73
                0.33    2.22 |  1.33   26.59 |  2.33    3.08 |  3.33    1.59
                0.50    2.87 |  1.50   12.64 |  2.50    2.66 |  3.50    1.47
                0.67    4.06 |  1.67    7.99 |  2.67    2.34 |  3.67    1.37
                0.83    6.86 |  1.83    5.76 |  2.83    2.10 |  3.83    1.29


--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=   4.93
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
-------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.88          0.05
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
```

```
     Length           (m)=     181.29       40.00
     Mannings n         =      0.013       0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.53 | 1.083   19.60 | 2.083    4.48 |  3.08    1.89
               0.167    1.53 | 1.167   19.60 | 2.167    4.48 |  3.17    1.89
               0.250    1.81 | 1.250   85.72 | 2.250    3.65 |  3.25    1.73
               0.333    1.81 | 1.333   85.72 | 2.333    3.65 |  3.33    1.73
               0.417    2.22 | 1.417   26.59 | 2.417    3.08 |  3.42    1.59
               0.500    2.22 | 1.500   26.59 | 2.500    3.08 |  3.50    1.59
               0.583    2.87 | 1.583   12.64 | 2.583    2.66 |  3.58    1.47
               0.667    2.87 | 1.667   12.64 | 2.667    2.66 |  3.67    1.47
               0.750    4.06 | 1.750    7.99 | 2.750    2.34 |  3.75    1.37
               0.833    4.06 | 1.833    7.99 | 2.833    2.34 |  3.83    1.37
               0.917    6.86 | 1.917    5.76 | 2.917    2.10 |  3.92    1.29
               1.000    6.86 | 2.000    5.76 | 3.000    2.10 |  4.00    1.29

     Max.Eff.Inten.(mm/hr)=      85.72       31.78
               over (min)        5.00       10.00
     Storage Coeff.  (min)=      3.88 (ii)   5.08 (ii)
     Unit Hyd. Tpeak (min)=      5.00       10.00
     Unit Hyd. peak  (cms)=      0.25        0.16
                                                    *TOTALS*
     PEAK FLOW       (cms)=      1.09        0.00        1.096 (iii)
     TIME TO PEAK    (hrs)=      1.33        1.42         1.33
     RUNOFF VOLUME    (mm)=     33.22       13.81        33.02
     TOTAL RAINFALL   (mm)=     34.22       34.22        34.22
     RUNOFF COEFFICIENT   =      0.97        0.40         0.97

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. 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(  0013)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.2070      0.1970

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)     4.930      1.096      1.33      33.02
   OUTFLOW: ID= 1 (  0013)     4.930      0.115      1.83      32.98
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.54
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1099

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   4.29
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.25        0.04
     Dep. Storage     (mm)=       1.00        1.50
     Average Slope     (%)=       1.00        2.00
     Length            (m)=     169.12       40.00
```



```
     Mannings n         =      0.013       0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    1.53 | 1.083   19.60 | 2.083    4.48 |  3.08    1.89
               0.167    1.53 | 1.167   19.60 | 2.167    4.48 |  3.17    1.89
               0.250    1.81 | 1.250   85.72 | 2.250    3.65 |  3.25    1.73
               0.333    1.81 | 1.333   85.72 | 2.333    3.65 |  3.33    1.73
               0.417    2.22 | 1.417   26.59 | 2.417    3.08 |  3.42    1.59
               0.500    2.22 | 1.500   26.59 | 2.500    3.08 |  3.50    1.59
               0.583    2.87 | 1.583   12.64 | 2.583    2.66 |  3.58    1.47
               0.667    2.87 | 1.667   12.64 | 2.667    2.66 |  3.67    1.47
               0.750    4.06 | 1.750    7.99 | 2.750    2.34 |  3.75    1.37
               0.833    4.06 | 1.833    7.99 | 2.833    2.34 |  3.83    1.37
               0.917    6.86 | 1.917    5.76 | 2.917    2.10 |  3.92    1.29
               1.000    6.86 | 2.000    5.76 | 3.000    2.10 |  4.00    1.29

     Max.Eff.Inten.(mm/hr)=      85.72       31.78
               over (min)        5.00        5.00
     Storage Coeff.  (min)=      3.72 (ii)   4.92 (ii)
     Unit Hyd. Tpeak (min)=      5.00        5.00
     Unit Hyd. peak  (cms)=      0.25        0.22
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.96        0.00         0.961 (iii)
     TIME TO PEAK    (hrs)=      1.33        1.33         1.33
     RUNOFF VOLUME    (mm)=     33.22       13.81        33.02
     TOTAL RAINFALL   (mm)=     34.22       34.22        34.22
     RUNOFF COEFFICIENT   =      0.97        0.40         0.97

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. 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(  0012)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.1800      0.1720

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0001)     4.290      0.961      1.33      33.02
   OUTFLOW: ID= 1 (  0012)     4.290      0.100      1.83      32.97
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.42
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0957

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0003)|   Area    (ha)=   0.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.93        0.01
     Dep. Storage     (mm)=       1.00        1.50
     Average Slope     (%)=       1.00        2.00
     Length            (m)=      79.16       40.00
     Mannings n          =      0.013       0.250
```

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

			TOTALS
Max.Eff.Inten.(mm/hr)=	85.72	31.78	
over (min)	5.00	5.00	
Storage Coeff. (min)=	2.36 (ii)	3.56 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.30	0.26	
PEAK FLOW (cms)=	0.22	0.00	0.220 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	33.22	13.81	33.02
TOTAL RAINFALL (mm)=	34.22	34.22	34.22
RUNOFF COEFFICIENT =	0.97	0.40	0.97

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0011) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0390	0.0380

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	0.940	0.220	1.33	33.02
OUTFLOW: ID= 1 (0011)	0.940	0.022	1.83	32.77
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.83
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.0211

CALIB STANDHYD (0062) ID= 1 DT= 5.0 min	Area (ha)= 3.30 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.27	0.03
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	148.32	40.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

			TOTALS
Max.Eff.Inten.(mm/hr)=	85.72	31.78	
over (min)	5.00	5.00	
Storage Coeff. (min)=	3.44 (ii)	4.64 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.26	0.22	
PEAK FLOW (cms)=	0.74	0.00	0.748 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	33.22	13.81	33.02
TOTAL RAINFALL (mm)=	34.22	34.22	34.22
RUNOFF COEFFICIENT =	0.97	0.40	0.97

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0063) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1390	0.1320

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0062)	3.300	0.748	1.33	33.02
OUTFLOW: ID= 1 (0063)	3.300	0.077	1.83	32.95
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.36
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.0736

ADD HYD (0031) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
*** W A R N I N G : HYDROGRAPH 0011 <ID= 1> IS DRY.				
*** W A R N I N G : HYDROGRAPH 0012 <ID= 2> IS DRY.				
*** W A R N I N G : HYDROGRAPH 0031 <ID= 3> IS ALSO DRY				

ADD HYD (0031) 3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.

```
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 3> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0013 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 1> IS ALSO DRY
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0063 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.46         0.57
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.33        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    1.53 | 1.083   19.60 | 2.083    4.48 |  3.08    1.89
              0.167    1.53 | 1.167   19.60 | 2.167    4.48 |  3.17    1.89
              0.250    1.81 | 1.250   85.72 | 2.250    3.65 |  3.25    1.73
              0.333    1.81 | 1.333   85.72 | 2.333    3.65 |  3.33    1.73
              0.417    2.22 | 1.417   26.59 | 2.417    3.08 |  3.42    1.59
              0.500    2.22 | 1.500   26.59 | 2.500    3.08 |  3.50    1.59
              0.583    2.87 | 1.583   12.64 | 2.583    2.66 |  3.58    1.47
              0.667    2.87 | 1.667   12.64 | 2.667    2.66 |  3.67    1.47
              0.750    4.06 | 1.750    7.99 | 2.750    2.34 |  3.75    1.37
              0.833    4.06 | 1.833    7.99 | 2.833    2.34 |  3.83    1.37
              0.917    6.86 | 1.917    5.76 | 2.917    2.10 |  3.92    1.29
              1.000    6.86 | 2.000    5.76 | 3.000    2.10 |  4.00    1.29

     Max.Eff.Inten.(mm/hr)=      85.72        25.86
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       2.98 (ii)   15.10 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.28         0.07
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.34         0.02       0.347 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.58        1.33
     RUNOFF VOLUME    (mm)=      33.22        13.81       27.78
     TOTAL RAINFALL   (mm)=      34.22        34.22       34.22
     RUNOFF COEFFICIENT   =       0.97         0.40        0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=  14.87
|ID= 1 DT= 5.0 min |   Total Imp(%)=  95.00   Dir. Conn.(%)=  95.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.13         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
```



```
     Length            (m)=     314.85        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    1.53 | 1.083   19.60 | 2.083    4.48 |  3.08    1.89
              0.167    1.53 | 1.167   19.60 | 2.167    4.48 |  3.17    1.89
              0.250    1.81 | 1.250   85.72 | 2.250    3.65 |  3.25    1.73
              0.333    1.81 | 1.333   85.72 | 2.333    3.65 |  3.33    1.73
              0.417    2.22 | 1.417   26.59 | 2.417    3.08 |  3.42    1.59
              0.500    2.22 | 1.500   26.59 | 2.500    3.08 |  3.50    1.59
              0.583    2.87 | 1.583   12.64 | 2.583    2.66 |  3.58    1.47
              0.667    2.87 | 1.667   12.64 | 2.667    2.66 |  3.67    1.47
              0.750    4.06 | 1.750    7.99 | 2.750    2.34 |  3.75    1.37
              0.833    4.06 | 1.833    7.99 | 2.833    2.34 |  3.83    1.37
              0.917    6.86 | 1.917    5.76 | 2.917    2.10 |  3.92    1.29
              1.000    6.86 | 2.000    5.76 | 3.000    2.10 |  4.00    1.29

     Max.Eff.Inten.(mm/hr)=      85.72        31.78
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       5.41 (ii)    7.72 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.21         0.13
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.94         0.05       2.980 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42        1.33
     RUNOFF VOLUME    (mm)=      33.22        13.81       32.25
     TOTAL RAINFALL   (mm)=      34.22        34.22       34.22
     RUNOFF COEFFICIENT   =       0.97         0.40        0.94


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
         ID1= 1 (  0012):     4.29   0.100     1.83    32.97
       + ID2= 2 (  0031):     0.00   0.000     0.00     0.00
         ================================================
         ID = 3 (  0007):     4.29   0.100     1.83    32.97

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

--------------------
| ADD HYD  (  0007)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 3 (  0007):     4.29   0.100     1.83    32.97
       + ID2= 2 (  0004):    14.87   2.980     1.33    32.25
         ================================================
         ID = 1 (  0007):    19.16   3.039     1.33    32.41

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

--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (  0007):    19.16   3.039     1.33    32.41
       + ID2= 2 (  0005):     2.03   0.347     1.33    27.78
```

```
       ================================================
       ID = 3 (  0007):    21.19   3.386     1.33    31.97

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0008)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.4990      1.4692
                         0.0070     0.2185   |   0.5260      1.5717
                         0.0090     0.3744   |   0.7070      1.7814
                         0.0490     0.5385   |   1.0740      1.9972
                         0.2300     0.7995   |   1.3010      2.1075
                         0.3350     0.9822   |   1.8240      2.3326
                         0.3740     1.0761   |   2.1160      2.4475
                         0.4410     1.2692   |   3.0960      2.8018

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)     21.190      3.386      1.33      31.97
   OUTFLOW: ID= 1 (  0008)     21.190      0.074      4.17      28.07

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.18
                  TIME SHIFT OF PEAK FLOW         (min)=170.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.5745

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

-------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0011):     0.94   0.022     1.83    32.77
     + ID2= 2 (  0013):     4.93   0.115     1.83    32.98
       ================================================
       ID = 3 (  0029):     5.87   0.137     1.83    32.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                         0.0001     0.0089   |   0.0468      0.2012
                         0.0080     0.0440   |   0.0508      0.2137
                         0.0177     0.0783   |   0.0544      0.2247
                         0.0235     0.1115   |   0.0709      0.2342
                         0.0292     0.1511   |   0.0998      0.2429
                         0.0388     0.1807   |   0.1169      0.2472

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)     5.870      0.137      1.83      32.94
   OUTFLOW: ID= 1 (  0030)     5.870      0.026      7.08      31.31
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 19.03
                  TIME SHIFT OF PEAK FLOW         (min)=315.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1295

--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0064)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0175      0.0792
```



```
                         0.0023     0.0112   |   0.0222      0.0973
                         0.0058     0.0278   |   0.0327      0.1273
                         0.0129     0.0595   |   0.0362      0.1357

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0063)     3.300      0.077      1.83      32.95
   OUTFLOW: ID= 1 (  0064)     3.300      0.016      6.92      32.59
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 20.37
                  TIME SHIFT OF PEAK FLOW         (min)=305.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0718

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

-------------------
| ADD HYD  (  0065)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):     5.87   0.026     7.08    31.31
     + ID2= 2 (  0064):     3.30   0.016     6.92    32.59
       ================================================
       ID = 3 (  0065):     9.17   0.042     7.00    31.77

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

-------------------
| ADD HYD  (  0066)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0030 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0064 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0065):     9.17   0.042     7.00    31.77
     + ID2= 2 (  0066):     0.00   0.000     0.00    31.77
       ================================================
       ID = 3 (  0061):     9.17   0.042     7.00    31.77

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

5YR 4HR CHICAGO STORM SIMULATION

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
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0432-4ae3-a4d7-29d4f520abc6\sce


DATE: 11/30/2023                          TIME: 05:04:16

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : B_5yr 4hr 10min Chicago       **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1593.000
| Ptotal= 49.55 mm |                          B=  11.000
--------------------                          C=   0.879
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.35 |  1.00   30.47 |  2.00    7.17 |  3.00    2.93
                0.17    2.80 |  1.17  109.68 |  2.17    5.81 |  3.17    2.67
                0.33    3.46 |  1.33   40.71 |  2.33    4.87 |  3.33    2.45
                0.50    4.52 |  1.50   20.28 |  2.50    4.19 |  3.50    2.26
                0.67    6.48 |  1.67   12.91 |  2.67    3.67 |  3.67    2.10
                0.83   11.07 |  1.83    9.28 |  2.83    3.26 |  3.83    1.96


------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=   4.93
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.88         0.05
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     181.29        40.00
     Mannings n           =      0.013        0.250
```



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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   2.35 | 1.083   30.47 | 2.083   7.17 |  3.08    2.93
                0.167   2.35 | 1.167   30.47 | 2.167   7.17 |  3.17    2.93
                0.250   2.80 | 1.250  109.68 | 2.250   5.81 |  3.25    2.67
                0.333   2.80 | 1.333  109.68 | 2.333   5.81 |  3.33    2.67
                0.417   3.46 | 1.417   40.71 | 2.417   4.87 |  3.42    2.45
                0.500   3.46 | 1.500   40.71 | 2.500   4.87 |  3.50    2.45
                0.583   4.52 | 1.583   20.28 | 2.583   4.19 |  3.58    2.26
                0.667   4.52 | 1.667   20.28 | 2.667   4.19 |  3.67    2.26
                0.750   6.48 | 1.750   12.91 | 2.750   3.67 |  3.75    2.10
                0.833   6.48 | 1.833   12.91 | 2.833   3.67 |  3.83    2.10
                0.917  11.07 | 1.917    9.28 | 2.917   3.26 |  3.92    1.96
                1.000  11.07 | 2.000    9.28 | 3.000   3.26 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     109.68        52.32
               over (min)          5.00         5.00
     Storage Coeff.  (min)=       3.52 (ii)    4.60 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.26         0.23
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.42         0.01          1.430 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      48.55        24.86          48.32
     TOTAL RAINFALL   (mm)=      49.55        49.55          49.55
     RUNOFF COEFFICIENT   =       0.98         0.50           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. 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(  0013)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.2070      0.1970

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      4.930     1.430      1.33       48.32
   OUTFLOW: ID= 1 (  0013)      4.930     0.165      1.83       48.27
   OVERFLOW:ID= 3 (  0003)      0.000     0.000      0.00        0.00

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.57
                    TIME SHIFT OF PEAK FLOW         (min)= 30.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.1577

------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   4.29
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.25         0.04
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.12        40.00
     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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Max.Eff.Inten.(mm/hr)=		109.68	52.32	
over (min)		5.00	5.00	
Storage Coeff. (min)=		3.37 (ii)	4.46 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.26	0.23	
				TOTALS
PEAK FLOW	(cms)=	1.25	0.01	1.251 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	48.55	24.86	48.32
TOTAL RAINFALL	(mm)=	49.55	49.55	49.55
RUNOFF COEFFICIENT	=	0.98	0.50	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0012)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1800	0.1720

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (	0001)	4.290	1.251	1.33	48.32
OUTFLOW: ID= 1 (	0012)	4.290	0.144	1.83	48.26
OVERFLOW:ID= 3 (	0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.47
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.1374

CALIB			
STANDHYD (0003)	Area (ha)= 0.94		
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.93	0.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	79.16	40.00
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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Max.Eff.Inten.(mm/hr)=		109.68	52.32	
over (min)		5.00	5.00	
Storage Coeff. (min)=		2.14 (ii)	3.22 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.31	0.27	
				TOTALS
PEAK FLOW	(cms)=	0.28	0.00	0.283 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	48.55	24.86	48.31
TOTAL RAINFALL	(mm)=	49.55	49.55	49.55
RUNOFF COEFFICIENT	=	0.98	0.50	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0011)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0390	0.0380

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (	0003)	0.940	0.283	1.33	48.31
OUTFLOW: ID= 1 (	0011)	0.940	0.031	1.83	48.06
OVERFLOW:ID= 3 (	0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.95
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.0302

CALIB			
STANDHYD (0062)	Area (ha)= 3.30		
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.27	0.03
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	148.32	40.00
Mannings n	=	0.013	0.250

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

```
                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
    hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.083    2.35 | 1.083   30.47 | 2.083    7.17 |  3.08    2.93
  0.167    2.35 | 1.167   30.47 | 2.167    7.17 |  3.17    2.93
  0.250    2.80 | 1.250  109.68 | 2.250    5.81 |  3.25    2.67
  0.333    2.80 | 1.333  109.68 | 2.333    5.81 |  3.33    2.67
  0.417    3.46 | 1.417   40.71 | 2.417    4.87 |  3.42    2.45
  0.500    3.46 | 1.500   40.71 | 2.500    4.87 |  3.50    2.45
  0.583    4.52 | 1.583   20.28 | 2.583    4.19 |  3.58    2.26
  0.667    4.52 | 1.667   20.28 | 2.667    4.19 |  3.67    2.26
  0.750    6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
  0.833    6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
  0.917   11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
  1.000   11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     109.68        52.32
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       3.12 (ii)    4.20 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.27         0.24
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.97         0.00          0.971 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      48.55        24.86          48.32
     TOTAL RAINFALL   (mm)=      49.55        49.55          49.55
     RUNOFF COEFFICIENT   =       0.98         0.50           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. 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(  0063)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.1390      0.1320

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0062)     3.300      0.971      1.33      48.32
   OUTFLOW: ID= 1 (  0063)     3.300      0.111      1.83      48.25
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.43
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1056

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

--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0011 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0012 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0031)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 3> IS DRY.
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*** W A R N I N G :  HYDROGRAPH   0013 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 1> IS ALSO DRY
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0063 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.46         0.57
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.33        40.00
     Mannings n            =      0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
    hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.083    2.35 | 1.083   30.47 | 2.083    7.17 |  3.08    2.93
  0.167    2.35 | 1.167   30.47 | 2.167    7.17 |  3.17    2.93
  0.250    2.80 | 1.250  109.68 | 2.250    5.81 |  3.25    2.67
  0.333    2.80 | 1.333  109.68 | 2.333    5.81 |  3.33    2.67
  0.417    3.46 | 1.417   40.71 | 2.417    4.87 |  3.42    2.45
  0.500    3.46 | 1.500   40.71 | 2.500    4.87 |  3.50    2.45
  0.583    4.52 | 1.583   20.28 | 2.583    4.19 |  3.58    2.26
  0.667    4.52 | 1.667   20.28 | 2.667    4.19 |  3.67    2.26
  0.750    6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
  0.833    6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
  0.917   11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
  1.000   11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     109.68        52.32
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.70 (ii)    7.36 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.13
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.44         0.06          0.487 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      48.55        24.86          41.92
     TOTAL RAINFALL   (mm)=      49.55        49.55          49.55
     RUNOFF COEFFICIENT   =       0.98         0.50           0.85

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=  14.87
|ID= 1 DT= 5.0 min |   Total Imp(%)=  95.00   Dir. Conn.(%)=  95.00
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.13         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     314.85        40.00
     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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Max.Eff.Inten.(mm/hr)=	109.68	52.32	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.90 (ii)	6.99 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.22	0.14	
			TOTALS
PEAK FLOW (cms)=	3.89	0.08	3.954 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	48.55	24.86	47.37
TOTAL RAINFALL (mm)=	49.55	49.55	49.55
RUNOFF COEFFICIENT =	0.98	0.50	0.96

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0007)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
*** W A R N I N G : HYDROGRAPH 0031 <ID= 2> IS DRY.					
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001					
ID1= 1 (0012):		4.29	0.144	1.83	48.26
+ ID2= 2 (0031):		0.00	0.000	0.00	0.00
ID = 3 (0007):		4.29	0.144	1.83	48.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0007)					
3 + 2 = 1		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0007):		4.29	0.144	1.83	48.26
+ ID2= 2 (0004):		14.87	3.954	1.33	47.37
ID = 1 (0007):		19.16	4.039	1.33	47.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0007)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0007):		19.16	4.039	1.33	47.57
+ ID2= 2 (0005):		2.03	0.487	1.33	41.92
ID = 3 (0007):		21.19	4.527	1.33	47.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4990	1.4692
	0.0070	0.2185	0.5260	1.5717
	0.0090	0.3744	0.7070	1.7814
	0.0490	0.5385	1.0740	1.9972
	0.2300	0.7995	1.3010	2.1075
	0.3350	0.9822	1.8240	2.3326
	0.3740	1.0761	2.1160	2.4475
	0.4410	1.2692	3.0960	2.8018

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0007)	21.190	4.527	1.33	47.03
OUTFLOW: ID= 1 (0008)	21.190	0.199	3.75	42.98

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.40
TIME SHIFT OF PEAK FLOW (min)=145.00
MAXIMUM STORAGE USED (ha.m.)= 0.7554

ADD HYD (0029)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):		0.94	0.031	1.83	48.06
+ ID2= 2 (0013):		4.93	0.165	1.83	48.27
ID = 3 (0029):		5.87	0.196	1.83	48.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0030)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
**** WARNING : FIRST OUTFLOW IS NOT ZERO.				
	0.0001	0.0089	0.0468	0.2012
	0.0080	0.0440	0.0508	0.2137
	0.0177	0.0783	0.0544	0.2247
	0.0235	0.1115	0.0709	0.2342
	0.0292	0.1511	0.0998	0.2429
	0.0388	0.1807	0.1169	0.2472

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0029)	5.870	0.196	1.83	48.23
OUTFLOW: ID= 1 (0030)	5.870	0.042	6.83	46.60
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.22
TIME SHIFT OF PEAK FLOW (min)=300.00
MAXIMUM STORAGE USED (ha.m.)= 0.1881

RESERVOIR(0064)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0175	0.0792
	0.0023	0.0112	0.0222	0.0973

```
                        0.0058     0.0278   |   0.0327      0.1273
                        0.0129     0.0595   |   0.0362      0.1357

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0063)     3.300     0.111      1.83      48.25
   OUTFLOW: ID= 1 (  0064)     3.300     0.024      6.75      47.88
   OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 22.05
                  TIME SHIFT OF PEAK FLOW         (min)=295.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1038

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

-------------------
| ADD HYD  (  0065)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):     5.87   0.042     6.83    46.60
     + ID2= 2 (  0064):     3.30   0.024     6.75    47.88
       ================================================
       ID = 3 (  0065):     9.17   0.066     6.83    47.06

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

-------------------
| ADD HYD  (  0066)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0030 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0064 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0065):     9.17   0.066     6.83    47.06
     + ID2= 2 (  0066):     0.00   0.000     0.00    47.06
       ================================================
       ID = 3 (  0061):     9.17   0.066     6.83    47.06

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


10YR 4HR CHICAGO STORM SIMULATION

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\53f68775-
6f39-4751-a7ed-73df4aff4784\sce
  Summary filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\53f68775-
6f39-4751-a7ed-73df4aff4784\sce


DATE: 11/30/2023                          TIME: 05:04:16

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : C_10yr 4hr 10min Chicago      **
  ***********************************************

-------------------
| CHICAGO STORM    |    IDF curve parameters: A=2221.000
| Ptotal= 58.62 mm |                          B=  12.000
-------------------                          C=   0.908
                        used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.39 |  1.00   37.17 |  2.00    8.06 |  3.00    3.05
                0.17    2.89 |  1.17  134.16 |  2.17    6.42 |  3.17    2.75
                0.33    3.65 |  1.33   50.03 |  2.33    5.30 |  3.33    2.50
                0.50    4.89 |  1.50   24.37 |  2.50    4.50 |  3.50    2.29
                0.67    7.23 |  1.67   15.14 |  2.67    3.89 |  3.67    2.11
                0.83   12.87 |  1.83   10.64 |  2.83    3.42 |  3.83    1.96


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-------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=   4.93
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
-------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=         4.88          0.05
     Dep. Storage     (mm)=         1.00          1.50
     Average Slope     (%)=         1.00          2.00
     Length            (m)=       181.29         40.00
```

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     Mannings n           =      0.013       0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.39 | 1.083   37.17 | 2.083    8.06 |  3.08    3.05
               0.167    2.39 | 1.167   37.17 | 2.167    8.06 |  3.17    3.05
               0.250    2.89 | 1.250  134.16 | 2.250    6.42 |  3.25    2.75
               0.333    2.89 | 1.333  134.16 | 2.333    6.42 |  3.33    2.75
               0.417    3.65 | 1.417   50.03 | 2.417    5.30 |  3.42    2.50
               0.500    3.65 | 1.500   50.03 | 2.500    5.30 |  3.50    2.50
               0.583    4.89 | 1.583   24.37 | 2.583    4.50 |  3.58    2.29
               0.667    4.89 | 1.667   24.37 | 2.667    4.50 |  3.67    2.29
               0.750    7.23 | 1.750   15.14 | 2.750    3.89 |  3.75    2.11
               0.833    7.23 | 1.833   15.14 | 2.833    3.89 |  3.83    2.11
               0.917   12.87 | 1.917   10.64 | 2.917    3.42 |  3.92    1.96
               1.000   12.87 | 2.000   10.64 | 3.000    3.42 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     134.16        71.15
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       3.25 (ii)    4.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.27         0.24
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.76         0.01          1.767 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      57.62        32.00          57.36
     TOTAL RAINFALL   (mm)=      58.62        58.62          58.62
     RUNOFF COEFFICIENT   =       0.98         0.55           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. 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(  0013)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.2070      0.1970

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)     4.930     1.767      1.33      57.36
   OUTFLOW: ID= 1 (  0013)     4.930     0.201      1.83      57.31
   OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.35
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1912

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   4.29
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.25         0.04
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.12        40.00
     Mannings n           =      0.013        0.250
```



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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.39 | 1.083   37.17 | 2.083    8.06 |  3.08    3.05
               0.167    2.39 | 1.167   37.17 | 2.167    8.06 |  3.17    3.05
               0.250    2.89 | 1.250  134.16 | 2.250    6.42 |  3.25    2.75
               0.333    2.89 | 1.333  134.16 | 2.333    6.42 |  3.33    2.75
               0.417    3.65 | 1.417   50.03 | 2.417    5.30 |  3.42    2.50
               0.500    3.65 | 1.500   50.03 | 2.500    5.30 |  3.50    2.50
               0.583    4.89 | 1.583   24.37 | 2.583    4.50 |  3.58    2.29
               0.667    4.89 | 1.667   24.37 | 2.667    4.50 |  3.67    2.29
               0.750    7.23 | 1.750   15.14 | 2.750    3.89 |  3.75    2.11
               0.833    7.23 | 1.833   15.14 | 2.833    3.89 |  3.83    2.11
               0.917   12.87 | 1.917   10.64 | 2.917    3.42 |  3.92    1.96
               1.000   12.87 | 2.000   10.64 | 3.000    3.42 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     134.16        71.15
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       3.11 (ii)    4.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.27         0.24
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.54         0.01          1.545 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      57.62        32.00          57.36
     TOTAL RAINFALL   (mm)=      58.62        58.62          58.62
     RUNOFF COEFFICIENT   =       0.98         0.55           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. 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(  0012)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.1800      0.1720

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0001)     4.290     1.545      1.33      57.36
   OUTFLOW: ID= 1 (  0012)     4.290     0.174      1.83      57.30
   OVERFLOW:ID= 3 (  0003)     0.000     0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.27
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1665

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0003)|   Area    (ha)=   0.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.93         0.01
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      79.16        40.00
     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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Max.Eff.Inten.(mm/hr)=		134.16	71.15	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.97 (ii)	2.97 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.31	0.28	
				TOTALS
PEAK FLOW	(cms)=	0.35	0.00	0.347 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	57.62	32.00	57.36
TOTAL RAINFALL	(mm)=	58.62	58.62	58.62
RUNOFF COEFFICIENT	=	0.98	0.55	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0011)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0390	0.0380

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	0.940	0.347	1.33	57.36
OUTFLOW: ID= 1 (0011)	0.940	0.038	1.83	57.11
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.82
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.0366

CALIB			
STANDHYD (0062)	Area (ha)= 3.30		
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.27	0.03
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	148.32	40.00
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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Max.Eff.Inten.(mm/hr)=		134.16	71.15	
over (min)		5.00	5.00	
Storage Coeff. (min)=		2.88 (ii)	3.88 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.28	0.25	
				TOTALS
PEAK FLOW	(cms)=	1.19	0.01	1.197 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	57.62	32.00	57.36
TOTAL RAINFALL	(mm)=	58.62	58.62	58.62
RUNOFF COEFFICIENT	=	0.98	0.55	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0063)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1390	0.1320

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0062)	3.300	1.197	1.33	57.36
OUTFLOW: ID= 1 (0063)	3.300	0.135	1.83	57.29
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.25
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.1279

ADD HYD (0031)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
*** W A R N I N G :	HYDROGRAPH	0011 <ID= 1> IS DRY.			
*** W A R N I N G :	HYDROGRAPH	0012 <ID= 2> IS DRY.			
*** W A R N I N G :	HYDROGRAPH	0031 <ID= 3> IS ALSO DRY			

ADD HYD (0031)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

```
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 3> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0013 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 1> IS ALSO DRY
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0063 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.46         0.57
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.33        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.39 | 1.083   37.17 | 2.083    8.06 |  3.08    3.05
               0.167    2.39 | 1.167   37.17 | 2.167    8.06 |  3.17    3.05
               0.250    2.89 | 1.250  134.16 | 2.250    6.42 |  3.25    2.75
               0.333    2.89 | 1.333  134.16 | 2.333    6.42 |  3.33    2.75
               0.417    3.65 | 1.417   50.03 | 2.417    5.30 |  3.42    2.50
               0.500    3.65 | 1.500   50.03 | 2.500    5.30 |  3.50    2.50
               0.583    4.89 | 1.583   24.37 | 2.583    4.50 |  3.58    2.29
               0.667    4.89 | 1.667   24.37 | 2.667    4.50 |  3.67    2.29
               0.750    7.23 | 1.750   15.14 | 2.750    3.89 |  3.75    2.11
               0.833    7.23 | 1.833   15.14 | 2.833    3.89 |  3.83    2.11
               0.917   12.87 | 1.917   10.64 | 2.917    3.42 |  3.92    1.96
               1.000   12.87 | 2.000   10.64 | 3.000    3.42 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     134.16        71.15
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.49 (ii)    6.79 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.54         0.09         0.609 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      57.62        32.00         50.44
     TOTAL RAINFALL   (mm)=      58.62        58.62         58.62
     RUNOFF COEFFICIENT   =       0.98         0.55          0.86

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=  14.87
|ID= 1 DT= 5.0 min |   Total Imp(%)=  95.00   Dir. Conn.(%)=  95.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.13         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     314.85        40.00
```



```
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.39 | 1.083   37.17 | 2.083    8.06 |  3.08    3.05
               0.167    2.39 | 1.167   37.17 | 2.167    8.06 |  3.17    3.05
               0.250    2.89 | 1.250  134.16 | 2.250    6.42 |  3.25    2.75
               0.333    2.89 | 1.333  134.16 | 2.333    6.42 |  3.33    2.75
               0.417    3.65 | 1.417   50.03 | 2.417    5.30 |  3.42    2.50
               0.500    3.65 | 1.500   50.03 | 2.500    5.30 |  3.50    2.50
               0.583    4.89 | 1.583   24.37 | 2.583    4.50 |  3.58    2.29
               0.667    4.89 | 1.667   24.37 | 2.667    4.50 |  3.67    2.29
               0.750    7.23 | 1.750   15.14 | 2.750    3.89 |  3.75    2.11
               0.833    7.23 | 1.833   15.14 | 2.833    3.89 |  3.83    2.11
               0.917   12.87 | 1.917   10.64 | 2.917    3.42 |  3.92    1.96
               1.000   12.87 | 2.000   10.64 | 3.000    3.42 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     134.16        71.15
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       4.52 (ii)    6.45 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.23         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       4.84         0.11         4.932 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      57.62        32.00         56.34
     TOTAL RAINFALL   (mm)=      58.62        58.62         58.62
     RUNOFF COEFFICIENT   =       0.98         0.55          0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0031 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0012):     4.29   0.174     1.83    57.30
     + ID2= 2 (  0031):     0.00   0.000     0.00     0.00
       ==================================================
       ID = 3 (  0007):     4.29   0.174     1.83    57.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0007)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0007):     4.29   0.174     1.83    57.30
     + ID2= 2 (  0004):    14.87   4.932     1.33    56.34
       ==================================================
       ID = 1 (  0007):    19.16   5.036     1.33    56.55

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0007):    19.16   5.036     1.33    56.55
     + ID2= 2 (  0005):     2.03   0.609     1.33    50.44
```

```
       ================================================
       ID = 3 (  0007):    21.19   5.645     1.33    55.97

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0008)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.4990      1.4692
                         0.0070     0.2185   |   0.5260      1.5717
                         0.0090     0.3744   |   0.7070      1.7814
                         0.0490     0.5385   |   1.0740      1.9972
                         0.2300     0.7995   |   1.3010      2.1075
                         0.3350     0.9822   |   1.8240      2.3326
                         0.3740     1.0761   |   2.1160      2.4475
                         0.4410     1.2692   |   3.0960      2.8018

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)     21.190      5.645      1.33      55.97
   OUTFLOW: ID= 1 (  0008)     21.190      0.269      3.17      51.87

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.77
                  TIME SHIFT OF PEAK FLOW         (min)=110.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.8683

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

-------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0011):     0.94   0.038     1.83    57.11
     + ID2= 2 (  0013):     4.93   0.201     1.83    57.31
       ================================================
       ID = 3 (  0029):     5.87   0.238     1.83    57.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                         0.0001     0.0089   |   0.0468      0.2012
                         0.0080     0.0440   |   0.0508      0.2137
                         0.0177     0.0783   |   0.0544      0.2247
                         0.0235     0.1115   |   0.0709      0.2342
                         0.0292     0.1511   |   0.0998      0.2429
                         0.0388     0.1807   |   0.1169      0.2472

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)     5.870      0.238      1.83      57.28
   OUTFLOW: ID= 1 (  0030)     5.870      0.053      6.67      55.65
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 22.11
                  TIME SHIFT OF PEAK FLOW         (min)=290.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2194

--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0064)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0175      0.0792
```



```
                         0.0023     0.0112   |   0.0222      0.0973
                         0.0058     0.0278   |   0.0327      0.1273
                         0.0129     0.0595   |   0.0362      0.1357

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0063)     3.300      0.135      1.83      57.29
   OUTFLOW: ID= 1 (  0064)     3.300      0.031      6.58      56.92
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 22.80
                  TIME SHIFT OF PEAK FLOW         (min)=285.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1215

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

-------------------
| ADD HYD  (  0065)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):     5.87   0.053     6.67    55.65
     + ID2= 2 (  0064):     3.30   0.031     6.58    56.92
       ================================================
       ID = 3 (  0065):     9.17   0.083     6.67    56.11

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

-------------------
| ADD HYD  (  0066)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0030 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0064 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0065):     9.17   0.083     6.67    56.11
     + ID2= 2 (  0066):     0.00   0.000     0.00    56.11
       ================================================
       ID = 3 (  0061):     9.17   0.083     6.67    56.11

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

25YR 4HR CHICAGO STORM SIMULATION

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\33a25c49-
bc5a-46ea-ab72-eae78d840a0d\sce
  Summary filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\33a25c49-
bc5a-46ea-ab72-eae78d840a0d\sce


DATE: 11/30/2023                          TIME: 05:04:16

USER:


COMMENTS: _____________________________________________________

----------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : D_25yr 4hr 10min Chicago      **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=3158.000
| Ptotal= 71.59 mm |                          B=  15.000
--------------------                          C=   0.933
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.68 |  1.00   47.76 |  2.00   10.11 |  3.00    3.51
                0.17    3.31 |  1.17  156.47 |  2.17    7.92 |  3.17    3.13
                0.33    4.28 |  1.33   63.86 |  2.33    6.44 |  3.33    2.81
                0.50    5.90 |  1.50   31.72 |  2.50    5.38 |  3.50    2.55
                0.67    9.00 |  1.67   19.56 |  2.67    4.59 |  3.67    2.33
                0.83   16.53 |  1.83   13.56 |  2.83    3.99 |  3.83    2.15


------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=   4.93
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.88         0.05
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     181.29        40.00
     Mannings n           =      0.013        0.250
```



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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   2.68 | 1.083   47.76 | 2.083   10.11 |  3.08    3.51
                0.167   2.68 | 1.167   47.76 | 2.167   10.11 |  3.17    3.51
                0.250   3.31 | 1.250  156.47 | 2.250    7.92 |  3.25    3.13
                0.333   3.31 | 1.333  156.47 | 2.333    7.92 |  3.33    3.13
                0.417   4.28 | 1.417   63.86 | 2.417    6.44 |  3.42    2.81
                0.500   4.28 | 1.500   63.86 | 2.500    6.44 |  3.50    2.81
                0.583   5.90 | 1.583   31.72 | 2.583    5.38 |  3.58    2.55
                0.667   5.90 | 1.667   31.72 | 2.667    5.38 |  3.67    2.55
                0.750   9.00 | 1.750   19.56 | 2.750    4.59 |  3.75    2.33
                0.833   9.00 | 1.833   19.56 | 2.833    4.59 |  3.83    2.33
                0.917  16.53 | 1.917   13.56 | 2.917    3.99 |  3.92    2.15
                1.000  16.53 | 2.000   13.56 | 3.000    3.99 |  4.00    2.15

     Max.Eff.Inten.(mm/hr)=     156.47        92.44
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       3.05 (ii)    3.99 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.27         0.24
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.07         0.01          2.078 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      70.59        42.75          70.31
     TOTAL RAINFALL   (mm)=      71.59        71.59          71.59
     RUNOFF COEFFICIENT   =       0.99         0.60           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. 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(  0013)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.2070      0.1970

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)     4.930     2.078      1.33      70.31
   OUTFLOW: ID= 1 (  0013)     4.315     0.207      1.50      70.37
   OVERFLOW:ID= 3 (  0003)     0.615     0.712      1.50      70.37

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     5
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.42
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  2.02

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.96
                    TIME SHIFT OF PEAK FLOW         (min)= 10.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.1970

------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   4.29
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.25         0.04
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.12        40.00
     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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Max.Eff.Inten.(mm/hr)=	156.47	92.44	
over (min)	5.00	5.00	
Storage Coeff. (min)=	2.93 (ii)	3.87 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.28	0.25	
			TOTALS
PEAK FLOW (cms)=	1.80	0.01	1.815 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	70.59	42.75	70.31
TOTAL RAINFALL (mm)=	71.59	71.59	71.59
RUNOFF COEFFICIENT =	0.99	0.60	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0012)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1800	0.1720

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	4.290	1.815	1.33	70.31
OUTFLOW: ID= 1 (0012)	3.761	0.180	1.50	70.35
OVERFLOW:ID= 3 (0003)	0.529	0.618	1.50	70.35

TOTAL NUMBER OF SIMULATION OVERFLOW = 5
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.42
PERCENTAGE OF TIME OVERFLOWING (%) = 2.05

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.92
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= 0.1720

CALIB			
STANDHYD (0003)	Area (ha)= 0.94		
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.93	0.01
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	79.16	40.00
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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Max.Eff.Inten.(mm/hr)=	156.47	92.44	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.86 (ii)	2.80 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.32	0.28	
			TOTALS
PEAK FLOW (cms)=	0.40	0.00	0.406 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	70.59	42.75	70.31
TOTAL RAINFALL (mm)=	71.59	71.59	71.59
RUNOFF COEFFICIENT =	0.99	0.60	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0011)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0390	0.0380

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	0.940	0.406	1.33	70.31
OUTFLOW: ID= 1 (0011)	0.827	0.039	1.50	70.06
OVERFLOW:ID= 3 (0003)	0.113	0.128	1.50	70.06

TOTAL NUMBER OF SIMULATION OVERFLOW = 5
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.42
PERCENTAGE OF TIME OVERFLOWING (%) = 2.53

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.61
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= 0.0380

CALIB			
STANDHYD (0062)	Area (ha)= 3.30		
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.27	0.03
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	148.32	40.00
Mannings n =	0.013	0.250

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

```
                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
    hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.083    2.68 | 1.083   47.76 | 2.083   10.11 |  3.08    3.51
  0.167    2.68 | 1.167   47.76 | 2.167   10.11 |  3.17    3.51
  0.250    3.31 | 1.250  156.47 | 2.250    7.92 |  3.25    3.13
  0.333    3.31 | 1.333  156.47 | 2.333    7.92 |  3.33    3.13
  0.417    4.28 | 1.417   63.86 | 2.417    6.44 |  3.42    2.81
  0.500    4.28 | 1.500   63.86 | 2.500    6.44 |  3.50    2.81
  0.583    5.90 | 1.583   31.72 | 2.583    5.38 |  3.58    2.55
  0.667    5.90 | 1.667   31.72 | 2.667    5.38 |  3.67    2.55
  0.750    9.00 | 1.750   19.56 | 2.750    4.59 |  3.75    2.33
  0.833    9.00 | 1.833   19.56 | 2.833    4.59 |  3.83    2.33
  0.917   16.53 | 1.917   13.56 | 2.917    3.99 |  3.92    2.15
  1.000   16.53 | 2.000   13.56 | 3.000    3.99 |  4.00    2.15

     Max.Eff.Inten.(mm/hr)=     156.47        92.44
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      2.71 (ii)    3.64 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.29         0.25
                                                    *TOTALS*
     PEAK FLOW       (cms)=      1.40         0.01      1.404 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.33       1.33
     RUNOFF VOLUME    (mm)=     70.59        42.75      70.31
     TOTAL RAINFALL   (mm)=     71.59        71.59      71.59
     RUNOFF COEFFICIENT   =      0.99         0.60       0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR(  0063)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.1390     0.1320

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0062)     3.300      1.404      1.33      70.31
   OUTFLOW: ID= 1 (  0063)     2.895      0.139      1.50      70.24
   OVERFLOW:ID= 3 (  0003)     0.405      0.466      1.50      70.24

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     5
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.42
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  2.14

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.90
                  TIME SHIFT OF PEAK FLOW         (min)= 10.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1320

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

--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0011):     0.11   0.128     1.50    70.06
     + ID2= 2 (  0012):     0.53   0.618     1.50    70.35
       ================================================
       ID = 3 (  0031):     0.64   0.746     1.50    70.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0031)|
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|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0031):     0.64   0.746     1.50    70.30
     + ID2= 2 (  0013):     0.61   0.712     1.50    70.37
       ================================================
       ID = 1 (  0031):     1.26   1.459     1.50    70.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0031):     1.26   1.459     1.50    70.34
     + ID2= 2 (  0063):     0.41   0.466     1.50    70.24
       ================================================
       ID = 3 (  0031):     1.66   1.924     1.50    70.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.46         0.57
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.33        40.00
     Mannings n            =      0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
    hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.083    2.68 | 1.083   47.76 | 2.083   10.11 |  3.08    3.51
  0.167    2.68 | 1.167   47.76 | 2.167   10.11 |  3.17    3.51
  0.250    3.31 | 1.250  156.47 | 2.250    7.92 |  3.25    3.13
  0.333    3.31 | 1.333  156.47 | 2.333    7.92 |  3.33    3.13
  0.417    4.28 | 1.417   63.86 | 2.417    6.44 |  3.42    2.81
  0.500    4.28 | 1.500   63.86 | 2.500    6.44 |  3.50    2.81
  0.583    5.90 | 1.583   31.72 | 2.583    5.38 |  3.58    2.55
  0.667    5.90 | 1.667   31.72 | 2.667    5.38 |  3.67    2.55
  0.750    9.00 | 1.750   19.56 | 2.750    4.59 |  3.75    2.33
  0.833    9.00 | 1.833   19.56 | 2.833    4.59 |  3.83    2.33
  0.917   16.53 | 1.917   13.56 | 2.917    3.99 |  3.92    2.15
  1.000   16.53 | 2.000   13.56 | 3.000    3.99 |  4.00    2.15

     Max.Eff.Inten.(mm/hr)=     156.47        92.44
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.34 (ii)    6.38 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.30         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.63         0.11      0.726 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.42       1.33
     RUNOFF VOLUME    (mm)=     70.59        42.75      62.79
     TOTAL RAINFALL   (mm)=     71.59        71.59      71.59
     RUNOFF COEFFICIENT   =      0.99         0.60       0.88

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
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| STANDHYD (  0004)|   Area    (ha)=  14.87
|ID= 1 DT= 5.0 min |   Total Imp(%)=  95.00   Dir. Conn.(%)=  95.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.13         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     314.85        40.00
     Mannings n             =     0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.68 | 1.083   47.76 | 2.083   10.11 |  3.08    3.51
               0.167    2.68 | 1.167   47.76 | 2.167   10.11 |  3.17    3.51
               0.250    3.31 | 1.250  156.47 | 2.250    7.92 |  3.25    3.13
               0.333    3.31 | 1.333  156.47 | 2.333    7.92 |  3.33    3.13
               0.417    4.28 | 1.417   63.86 | 2.417    6.44 |  3.42    2.81
               0.500    4.28 | 1.500   63.86 | 2.500    6.44 |  3.50    2.81
               0.583    5.90 | 1.583   31.72 | 2.583    5.38 |  3.58    2.55
               0.667    5.90 | 1.667   31.72 | 2.667    5.38 |  3.67    2.55
               0.750    9.00 | 1.750   19.56 | 2.750    4.59 |  3.75    2.33
               0.833    9.00 | 1.833   19.56 | 2.833    4.59 |  3.83    2.33
               0.917   16.53 | 1.917   13.56 | 2.917    3.99 |  3.92    2.15
               1.000   16.53 | 2.000   13.56 | 3.000    3.99 |  4.00    2.15

     Max.Eff.Inten.(mm/hr)=     156.47        92.44
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       4.25 (ii)    6.07 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.24         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       5.72         0.15         5.853 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      70.59        42.75         69.20
     TOTAL RAINFALL   (mm)=      71.59        71.59         71.59
     RUNOFF COEFFICIENT   =       0.99         0.60          0.97

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     3.76   0.180     1.50    70.35
     + ID2= 2 (  0031):     1.66   1.924     1.50    70.31
       ================================================
       ID = 3 (  0007):     5.42   2.104     1.50    70.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| ADD HYD  (  0007)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0007):     5.42   2.104     1.50    70.34
     + ID2= 2 (  0004):    14.87   5.853     1.33    69.20
       ================================================
       ID = 1 (  0007):    20.29   5.981     1.33    69.50

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0007):    20.29   5.981     1.33    69.50
     + ID2= 2 (  0005):     2.03   0.726     1.33    62.79
       ================================================
       ID = 3 (  0007):    22.32   6.707     1.33    68.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0008)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.4990      1.4692
                          0.0070     0.2185   |   0.5260      1.5717
                          0.0090     0.3744   |   0.7070      1.7814
                          0.0490     0.5385   |   1.0740      1.9972
                          0.2300     0.7995   |   1.3010      2.1075
                          0.3350     0.9822   |   1.8240      2.3326
                          0.3740     1.0761   |   2.1160      2.4475
                          0.4410     1.2692   |   3.0960      2.8018

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)     22.323     6.707      1.33      68.89
   OUTFLOW: ID= 1 (  0008)     22.323     0.392      2.75      64.94

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.84
                  TIME SHIFT OF PEAK FLOW         (min)= 85.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.1279

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-------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0011):     0.83   0.039     1.50    70.06
     + ID2= 2 (  0013):     4.32   0.207     1.50    70.37
       ================================================
       ID = 3 (  0029):     5.14   0.246     1.50    70.32

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                          0.0001     0.0089   |   0.0468      0.2012
                          0.0080     0.0440   |   0.0508      0.2137
                          0.0177     0.0783   |   0.0544      0.2247
                          0.0235     0.1115   |   0.0709      0.2342
                          0.0292     0.1511   |   0.0998      0.2429
                          0.0388     0.1807   |   0.1169      0.2472

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)     5.142      0.246      1.50      70.32
   OUTFLOW: ID= 1 (  0030)     5.142      0.066      6.25      68.46
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 26.88
                  TIME SHIFT OF PEAK FLOW         (min)=285.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2315

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

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--------------------
| RESERVOIR(  0064)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0175      0.0792
                          0.0023     0.0112   |   0.0222      0.0973
                          0.0058     0.0278   |   0.0327      0.1273
                          0.0129     0.0595   |   0.0362      0.1357

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0063)      2.895      0.139      1.50      70.24
   OUTFLOW: ID= 1 (  0064)      2.895      0.034      6.50      69.82
   OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 24.28
                  TIME SHIFT OF PEAK FLOW         (min)=300.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1298

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

--------------------
| ADD HYD  (  0065)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):     5.14   0.066     6.25    68.46
     + ID2= 2 (  0064):     2.89   0.034     6.50    69.82
       ================================================
       ID = 3 (  0065):     8.04   0.100     6.25    68.95

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

--------------------
| ADD HYD  (  0066)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0030 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0064 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 3> IS ALSO DRY
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0065):     8.04   0.100     6.25    68.95
     + ID2= 2 (  0066):     0.00   0.000     0.00    68.95
       ================================================
       ID = 3 (  0061):     8.04   0.100     6.25    68.95

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


50YR 4HR CHICAGO STORM SIMULATION

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\eee7ca1e-
15f9-4aa6-8721-5bbc07c34db1\sce
  Summary filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\eee7ca1e-
15f9-4aa6-8721-5bbc07c34db1\sce


DATE: 11/30/2023                          TIME: 05:04:17

USER:


COMMENTS: _____________________________________________________


------------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : E_50yr 4hr 10min Chicago      **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=3886.000
| Ptotal= 80.32 mm |                          B=  16.000
--------------------                          C=   0.950
                       used in:   INTENSITY =  A / (t + B)^C

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

               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    2.76 |  1.00   54.62 |  2.00   11.20 |  3.00    3.68
               0.17    3.46 |  1.17  176.19 |  2.17    8.68 |  3.17    3.25
               0.33    4.54 |  1.33   73.10 |  2.33    6.99 |  3.33    2.91
               0.50    6.37 |  1.50   36.22 |  2.50    5.78 |  3.50    2.62
               0.67    9.92 |  1.67   22.14 |  2.67    4.89 |  3.67    2.38
               0.83   18.63 |  1.83   15.18 |  2.83    4.21 |  3.83    2.18


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--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=   4.93
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.88          0.05
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     181.29         40.00
     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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Max.Eff.Inten.(mm/hr)=	176.19	110.25	
over (min)	5.00	5.00	
Storage Coeff. (min)=	2.91 (ii)	3.81 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.28	0.25	
			TOTALS
PEAK FLOW (cms)=	2.34	0.02	2.350 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	79.32	50.25	79.03
TOTAL RAINFALL (mm)=	80.32	80.32	80.32
RUNOFF COEFFICIENT =	0.99	0.63	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0013)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.2070	0.1970

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	4.930	2.350	1.33	79.03
OUTFLOW: ID= 1 (0013)	3.832	0.207	1.42	80.80
OVERFLOW:ID= 3 (0003)	1.098	1.173	1.42	80.80

TOTAL NUMBER OF SIMULATION OVERFLOW = 7
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.58
PERCENTAGE OF TIME OVERFLOWING (%) = 2.82

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.81
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= 0.1970

CALIB		
STANDHYD (0001)	Area (ha)=	4.29
ID= 1 DT= 5.0 min	Total Imp(%)=	99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.25	0.04
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	169.12	40.00
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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Max.Eff.Inten.(mm/hr)=	176.19	110.25	
over (min)	5.00	5.00	
Storage Coeff. (min)=	2.79 (ii)	3.69 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.28	0.25	
			TOTALS
PEAK FLOW (cms)=	2.04	0.01	2.052 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	79.32	50.25	79.03
TOTAL RAINFALL (mm)=	80.32	80.32	80.32
RUNOFF COEFFICIENT =	0.99	0.63	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0012)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1800	0.1720

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	4.290	2.052	1.33	79.03
OUTFLOW: ID= 1 (0012)	3.345	0.180	1.42	80.67
OVERFLOW:ID= 3 (0003)	0.945	1.005	1.42	80.67

TOTAL NUMBER OF SIMULATION OVERFLOW = 8
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.67
PERCENTAGE OF TIME OVERFLOWING (%) = 3.28

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.77
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= 0.1720

CALIB		
STANDHYD (0003)	Area (ha)=	0.94
ID= 1 DT= 5.0 min	Total Imp(%)=	99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.93	0.01
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	79.16	40.00
Mannings n =	0.013	0.250

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

```
                        ---- TRANSFORMED HYETOGRAPH ----
   TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
    hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.083    2.76 | 1.083   54.62 | 2.083   11.20 |  3.08    3.68
  0.167    2.76 | 1.167   54.62 | 2.167   11.20 |  3.17    3.68
  0.250    3.46 | 1.250  176.19 | 2.250    8.68 |  3.25    3.25
  0.333    3.46 | 1.333  176.19 | 2.333    8.68 |  3.33    3.25
  0.417    4.54 | 1.417   73.10 | 2.417    6.99 |  3.42    2.91
  0.500    4.54 | 1.500   73.10 | 2.500    6.99 |  3.50    2.91
  0.583    6.37 | 1.583   36.22 | 2.583    5.78 |  3.58    2.62
  0.667    6.37 | 1.667   36.22 | 2.667    5.78 |  3.67    2.62
  0.750    9.92 | 1.750   22.14 | 2.750    4.89 |  3.75    2.38
  0.833    9.92 | 1.833   22.14 | 2.833    4.89 |  3.83    2.38
  0.917   18.63 | 1.917   15.18 | 2.917    4.21 |  3.92    2.18
  1.000   18.63 | 2.000   15.18 | 3.000    4.21 |  4.00    2.18

     Max.Eff.Inten.(mm/hr)=     176.19       110.25
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.77 (ii)    2.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.29
                                              *TOTALS*
     PEAK FLOW       (cms)=       0.45         0.00          0.457 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      79.32        50.25          79.03
     TOTAL RAINFALL   (mm)=      80.32        80.32          80.32
     RUNOFF COEFFICIENT   =       0.99         0.63           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. 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(  0011)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0390     0.0380

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0003)     0.940     0.457      1.33      79.03
   OUTFLOW: ID= 1 (  0011)     0.749     0.039      1.42      78.65
   OVERFLOW:ID= 3 (  0003)     0.191     0.167      1.42      78.65

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     7
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.58
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  3.54

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.53
                  TIME SHIFT OF PEAK FLOW         (min)=  5.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0380

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0062)|   Area    (ha)=   3.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
-------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.27         0.03
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     148.32        40.00
     Mannings n           =      0.013        0.250

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



```
                        ---- TRANSFORMED HYETOGRAPH ----
   TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
    hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.083    2.76 | 1.083   54.62 | 2.083   11.20 |  3.08    3.68
  0.167    2.76 | 1.167   54.62 | 2.167   11.20 |  3.17    3.68
  0.250    3.46 | 1.250  176.19 | 2.250    8.68 |  3.25    3.25
  0.333    3.46 | 1.333  176.19 | 2.333    8.68 |  3.33    3.25
  0.417    4.54 | 1.417   73.10 | 2.417    6.99 |  3.42    2.91
  0.500    4.54 | 1.500   73.10 | 2.500    6.99 |  3.50    2.91
  0.583    6.37 | 1.583   36.22 | 2.583    5.78 |  3.58    2.62
  0.667    6.37 | 1.667   36.22 | 2.667    5.78 |  3.67    2.62
  0.750    9.92 | 1.750   22.14 | 2.750    4.89 |  3.75    2.38
  0.833    9.92 | 1.833   22.14 | 2.833    4.89 |  3.83    2.38
  0.917   18.63 | 1.917   15.18 | 2.917    4.21 |  3.92    2.18
  1.000   18.63 | 2.000   15.18 | 3.000    4.21 |  4.00    2.18

     Max.Eff.Inten.(mm/hr)=     176.19       110.25
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.58 (ii)    3.48 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.29         0.26
                                              *TOTALS*
     PEAK FLOW       (cms)=       1.58         0.01          1.586 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      79.32        50.25          79.03
     TOTAL RAINFALL   (mm)=      80.32        80.32          80.32
     RUNOFF COEFFICIENT   =       0.99         0.63           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. 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(  0063)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.1390     0.1320

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0062)     3.300      1.586      1.33      79.03
   OUTFLOW: ID= 1 (  0063)     2.609      0.139      1.42      79.45
   OVERFLOW:ID= 3 (  0003)     0.691      0.678      1.42      79.45

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     7
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.58
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  2.98

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.76
                  TIME SHIFT OF PEAK FLOW         (min)=  5.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1320

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

-------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0011):     0.19   0.167     1.42    78.65
     + ID2= 2 (  0012):     0.95   1.005     1.42    80.67
       ================================================
       ID = 3 (  0031):     1.14   1.173     1.42    80.33

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

-------------------
| ADD HYD  (  0031)|
```

```
|   3 +  2 =  1    |        AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0031):     1.14   1.173     1.42    80.33
     + ID2= 2 (  0013):     1.10   1.173     1.42    80.80
       ================================================
       ID = 1 (  0031):     2.23   2.346     1.42    80.56

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

-------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0031):     2.23   2.346     1.42    80.56
     + ID2= 2 (  0063):     0.69   0.678     1.42    79.45
       ================================================
       ID = 3 (  0031):     2.92   3.024     1.42    80.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.46         0.57
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.33        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.76 | 1.083   54.62 | 2.083   11.20 |  3.08    3.68
               0.167    2.76 | 1.167   54.62 | 2.167   11.20 |  3.17    3.68
               0.250    3.46 | 1.250  176.19 | 2.250    8.68 |  3.25    3.25
               0.333    3.46 | 1.333  176.19 | 2.333    8.68 |  3.33    3.25
               0.417    4.54 | 1.417   73.10 | 2.417    6.99 |  3.42    2.91
               0.500    4.54 | 1.500   73.10 | 2.500    6.99 |  3.50    2.91
               0.583    6.37 | 1.583   36.22 | 2.583    5.78 |  3.58    2.62
               0.667    6.37 | 1.667   36.22 | 2.667    5.78 |  3.67    2.62
               0.750    9.92 | 1.750   22.14 | 2.750    4.89 |  3.75    2.38
               0.833    9.92 | 1.833   22.14 | 2.833    4.89 |  3.83    2.38
               0.917   18.63 | 1.917   15.18 | 2.917    4.21 |  3.92    2.18
               1.000   18.63 | 2.000   15.18 | 3.000    4.21 |  4.00    2.18

     Max.Eff.Inten.(mm/hr)=     176.19       110.25
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.23 (ii)    6.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.71         0.14          0.829 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      79.32        50.25         71.18
     TOTAL RAINFALL   (mm)=      80.32        80.32         80.32
     RUNOFF COEFFICIENT   =       0.99         0.63          0.89

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
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```
| STANDHYD (  0004)|   Area    (ha)=  14.87
|ID= 1 DT= 5.0 min |   Total Imp(%)=  95.00   Dir. Conn.(%)=  95.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.13         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     314.85        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.76 | 1.083   54.62 | 2.083   11.20 |  3.08    3.68
               0.167    2.76 | 1.167   54.62 | 2.167   11.20 |  3.17    3.68
               0.250    3.46 | 1.250  176.19 | 2.250    8.68 |  3.25    3.25
               0.333    3.46 | 1.333  176.19 | 2.333    8.68 |  3.33    3.25
               0.417    4.54 | 1.417   73.10 | 2.417    6.99 |  3.42    2.91
               0.500    4.54 | 1.500   73.10 | 2.500    6.99 |  3.50    2.91
               0.583    6.37 | 1.583   36.22 | 2.583    5.78 |  3.58    2.62
               0.667    6.37 | 1.667   36.22 | 2.667    5.78 |  3.67    2.62
               0.750    9.92 | 1.750   22.14 | 2.750    4.89 |  3.75    2.38
               0.833    9.92 | 1.833   22.14 | 2.833    4.89 |  3.83    2.38
               0.917   18.63 | 1.917   15.18 | 2.917    4.21 |  3.92    2.18
               1.000   18.63 | 2.000   15.18 | 3.000    4.21 |  4.00    2.18

     Max.Eff.Inten.(mm/hr)=     176.19       110.25
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       4.05 (ii)    5.79 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.24         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=       6.50         0.18          6.658 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      79.32        50.25         77.87
     TOTAL RAINFALL   (mm)=      80.32        80.32         80.32
     RUNOFF COEFFICIENT   =       0.99         0.63          0.97

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     3.34   0.180     1.42    80.67
     + ID2= 2 (  0031):     2.92   3.024     1.42    80.30
       ================================================
       ID = 3 (  0007):     6.27   3.204     1.42    80.49

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

-------------------
| ADD HYD  (  0007)|
|   3 +  2 =  1    |        AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0007):     6.27   3.204     1.42    80.49
     + ID2= 2 (  0004):    14.87   6.658     1.33    77.87
       ================================================
       ID = 1 (  0007):    21.14   7.313     1.42    78.65

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

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--------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0007):    21.14   7.313    1.42    78.65
     + ID2= 2 (  0005):     2.03   0.829    1.33    71.18
       ================================================
       ID = 3 (  0007):    23.17   7.791    1.42    77.99

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.4990      1.4692
                         0.0070     0.2185   |   0.5260      1.5717
                         0.0090     0.3744   |   0.7070      1.7814
                         0.0490     0.5385   |   1.0740      1.9972
                         0.2300     0.7995   |   1.3010      2.1075
                         0.3350     0.9822   |   1.8240      2.3326
                         0.3740     1.0761   |   2.1160      2.4475
                         0.4410     1.2692   |   3.0960      2.8018

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)     23.169      7.791      1.42      77.99
   OUTFLOW: ID= 1 (  0008)     23.169      0.465      2.58      74.14

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.97
                  TIME SHIFT OF PEAK FLOW         (min)= 70.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.3521

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

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0011):     0.75   0.039    1.42    78.65
     + ID2= 2 (  0013):     3.83   0.207    1.42    80.80
       ================================================
       ID = 3 (  0029):     4.58   0.246    1.42    80.45

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                         0.0001     0.0089   |   0.0468      0.2012
                         0.0080     0.0440   |   0.0508      0.2137
                         0.0177     0.0783   |   0.0544      0.2247
                         0.0235     0.1115   |   0.0709      0.2342
                         0.0292     0.1511   |   0.0998      0.2429
                         0.0388     0.1807   |   0.1169      0.2472

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)     4.582      0.246      1.42      80.45
   OUTFLOW: ID= 1 (  0030)     4.582      0.070      6.17      78.36
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 28.62
                  TIME SHIFT OF PEAK FLOW         (min)=285.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2339

-------------------------------------------------------------------------------
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--------------------
| RESERVOIR(  0064)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0175      0.0792
                         0.0023     0.0112   |   0.0222      0.0973
                         0.0058     0.0278   |   0.0327      0.1273
                         0.0129     0.0595   |   0.0362      0.1357

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0063)     2.609      0.139      1.42      79.45
   OUTFLOW: ID= 1 (  0064)     2.609      0.035      6.50      78.99
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 24.94
                  TIME SHIFT OF PEAK FLOW         (min)=305.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1320

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

--------------------
| ADD HYD  (  0065)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):     4.58   0.070    6.17    78.36
     + ID2= 2 (  0064):     2.61   0.035    6.50    78.99
       ================================================
       ID = 3 (  0065):     7.19   0.105    6.17    78.59

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

--------------------
| ADD HYD  (  0066)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0030 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0064 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 3> IS ALSO DRY
-------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0065):     7.19   0.105     6.17    78.59
     + ID2= 2 (  0066):     0.00   0.000     0.00    78.59
       ================================================
       ID = 3 (  0061):     7.19   0.105     6.17    78.59

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

100YR 4HR CHICAGO STORM SIMULATION

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\fe773ff5-
df57-461d-b465-9710bc7b7d21\sce
  Summary filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\fe773ff5-
df57-461d-b465-9710bc7b7d21\sce


DATE: 11/30/2023                          TIME: 05:04:17

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : F_100yr 4hr 10min Chicago     **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=4688.000
| Ptotal= 89.87 mm |                          B=  17.000
--------------------                          C=   0.962
                       used in:   INTENSITY =  A / (t + B)^C

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

                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.00    2.89 |  1.00   62.12 |  2.00   12.48 |  3.00    3.91
                 0.17    3.67 |  1.17  196.54 |  2.17    9.60 |  3.17    3.44
                 0.33    4.88 |  1.33   83.09 |  2.33    7.66 |  3.33    3.05
                 0.50    6.96 |  1.50   41.25 |  2.50    6.29 |  3.50    2.73
                 0.67   11.02 |  1.67   25.07 |  2.67    5.28 |  3.67    2.47
                 0.83   21.03 |  1.83   17.06 |  2.83    4.51 |  3.83    2.24


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=   4.93
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.88         0.05
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     181.29        40.00
     Mannings n           =      0.013        0.250
```



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


                              ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    2.89 | 1.083   62.12 | 2.083   12.48 |  3.08    3.91
                0.167    2.89 | 1.167   62.12 | 2.167   12.48 |  3.17    3.91
                0.250    3.67 | 1.250  196.54 | 2.250    9.60 |  3.25    3.44
                0.333    3.67 | 1.333  196.54 | 2.333    9.60 |  3.33    3.44
                0.417    4.88 | 1.417   83.09 | 2.417    7.66 |  3.42    3.05
                0.500    4.88 | 1.500   83.09 | 2.500    7.66 |  3.50    3.05
                0.583    6.96 | 1.583   41.25 | 2.583    6.29 |  3.58    2.73
                0.667    6.96 | 1.667   41.25 | 2.667    6.29 |  3.67    2.73
                0.750   11.02 | 1.750   25.07 | 2.750    5.28 |  3.75    2.47
                0.833   11.02 | 1.833   25.07 | 2.833    5.28 |  3.83    2.47
                0.917   21.03 | 1.917   17.06 | 2.917    4.51 |  3.92    2.24
                1.000   21.03 | 2.000   17.06 | 3.000    4.51 |  4.00    2.24

     Max.Eff.Inten.(mm/hr)=     196.54       129.47
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      2.79 (ii)    3.64 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.28         0.25
                                                      *TOTALS*
     PEAK FLOW       (cms)=      2.61         0.02       2.632 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.33        1.33
     RUNOFF VOLUME    (mm)=     88.87        58.63       88.57
     TOTAL RAINFALL   (mm)=     89.87        89.87       89.87
     RUNOFF COEFFICIENT   =      0.99         0.65        0.99

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. 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(  0013)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.2070      0.1970

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0002)      4.930     2.632      1.33      88.57
   OUTFLOW: ID= 1 (  0013)      3.564     0.207      1.42      88.52
   OVERFLOW:ID= 3 (  0003)      1.366     1.178      1.42      88.52

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     8
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.67
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  3.23

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.87
                    TIME SHIFT OF PEAK FLOW         (min)=  5.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.1970

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=   4.29
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.25         0.04
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.12        40.00
     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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

			TOTALS
Max.Eff.Inten.(mm/hr)=	196.54	129.47	
over (min)	5.00	5.00	
Storage Coeff. (min)=	2.67 (ii)	3.53 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.29	0.26	
PEAK FLOW (cms)=	2.28	0.02	2.296 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	88.87	58.63	88.57
TOTAL RAINFALL (mm)=	89.87	89.87	89.87
RUNOFF COEFFICIENT =	0.99	0.65	0.99

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0012)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1800	0.1720

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	4.290	2.296	1.33	88.57
OUTFLOW: ID= 1 (0012)	3.107	0.180	1.42	88.54
OVERFLOW:ID= 3 (0003)	1.183	1.010	1.42	88.54

TOTAL NUMBER OF SIMULATION OVERFLOW = 8
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.67
PERCENTAGE OF TIME OVERFLOWING (%) = 3.27

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.84
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= 0.1720

CALIB			
STANDHYD (0003)	Area (ha)= 0.94		
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.93	0.01
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	79.16	40.00
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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

			TOTALS
Max.Eff.Inten.(mm/hr)=	196.54	129.47	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.69 (ii)	2.55 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.32	0.29	
PEAK FLOW (cms)=	0.51	0.00	0.511 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	88.87	58.63	88.57
TOTAL RAINFALL (mm)=	89.87	89.87	89.87
RUNOFF COEFFICIENT =	0.99	0.65	0.99

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0011)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0390	0.0380

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	0.940	0.511	1.33	88.57
OUTFLOW: ID= 1 (0011)	0.680	0.039	1.42	87.96
OVERFLOW:ID= 3 (0003)	0.260	0.193	1.42	87.96

TOTAL NUMBER OF SIMULATION OVERFLOW = 8
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.67
PERCENTAGE OF TIME OVERFLOWING (%) = 4.02

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.64
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= 0.0380

CALIB			
STANDHYD (0062)	Area (ha)= 3.30		
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.27	0.03
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	148.32	40.00
Mannings n =	0.013	0.250

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

```
                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
    hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.083    2.89 | 1.083   62.12 | 2.083   12.48 |  3.08    3.91
  0.167    2.89 | 1.167   62.12 | 2.167   12.48 |  3.17    3.91
  0.250    3.67 | 1.250  196.54 | 2.250    9.60 |  3.25    3.44
  0.333    3.67 | 1.333  196.54 | 2.333    9.60 |  3.33    3.44
  0.417    4.88 | 1.417   83.09 | 2.417    7.66 |  3.42    3.05
  0.500    4.88 | 1.500   83.09 | 2.500    7.66 |  3.50    3.05
  0.583    6.96 | 1.583   41.25 | 2.583    6.29 |  3.58    2.73
  0.667    6.96 | 1.667   41.25 | 2.667    6.29 |  3.67    2.73
  0.750   11.02 | 1.750   25.07 | 2.750    5.28 |  3.75    2.47
  0.833   11.02 | 1.833   25.07 | 2.833    5.28 |  3.83    2.47
  0.917   21.03 | 1.917   17.06 | 2.917    4.51 |  3.92    2.24
  1.000   21.03 | 2.000   17.06 | 3.000    4.51 |  4.00    2.24

     Max.Eff.Inten.(mm/hr)=     196.54       129.47
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.47 (ii)    3.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.29         0.26
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.76         0.01          1.774 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.33           1.33
     RUNOFF VOLUME    (mm)=      88.87        58.63          88.57
     TOTAL RAINFALL   (mm)=      89.87        89.87          89.87
     RUNOFF COEFFICIENT   =       0.99         0.65           0.99

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR(  0063)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.1390     0.1320

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0062)     3.300      1.774      1.33      88.57
   OUTFLOW: ID= 1 (  0063)     2.387      0.139      1.42      88.47
   OVERFLOW:ID= 3 (  0003)     0.913      0.756      1.42      88.47

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     8
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.67
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  3.40

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.83
                  TIME SHIFT OF PEAK FLOW         (min)=  5.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1320

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--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0011):     0.26   0.193     1.42    87.96
     + ID2= 2 (  0012):     1.18   1.010     1.42    88.54
       ================================================
       ID = 3 (  0031):     1.44   1.203     1.42    88.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| ADD HYD  (  0031)|
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|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0031):     1.44   1.203     1.42    88.44
     + ID2= 2 (  0013):     1.37   1.178     1.42    88.52
       ================================================
       ID = 1 (  0031):     2.81   2.381     1.42    88.48

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0031):     2.81   2.381     1.42    88.48
     + ID2= 2 (  0063):     0.91   0.756     1.42    88.47
       ================================================
       ID = 3 (  0031):     3.72   3.137     1.42    88.48

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0005)|   Area    (ha)=   2.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.46         0.57
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     116.33        40.00
     Mannings n            =      0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
    hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.083    2.89 | 1.083   62.12 | 2.083   12.48 |  3.08    3.91
  0.167    2.89 | 1.167   62.12 | 2.167   12.48 |  3.17    3.91
  0.250    3.67 | 1.250  196.54 | 2.250    9.60 |  3.25    3.44
  0.333    3.67 | 1.333  196.54 | 2.333    9.60 |  3.33    3.44
  0.417    4.88 | 1.417   83.09 | 2.417    7.66 |  3.42    3.05
  0.500    4.88 | 1.500   83.09 | 2.500    7.66 |  3.50    3.05
  0.583    6.96 | 1.583   41.25 | 2.583    6.29 |  3.58    2.73
  0.667    6.96 | 1.667   41.25 | 2.667    6.29 |  3.67    2.73
  0.750   11.02 | 1.750   25.07 | 2.750    5.28 |  3.75    2.47
  0.833   11.02 | 1.833   25.07 | 2.833    5.28 |  3.83    2.47
  0.917   21.03 | 1.917   17.06 | 2.917    4.51 |  3.92    2.24
  1.000   21.03 | 2.000   17.06 | 3.000    4.51 |  4.00    2.24

     Max.Eff.Inten.(mm/hr)=     196.54       129.47
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.13 (ii)    5.83 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.79         0.16          0.936 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42           1.33
     RUNOFF VOLUME    (mm)=      88.87        58.63          80.40
     TOTAL RAINFALL   (mm)=      89.87        89.87          89.87
     RUNOFF COEFFICIENT   =       0.99         0.65           0.89

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
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| STANDHYD (  0004)|   Area    (ha)=  14.87
|ID= 1 DT= 5.0 min |   Total Imp(%)=  95.00   Dir. Conn.(%)=  95.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.13         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     314.85        40.00
     Mannings n             =     0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.89 | 1.083   62.12 | 2.083   12.48 |  3.08    3.91
               0.167    2.89 | 1.167   62.12 | 2.167   12.48 |  3.17    3.91
               0.250    3.67 | 1.250  196.54 | 2.250    9.60 |  3.25    3.44
               0.333    3.67 | 1.333  196.54 | 2.333    9.60 |  3.33    3.44
               0.417    4.88 | 1.417   83.09 | 2.417    7.66 |  3.42    3.05
               0.500    4.88 | 1.500   83.09 | 2.500    7.66 |  3.50    3.05
               0.583    6.96 | 1.583   41.25 | 2.583    6.29 |  3.58    2.73
               0.667    6.96 | 1.667   41.25 | 2.667    6.29 |  3.67    2.73
               0.750   11.02 | 1.750   25.07 | 2.750    5.28 |  3.75    2.47
               0.833   11.02 | 1.833   25.07 | 2.833    5.28 |  3.83    2.47
               0.917   21.03 | 1.917   17.06 | 2.917    4.51 |  3.92    2.24
               1.000   21.03 | 2.000   17.06 | 3.000    4.51 |  4.00    2.24

     Max.Eff.Inten.(mm/hr)=     196.54       129.47
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.88 (ii)    5.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.25         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=       7.30         0.22         7.493 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      88.87        58.63         87.36
     TOTAL RAINFALL   (mm)=      89.87        89.87         89.87
     RUNOFF COEFFICIENT   =       0.99         0.65          0.97

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     3.11   0.180     1.42    88.54
     + ID2= 2 (  0031):     3.72   3.137     1.42    88.48
       ================================================
       ID = 3 (  0007):     6.83   3.317     1.42    88.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| ADD HYD  (  0007)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0007):     6.83   3.317     1.42    88.51
     + ID2= 2 (  0004):    14.87   7.493     1.33    87.36
       ================================================
       ID = 1 (  0007):    21.70   9.593     1.33    87.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| ADD HYD  (  0007)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0007):     21.70   9.593     1.33    87.72
     + ID2= 2 (  0005):      2.03   0.936     1.33    80.40
       ================================================
       ID = 3 (  0007):     23.73  10.529     1.33    87.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0008)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.4990      1.4692
                         0.0070     0.2185   |   0.5260      1.5717
                         0.0090     0.3744   |   0.7070      1.7814
                         0.0490     0.5385   |   1.0740      1.9972
                         0.2300     0.7995   |   1.3010      2.1075
                         0.3350     0.9822   |   1.8240      2.3326
                         0.3740     1.0761   |   2.1160      2.4475
                         0.4410     1.2692   |   3.0960      2.8018

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)     23.729     10.529      1.33      87.09
   OUTFLOW: ID= 1 (  0008)     23.729      0.527      2.50      83.29

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.01
                  TIME SHIFT OF PEAK FLOW         (min)= 70.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.5730

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-------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0011):     0.68   0.039     1.42    87.96
     + ID2= 2 (  0013):     3.56   0.207     1.42    88.52
       ================================================
       ID = 3 (  0029):     4.24   0.246     1.42    88.43

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
     **** WARNING : FIRST OUTFLOW IS NOT ZERO.
                         0.0001     0.0089   |   0.0468      0.2012
                         0.0080     0.0440   |   0.0508      0.2137
                         0.0177     0.0783   |   0.0544      0.2247
                         0.0235     0.1115   |   0.0709      0.2342
                         0.0292     0.1511   |   0.0998      0.2429
                         0.0388     0.1807   |   0.1169      0.2472

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)     4.244      0.246      1.42      88.43
   OUTFLOW: ID= 1 (  0030)     4.244      0.076      5.92      86.17
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 31.07
                  TIME SHIFT OF PEAK FLOW         (min)=270.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2359

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| RESERVOIR(  0064)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0175      0.0792
                          0.0023     0.0112   |   0.0222      0.0973
                          0.0058     0.0278   |   0.0327      0.1273
                          0.0129     0.0595   |   0.0362      0.1357

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0063)      2.387      0.139      1.42      88.47
   OUTFLOW: ID= 1 (  0064)      2.387      0.036      6.42      87.96
   OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 25.60
                  TIME SHIFT OF PEAK FLOW         (min)=300.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1342

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--------------------
| ADD HYD  (  0065)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):     4.24   0.076     5.92    86.17
     + ID2= 2 (  0064):     2.39   0.036     6.42    87.96
       ================================================
       ID = 3 (  0065):     6.63   0.112     6.00    86.82

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

--------------------
| ADD HYD  (  0066)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0030 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0064 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 3> IS ALSO DRY
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--------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0066 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0065):     6.63   0.112     6.00    86.82
     + ID2= 2 (  0066):     0.00   0.000     0.00    86.82
       ================================================
       ID = 3 (  0061):     6.63   0.112     6.00    86.82

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
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HAZEL 48HR REGIONAL STORM SIMULATION

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\ad4c0876-
58d9-4c37-870b-e81acfc9006f\sce
  Summary filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\ad4c0876-
58d9-4c37-870b-e81acfc9006f\sce


DATE: 11/30/2023                          TIME: 05:04:17

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : G_Hzl48h15                    **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\kbobinac\AppD
|                  |              ata\Local\Temp\
|                  |              9a966027-3062-4799-96eb-a80cf3166d02\39ccfdd4
| Ptotal=285.00 mm |    Comments: Hzl48h15
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.00	12.00	2.00	24.00	2.00	36.00	6.00
0.25	2.00	12.25	2.00	24.25	2.00	36.25	6.00
0.50	2.00	12.50	2.00	24.50	2.00	36.50	6.00
0.75	2.00	12.75	2.00	24.75	2.00	36.75	6.00
1.00	2.00	13.00	2.00	25.00	2.00	37.00	4.00
1.25	2.00	13.25	2.00	25.25	2.00	37.25	4.00
1.50	2.00	13.50	2.00	25.50	2.00	37.50	4.00
1.75	2.00	13.75	2.00	25.75	2.00	37.75	4.00
2.00	2.00	14.00	2.00	26.00	2.00	38.00	6.00
2.25	2.00	14.25	2.00	26.25	2.00	38.25	6.00
2.50	2.00	14.50	2.00	26.50	2.00	38.50	6.00
2.75	2.00	14.75	2.00	26.75	2.00	38.75	6.00
3.00	2.00	15.00	2.00	27.00	2.00	39.00	13.00
3.25	2.00	15.25	2.00	27.25	2.00	39.25	13.00
3.50	2.00	15.50	2.00	27.50	2.00	39.50	13.00
3.75	2.00	15.75	2.00	27.75	2.00	39.75	13.00
4.00	2.00	16.00	2.00	28.00	2.00	40.00	17.00
4.25	2.00	16.25	2.00	28.25	2.00	40.25	17.00
4.50	2.00	16.50	2.00	28.50	2.00	40.50	17.00
4.75	2.00	16.75	2.00	28.75	2.00	40.75	17.00
5.00	2.00	17.00	2.00	29.00	2.00	41.00	13.00
5.25	2.00	17.25	2.00	29.25	2.00	41.25	13.00
5.50	2.00	17.50	2.00	29.50	2.00	41.50	13.00

5.75	2.00	17.75	2.00	29.75	2.00	41.75	13.00
6.00	2.00	18.00	2.00	30.00	2.00	42.00	23.00
6.25	2.00	18.25	2.00	30.25	2.00	42.25	23.00
6.50	2.00	18.50	2.00	30.50	2.00	42.50	23.00
6.75	2.00	18.75	2.00	30.75	2.00	42.75	23.00
7.00	2.00	19.00	2.00	31.00	2.00	43.00	13.00
7.25	2.00	19.25	2.00	31.25	2.00	43.25	13.00
7.50	2.00	19.50	2.00	31.50	2.00	43.50	13.00
7.75	2.00	19.75	2.00	31.75	2.00	43.75	13.00
8.00	2.00	20.00	2.00	32.00	2.00	44.00	13.00
8.25	2.00	20.25	2.00	32.25	2.00	44.25	13.00
8.50	2.00	20.50	2.00	32.50	2.00	44.50	13.00
8.75	2.00	20.75	2.00	32.75	2.00	44.75	13.00
9.00	2.00	21.00	2.00	33.00	2.00	45.00	53.00
9.25	2.00	21.25	2.00	33.25	2.00	45.25	53.00
9.50	2.00	21.50	2.00	33.50	2.00	45.50	53.00
9.75	2.00	21.75	2.00	33.75	2.00	45.75	53.00
10.00	2.00	22.00	2.00	34.00	2.00	46.00	38.00
10.25	2.00	22.25	2.00	34.25	2.00	46.25	38.00
10.50	2.00	22.50	2.00	34.50	2.00	46.50	38.00
10.75	2.00	22.75	2.00	34.75	2.00	46.75	38.00
11.00	2.00	23.00	2.00	35.00	3.00	47.00	13.00
11.25	2.00	23.25	2.00	35.25	3.00	47.25	13.00
11.50	2.00	23.50	2.00	35.50	3.00	47.50	13.00
11.75	2.00	23.75	2.00	35.75	3.00	47.75	13.00

CALIB
STANDHYD (0002) | Area (ha)= 4.93
ID= 1 DT= 5.0 min | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.88	0.05
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	181.29	40.00
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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00

2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00

8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	51.57	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.71 (ii)	6.15 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.22	0.15	
			TOTALS
PEAK FLOW (cms)=	0.72	0.01	0.726 (iii)
TIME TO PEAK (hrs)=	46.00	46.00	46.00
RUNOFF VOLUME (mm)=	284.00	244.80	283.61
TOTAL RAINFALL (mm)=	285.00	285.00	285.00
RUNOFF COEFFICIENT =	1.00	0.86	1.00

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0013)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.2070	0.1970

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (	0002)	4.930	0.726	46.00	283.61
OUTFLOW: ID= 1 (	0013)	3.875	0.207	45.17	288.24
OVERFLOW:ID= 3 (	0003)	1.055	0.839	45.17	288.24

TOTAL NUMBER OF SIMULATION OVERFLOW = 25
CUMULATIVE TIME OF OVERFLOW (HOURS) = 2.08
PERCENTAGE OF TIME OVERFLOWING (%) = 3.16

PEAK FLOW REDUCTION [Qout/Qin](%)= 28.53
TIME SHIFT OF PEAK FLOW (min)=-50.00
MAXIMUM STORAGE USED (ha.m.)= 0.1970

CALIB		
STANDHYD (0001)	Area (ha)= 4.29	
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.25	0.04
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	169.12	40.00
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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00

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 4.083    2.00 |16.083    2.00 |28.083    2.00 | 40.08   17.00
 4.167    2.00 |16.167    2.00 |28.167    2.00 | 40.17   17.00
 4.250    2.00 |16.250    2.00 |28.250    2.00 | 40.25   17.00
 4.333    2.00 |16.333    2.00 |28.333    2.00 | 40.33   17.00
 4.417    2.00 |16.417    2.00 |28.417    2.00 | 40.42   17.00
 4.500    2.00 |16.500    2.00 |28.500    2.00 | 40.50   17.00
 4.583    2.00 |16.583    2.00 |28.583    2.00 | 40.58   17.00
 4.667    2.00 |16.667    2.00 |28.667    2.00 | 40.67   17.00
 4.750    2.00 |16.750    2.00 |28.750    2.00 | 40.75   17.00
 4.833    2.00 |16.833    2.00 |28.833    2.00 | 40.83   17.00
 4.917    2.00 |16.917    2.00 |28.917    2.00 | 40.92   17.00
 5.000    2.00 |17.000    2.00 |29.000    2.00 | 41.00   17.00
 5.083    2.00 |17.083    2.00 |29.083    2.00 | 41.08   13.00
 5.167    2.00 |17.167    2.00 |29.167    2.00 | 41.17   13.00
 5.250    2.00 |17.250    2.00 |29.250    2.00 | 41.25   13.00
 5.333    2.00 |17.333    2.00 |29.333    2.00 | 41.33   13.00
 5.417    2.00 |17.417    2.00 |29.417    2.00 | 41.42   13.00
 5.500    2.00 |17.500    2.00 |29.500    2.00 | 41.50   13.00
 5.583    2.00 |17.583    2.00 |29.583    2.00 | 41.58   13.00
 5.667    2.00 |17.667    2.00 |29.667    2.00 | 41.67   13.00
 5.750    2.00 |17.750    2.00 |29.750    2.00 | 41.75   13.00
 5.833    2.00 |17.833    2.00 |29.833    2.00 | 41.83   13.00
 5.917    2.00 |17.917    2.00 |29.917    2.00 | 41.92   13.00
 6.000    2.00 |18.000    2.00 |30.000    2.00 | 42.00   13.00
 6.083    2.00 |18.083    2.00 |30.083    2.00 | 42.08   22.99
 6.167    2.00 |18.167    2.00 |30.167    2.00 | 42.17   23.00
 6.250    2.00 |18.250    2.00 |30.250    2.00 | 42.25   23.00
 6.333    2.00 |18.333    2.00 |30.333    2.00 | 42.33   23.00
 6.417    2.00 |18.417    2.00 |30.417    2.00 | 42.42   23.00
 6.500    2.00 |18.500    2.00 |30.500    2.00 | 42.50   23.00
 6.583    2.00 |18.583    2.00 |30.583    2.00 | 42.58   23.00
 6.667    2.00 |18.667    2.00 |30.667    2.00 | 42.67   23.00
 6.750    2.00 |18.750    2.00 |30.750    2.00 | 42.75   23.00
 6.833    2.00 |18.833    2.00 |30.833    2.00 | 42.83   23.00
 6.917    2.00 |18.917    2.00 |30.917    2.00 | 42.92   23.00
 7.000    2.00 |19.000    2.00 |31.000    2.00 | 43.00   23.00
 7.083    2.00 |19.083    2.00 |31.083    2.00 | 43.08   13.01
 7.167    2.00 |19.167    2.00 |31.167    2.00 | 43.17   13.00
 7.250    2.00 |19.250    2.00 |31.250    2.00 | 43.25   13.00
 7.333    2.00 |19.333    2.00 |31.333    2.00 | 43.33   13.00
 7.417    2.00 |19.417    2.00 |31.417    2.00 | 43.42   13.00
 7.500    2.00 |19.500    2.00 |31.500    2.00 | 43.50   13.00
 7.583    2.00 |19.583    2.00 |31.583    2.00 | 43.58   13.00
 7.667    2.00 |19.667    2.00 |31.667    2.00 | 43.67   13.00
 7.750    2.00 |19.750    2.00 |31.750    2.00 | 43.75   13.00
 7.833    2.00 |19.833    2.00 |31.833    2.00 | 43.83   13.00
 7.917    2.00 |19.917    2.00 |31.917    2.00 | 43.92   13.00
 8.000    2.00 |20.000    2.00 |32.000    2.00 | 44.00   13.00
 8.083    2.00 |20.083    2.00 |32.083    2.00 | 44.08   13.00
 8.167    2.00 |20.167    2.00 |32.167    2.00 | 44.17   13.00
 8.250    2.00 |20.250    2.00 |32.250    2.00 | 44.25   13.00
 8.333    2.00 |20.333    2.00 |32.333    2.00 | 44.33   13.00
 8.417    2.00 |20.417    2.00 |32.417    2.00 | 44.42   13.00
 8.500    2.00 |20.500    2.00 |32.500    2.00 | 44.50   13.00
 8.583    2.00 |20.583    2.00 |32.583    2.00 | 44.58   13.00
 8.667    2.00 |20.667    2.00 |32.667    2.00 | 44.67   13.00
 8.750    2.00 |20.750    2.00 |32.750    2.00 | 44.75   13.00
 8.833    2.00 |20.833    2.00 |32.833    2.00 | 44.83   13.00
 8.917    2.00 |20.917    2.00 |32.917    2.00 | 44.92   13.00
 9.000    2.00 |21.000    2.00 |33.000    2.00 | 45.00   13.00
 9.083    2.00 |21.083    2.00 |33.083    2.00 | 45.08   52.95
 9.167    2.00 |21.167    2.00 |33.167    2.00 | 45.17   53.00
 9.250    2.00 |21.250    2.00 |33.250    2.00 | 45.25   53.00
 9.333    2.00 |21.333    2.00 |33.333    2.00 | 45.33   53.00
 9.417    2.00 |21.417    2.00 |33.417    2.00 | 45.42   53.00
 9.500    2.00 |21.500    2.00 |33.500    2.00 | 45.50   53.00
 9.583    2.00 |21.583    2.00 |33.583    2.00 | 45.58   53.00
 9.667    2.00 |21.667    2.00 |33.667    2.00 | 45.67   53.00
 9.750    2.00 |21.750    2.00 |33.750    2.00 | 45.75   53.00
 9.833    2.00 |21.833    2.00 |33.833    2.00 | 45.83   53.00
 9.917    2.00 |21.917    2.00 |33.917    2.00 | 45.92   53.00
10.000    2.00 |22.000    2.00 |34.000    2.00 | 46.00   53.00
10.083    2.00 |22.083    2.00 |34.083    2.00 | 46.08   38.02
10.167    2.00 |22.167    2.00 |34.167    2.00 | 46.17   38.00
10.250    2.00 |22.250    2.00 |34.250    2.00 | 46.25   38.00
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10.333    2.00 |22.333    2.00 |34.333    2.00 | 46.33   38.00
10.417    2.00 |22.417    2.00 |34.417    2.00 | 46.42   38.00
10.500    2.00 |22.500    2.00 |34.500    2.00 | 46.50   38.00
10.583    2.00 |22.583    2.00 |34.583    2.00 | 46.58   38.00
10.667    2.00 |22.667    2.00 |34.667    2.00 | 46.67   38.00
10.750    2.00 |22.750    2.00 |34.750    2.00 | 46.75   38.00
10.833    2.00 |22.833    2.00 |34.833    2.00 | 46.83   38.00
10.917    2.00 |22.917    2.00 |34.917    2.00 | 46.92   38.00
11.000    2.00 |23.000    2.00 |35.000    2.00 | 47.00   38.00
11.083    2.00 |23.083    2.00 |35.083    3.00 | 47.08   13.04
11.167    2.00 |23.167    2.00 |35.167    3.00 | 47.17   13.00
11.250    2.00 |23.250    2.00 |35.250    3.00 | 47.25   13.00
11.333    2.00 |23.333    2.00 |35.333    3.00 | 47.33   13.00
11.417    2.00 |23.417    2.00 |35.417    3.00 | 47.42   13.00
11.500    2.00 |23.500    2.00 |35.500    3.00 | 47.50   13.00
11.583    2.00 |23.583    2.00 |35.583    3.00 | 47.58   13.00
11.667    2.00 |23.667    2.00 |35.667    3.00 | 47.67   13.00
11.750    2.00 |23.750    2.00 |35.750    3.00 | 47.75   13.00
11.833    2.00 |23.833    2.00 |35.833    3.00 | 47.83   13.00
11.917    2.00 |23.917    2.00 |35.917    3.00 | 47.92   13.00
12.000    2.00 |24.000    2.00 |36.000    3.00 | 48.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        51.57
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       4.51 (ii)    5.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.23         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.63         0.01         0.631 (iii)
     TIME TO PEAK    (hrs)=      46.00        46.00          46.00
     RUNOFF VOLUME    (mm)=     284.00       244.80         283.61
     TOTAL RAINFALL   (mm)=     285.00       285.00         285.00
     RUNOFF COEFFICIENT   =       1.00         0.86           1.00

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| RESERVOIR(  0012)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.1800      0.1720

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0001)     4.290     0.631     46.00     283.61
   OUTFLOW: ID= 1 (  0012)     3.372     0.180     45.17     288.18
   OVERFLOW:ID= 3 (  0003)     0.918     0.728     45.17     288.18

                TOTAL NUMBER OF SIMULATION OVERFLOW  =    25
                CUMULATIVE TIME OF OVERFLOW  (HOURS) =  2.08
                PERCENTAGE OF TIME OVERFLOWING   (%) =  3.18

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 28.51
                TIME SHIFT OF PEAK FLOW         (min)=-50.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.1720

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| CALIB            |
| STANDHYD (  0003)|   Area    (ha)=   0.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
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                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.93         0.01
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      79.16        40.00
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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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00

5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00

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              11.917    2.00 |23.917    2.00 |35.917    3.00 | 47.92   13.00
              12.000    2.00 |24.000    2.00 |36.000    3.00 | 48.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        51.57
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      2.86 (ii)    4.31 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.28         0.23
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.14         0.00          0.138 (iii)
     TIME TO PEAK    (hrs)=     45.75        46.00         46.00
     RUNOFF VOLUME    (mm)=    284.00       244.80        283.61
     TOTAL RAINFALL   (mm)=    285.00       285.00        285.00
     RUNOFF COEFFICIENT   =      1.00         0.86          1.00

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| RESERVOIR(  0011)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0390     0.0380

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0003)     0.940      0.138     46.00     283.61
   OUTFLOW: ID= 1 (  0011)     0.740      0.039     45.17     285.83
   OVERFLOW:ID= 3 (  0003)     0.200      0.114     45.17     285.83

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =    24
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  2.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  3.24

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 28.19
                  TIME SHIFT OF PEAK FLOW         (min)=-50.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0380

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-------------------
| CALIB            |
| STANDHYD (  0062)|   Area    (ha)=   3.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.27         0.03
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     148.32        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    2.00 |12.083    2.00 |24.083    2.00 | 36.08    6.00
               0.167    2.00 |12.167    2.00 |24.167    2.00 | 36.17    6.00
               0.250    2.00 |12.250    2.00 |24.250    2.00 | 36.25    6.00
               0.333    2.00 |12.333    2.00 |24.333    2.00 | 36.33    6.00
               0.417    2.00 |12.417    2.00 |24.417    2.00 | 36.42    6.00
               0.500    2.00 |12.500    2.00 |24.500    2.00 | 36.50    6.00
               0.583    2.00 |12.583    2.00 |24.583    2.00 | 36.58    6.00
               0.667    2.00 |12.667    2.00 |24.667    2.00 | 36.67    6.00
               0.750    2.00 |12.750    2.00 |24.750    2.00 | 36.75    6.00
               0.833    2.00 |12.833    2.00 |24.833    2.00 | 36.83    6.00
               0.917    2.00 |12.917    2.00 |24.917    2.00 | 36.92    6.00
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               1.000    2.00 |13.000    2.00 |25.000    2.00 | 37.00    6.00
               1.083    2.00 |13.083    2.00 |25.083    2.00 | 37.08    4.00
               1.167    2.00 |13.167    2.00 |25.167    2.00 | 37.17    4.00
               1.250    2.00 |13.250    2.00 |25.250    2.00 | 37.25    4.00
               1.333    2.00 |13.333    2.00 |25.333    2.00 | 37.33    4.00
               1.417    2.00 |13.417    2.00 |25.417    2.00 | 37.42    4.00
               1.500    2.00 |13.500    2.00 |25.500    2.00 | 37.50    4.00
               1.583    2.00 |13.583    2.00 |25.583    2.00 | 37.58    4.00
               1.667    2.00 |13.667    2.00 |25.667    2.00 | 37.67    4.00
               1.750    2.00 |13.750    2.00 |25.750    2.00 | 37.75    4.00
               1.833    2.00 |13.833    2.00 |25.833    2.00 | 37.83    4.00
               1.917    2.00 |13.917    2.00 |25.917    2.00 | 37.92    4.00
               2.000    2.00 |14.000    2.00 |26.000    2.00 | 38.00    4.00
               2.083    2.00 |14.083    2.00 |26.083    2.00 | 38.08    6.00
               2.167    2.00 |14.167    2.00 |26.167    2.00 | 38.17    6.00
               2.250    2.00 |14.250    2.00 |26.250    2.00 | 38.25    6.00
               2.333    2.00 |14.333    2.00 |26.333    2.00 | 38.33    6.00
               2.417    2.00 |14.417    2.00 |26.417    2.00 | 38.42    6.00
               2.500    2.00 |14.500    2.00 |26.500    2.00 | 38.50    6.00
               2.583    2.00 |14.583    2.00 |26.583    2.00 | 38.58    6.00
               2.667    2.00 |14.667    2.00 |26.667    2.00 | 38.67    6.00
               2.750    2.00 |14.750    2.00 |26.750    2.00 | 38.75    6.00
               2.833    2.00 |14.833    2.00 |26.833    2.00 | 38.83    6.00
               2.917    2.00 |14.917    2.00 |26.917    2.00 | 38.92    6.00
               3.000    2.00 |15.000    2.00 |27.000    2.00 | 39.00    6.00
               3.083    2.00 |15.083    2.00 |27.083    2.00 | 39.08   13.00
               3.167    2.00 |15.167    2.00 |27.167    2.00 | 39.17   13.00
               3.250    2.00 |15.250    2.00 |27.250    2.00 | 39.25   13.00
               3.333    2.00 |15.333    2.00 |27.333    2.00 | 39.33   13.00
               3.417    2.00 |15.417    2.00 |27.417    2.00 | 39.42   13.00
               3.500    2.00 |15.500    2.00 |27.500    2.00 | 39.50   13.00
               3.583    2.00 |15.583    2.00 |27.583    2.00 | 39.58   13.00
               3.667    2.00 |15.667    2.00 |27.667    2.00 | 39.67   13.00
               3.750    2.00 |15.750    2.00 |27.750    2.00 | 39.75   13.00
               3.833    2.00 |15.833    2.00 |27.833    2.00 | 39.83   13.00
               3.917    2.00 |15.917    2.00 |27.917    2.00 | 39.92   13.00
               4.000    2.00 |16.000    2.00 |28.000    2.00 | 40.00   13.00
               4.083    2.00 |16.083    2.00 |28.083    2.00 | 40.08   17.00
               4.167    2.00 |16.167    2.00 |28.167    2.00 | 40.17   17.00
               4.250    2.00 |16.250    2.00 |28.250    2.00 | 40.25   17.00
               4.333    2.00 |16.333    2.00 |28.333    2.00 | 40.33   17.00
               4.417    2.00 |16.417    2.00 |28.417    2.00 | 40.42   17.00
               4.500    2.00 |16.500    2.00 |28.500    2.00 | 40.50   17.00
               4.583    2.00 |16.583    2.00 |28.583    2.00 | 40.58   17.00
               4.667    2.00 |16.667    2.00 |28.667    2.00 | 40.67   17.00
               4.750    2.00 |16.750    2.00 |28.750    2.00 | 40.75   17.00
               4.833    2.00 |16.833    2.00 |28.833    2.00 | 40.83   17.00
               4.917    2.00 |16.917    2.00 |28.917    2.00 | 40.92   17.00
               5.000    2.00 |17.000    2.00 |29.000    2.00 | 41.00   17.00
               5.083    2.00 |17.083    2.00 |29.083    2.00 | 41.08   13.00
               5.167    2.00 |17.167    2.00 |29.167    2.00 | 41.17   13.00
               5.250    2.00 |17.250    2.00 |29.250    2.00 | 41.25   13.00
               5.333    2.00 |17.333    2.00 |29.333    2.00 | 41.33   13.00
               5.417    2.00 |17.417    2.00 |29.417    2.00 | 41.42   13.00
               5.500    2.00 |17.500    2.00 |29.500    2.00 | 41.50   13.00
               5.583    2.00 |17.583    2.00 |29.583    2.00 | 41.58   13.00
               5.667    2.00 |17.667    2.00 |29.667    2.00 | 41.67   13.00
               5.750    2.00 |17.750    2.00 |29.750    2.00 | 41.75   13.00
               5.833    2.00 |17.833    2.00 |29.833    2.00 | 41.83   13.00
               5.917    2.00 |17.917    2.00 |29.917    2.00 | 41.92   13.00
               6.000    2.00 |18.000    2.00 |30.000    2.00 | 42.00   13.00
               6.083    2.00 |18.083    2.00 |30.083    2.00 | 42.08   22.99
               6.167    2.00 |18.167    2.00 |30.167    2.00 | 42.17   23.00
               6.250    2.00 |18.250    2.00 |30.250    2.00 | 42.25   23.00
               6.333    2.00 |18.333    2.00 |30.333    2.00 | 42.33   23.00
               6.417    2.00 |18.417    2.00 |30.417    2.00 | 42.42   23.00
               6.500    2.00 |18.500    2.00 |30.500    2.00 | 42.50   23.00
               6.583    2.00 |18.583    2.00 |30.583    2.00 | 42.58   23.00
               6.667    2.00 |18.667    2.00 |30.667    2.00 | 42.67   23.00
               6.750    2.00 |18.750    2.00 |30.750    2.00 | 42.75   23.00
               6.833    2.00 |18.833    2.00 |30.833    2.00 | 42.83   23.00
               6.917    2.00 |18.917    2.00 |30.917    2.00 | 42.92   23.00
               7.000    2.00 |19.000    2.00 |31.000    2.00 | 43.00   23.00
               7.083    2.00 |19.083    2.00 |31.083    2.00 | 43.08   13.01
               7.167    2.00 |19.167    2.00 |31.167    2.00 | 43.17   13.00
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7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	51.57	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.17 (ii)	5.62 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.24	0.15	
			TOTALS
PEAK FLOW (cms)=	0.48	0.00	0.486 (iii)
TIME TO PEAK (hrs)=	46.00	46.00	46.00
RUNOFF VOLUME (mm)=	284.00	244.80	283.61
TOTAL RAINFALL (mm)=	285.00	285.00	285.00
RUNOFF COEFFICIENT =	1.00	0.86	1.00

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0063)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1390	0.1320

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0062)	3.300	0.486	46.00	283.61
OUTFLOW: ID= 1 (0063)	2.595	0.139	45.17	288.18
OVERFLOW:ID= 3 (0003)	0.705	0.570	45.17	288.18

TOTAL NUMBER OF SIMULATION OVERFLOW = 25
CUMULATIVE TIME OF OVERFLOW (HOURS) = 2.08
PERCENTAGE OF TIME OVERFLOWING (%) = 3.22

PEAK FLOW REDUCTION [Qout/Qin](%)= 28.62
TIME SHIFT OF PEAK FLOW (min)=-50.00
MAXIMUM STORAGE USED (ha.m.)= 0.1320

ADD HYD (0031)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0011):	0.20	0.114	45.17	285.83
+ ID2= 2 (0012):	0.92	0.728	45.17	288.18
ID = 3 (0031):	1.12	0.842	45.17	287.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0031)					
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0031):	1.12	0.842	45.17	287.76
+ ID2= 2 (0013):	1.06	0.839	45.17	288.24
ID = 1 (0031):	2.17	1.681	45.17	287.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0031)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0031):	2.17	1.681	45.17	287.99
+ ID2= 2 (0063):	0.71	0.570	45.17	288.18
ID = 3 (0031):	2.88	2.251	45.17	288.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0005)	Area (ha)= 2.03		
ID= 1 DT= 5.0 min	Total Imp(%)= 72.00	Dir. Conn.(%)= 72.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.46	0.57
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	116.33	40.00
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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

```
     Max.Eff.Inten.(mm/hr)=      53.00        51.57
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       3.61 (ii)   12.80 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.25         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.22         0.08         0.295 (iii)
     TIME TO PEAK    (hrs)=      46.00        46.00          46.00
     RUNOFF VOLUME    (mm)=     284.00       244.79         273.02
     TOTAL RAINFALL   (mm)=     285.00       285.00         285.00
     RUNOFF COEFFICIENT   =       1.00         0.86           0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0004)|   Area    (ha)=  14.87
|ID= 1 DT= 5.0 min |   Total Imp(%)=  95.00   Dir. Conn.(%)=  95.00
--------------------
                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.13         0.74
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     314.85        40.00
     Mannings n           =      0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    2.00 |12.083    2.00 |24.083    2.00 | 36.08    6.00
             0.167    2.00 |12.167    2.00 |24.167    2.00 | 36.17    6.00
             0.250    2.00 |12.250    2.00 |24.250    2.00 | 36.25    6.00
             0.333    2.00 |12.333    2.00 |24.333    2.00 | 36.33    6.00
             0.417    2.00 |12.417    2.00 |24.417    2.00 | 36.42    6.00
             0.500    2.00 |12.500    2.00 |24.500    2.00 | 36.50    6.00
             0.583    2.00 |12.583    2.00 |24.583    2.00 | 36.58    6.00
             0.667    2.00 |12.667    2.00 |24.667    2.00 | 36.67    6.00
             0.750    2.00 |12.750    2.00 |24.750    2.00 | 36.75    6.00
             0.833    2.00 |12.833    2.00 |24.833    2.00 | 36.83    6.00
             0.917    2.00 |12.917    2.00 |24.917    2.00 | 36.92    6.00
             1.000    2.00 |13.000    2.00 |25.000    2.00 | 37.00    6.00
             1.083    2.00 |13.083    2.00 |25.083    2.00 | 37.08    4.00
             1.167    2.00 |13.167    2.00 |25.167    2.00 | 37.17    4.00
             1.250    2.00 |13.250    2.00 |25.250    2.00 | 37.25    4.00
             1.333    2.00 |13.333    2.00 |25.333    2.00 | 37.33    4.00
             1.417    2.00 |13.417    2.00 |25.417    2.00 | 37.42    4.00
             1.500    2.00 |13.500    2.00 |25.500    2.00 | 37.50    4.00
             1.583    2.00 |13.583    2.00 |25.583    2.00 | 37.58    4.00
             1.667    2.00 |13.667    2.00 |25.667    2.00 | 37.67    4.00
             1.750    2.00 |13.750    2.00 |25.750    2.00 | 37.75    4.00
             1.833    2.00 |13.833    2.00 |25.833    2.00 | 37.83    4.00
             1.917    2.00 |13.917    2.00 |25.917    2.00 | 37.92    4.00
             2.000    2.00 |14.000    2.00 |26.000    2.00 | 38.00    4.00
             2.083    2.00 |14.083    2.00 |26.083    2.00 | 38.08    6.00
             2.167    2.00 |14.167    2.00 |26.167    2.00 | 38.17    6.00
             2.250    2.00 |14.250    2.00 |26.250    2.00 | 38.25    6.00
             2.333    2.00 |14.333    2.00 |26.333    2.00 | 38.33    6.00
             2.417    2.00 |14.417    2.00 |26.417    2.00 | 38.42    6.00
             2.500    2.00 |14.500    2.00 |26.500    2.00 | 38.50    6.00
             2.583    2.00 |14.583    2.00 |26.583    2.00 | 38.58    6.00
             2.667    2.00 |14.667    2.00 |26.667    2.00 | 38.67    6.00
             2.750    2.00 |14.750    2.00 |26.750    2.00 | 38.75    6.00
             2.833    2.00 |14.833    2.00 |26.833    2.00 | 38.83    6.00
             2.917    2.00 |14.917    2.00 |26.917    2.00 | 38.92    6.00
```



```
             3.000    2.00 |15.000    2.00 |27.000    2.00 | 39.00    6.00
             3.083    2.00 |15.083    2.00 |27.083    2.00 | 39.08   13.00
             3.167    2.00 |15.167    2.00 |27.167    2.00 | 39.17   13.00
             3.250    2.00 |15.250    2.00 |27.250    2.00 | 39.25   13.00
             3.333    2.00 |15.333    2.00 |27.333    2.00 | 39.33   13.00
             3.417    2.00 |15.417    2.00 |27.417    2.00 | 39.42   13.00
             3.500    2.00 |15.500    2.00 |27.500    2.00 | 39.50   13.00
             3.583    2.00 |15.583    2.00 |27.583    2.00 | 39.58   13.00
             3.667    2.00 |15.667    2.00 |27.667    2.00 | 39.67   13.00
             3.750    2.00 |15.750    2.00 |27.750    2.00 | 39.75   13.00
             3.833    2.00 |15.833    2.00 |27.833    2.00 | 39.83   13.00
             3.917    2.00 |15.917    2.00 |27.917    2.00 | 39.92   13.00
             4.000    2.00 |16.000    2.00 |28.000    2.00 | 40.00   13.00
             4.083    2.00 |16.083    2.00 |28.083    2.00 | 40.08   17.00
             4.167    2.00 |16.167    2.00 |28.167    2.00 | 40.17   17.00
             4.250    2.00 |16.250    2.00 |28.250    2.00 | 40.25   17.00
             4.333    2.00 |16.333    2.00 |28.333    2.00 | 40.33   17.00
             4.417    2.00 |16.417    2.00 |28.417    2.00 | 40.42   17.00
             4.500    2.00 |16.500    2.00 |28.500    2.00 | 40.50   17.00
             4.583    2.00 |16.583    2.00 |28.583    2.00 | 40.58   17.00
             4.667    2.00 |16.667    2.00 |28.667    2.00 | 40.67   17.00
             4.750    2.00 |16.750    2.00 |28.750    2.00 | 40.75   17.00
             4.833    2.00 |16.833    2.00 |28.833    2.00 | 40.83   17.00
             4.917    2.00 |16.917    2.00 |28.917    2.00 | 40.92   17.00
             5.000    2.00 |17.000    2.00 |29.000    2.00 | 41.00   17.00
             5.083    2.00 |17.083    2.00 |29.083    2.00 | 41.08   13.00
             5.167    2.00 |17.167    2.00 |29.167    2.00 | 41.17   13.00
             5.250    2.00 |17.250    2.00 |29.250    2.00 | 41.25   13.00
             5.333    2.00 |17.333    2.00 |29.333    2.00 | 41.33   13.00
             5.417    2.00 |17.417    2.00 |29.417    2.00 | 41.42   13.00
             5.500    2.00 |17.500    2.00 |29.500    2.00 | 41.50   13.00
             5.583    2.00 |17.583    2.00 |29.583    2.00 | 41.58   13.00
             5.667    2.00 |17.667    2.00 |29.667    2.00 | 41.67   13.00
             5.750    2.00 |17.750    2.00 |29.750    2.00 | 41.75   13.00
             5.833    2.00 |17.833    2.00 |29.833    2.00 | 41.83   13.00
             5.917    2.00 |17.917    2.00 |29.917    2.00 | 41.92   13.00
             6.000    2.00 |18.000    2.00 |30.000    2.00 | 42.00   13.00
             6.083    2.00 |18.083    2.00 |30.083    2.00 | 42.08   22.99
             6.167    2.00 |18.167    2.00 |30.167    2.00 | 42.17   23.00
             6.250    2.00 |18.250    2.00 |30.250    2.00 | 42.25   23.00
             6.333    2.00 |18.333    2.00 |30.333    2.00 | 42.33   23.00
             6.417    2.00 |18.417    2.00 |30.417    2.00 | 42.42   23.00
             6.500    2.00 |18.500    2.00 |30.500    2.00 | 42.50   23.00
             6.583    2.00 |18.583    2.00 |30.583    2.00 | 42.58   23.00
             6.667    2.00 |18.667    2.00 |30.667    2.00 | 42.67   23.00
             6.750    2.00 |18.750    2.00 |30.750    2.00 | 42.75   23.00
             6.833    2.00 |18.833    2.00 |30.833    2.00 | 42.83   23.00
             6.917    2.00 |18.917    2.00 |30.917    2.00 | 42.92   23.00
             7.000    2.00 |19.000    2.00 |31.000    2.00 | 43.00   23.00
             7.083    2.00 |19.083    2.00 |31.083    2.00 | 43.08   13.01
             7.167    2.00 |19.167    2.00 |31.167    2.00 | 43.17   13.00
             7.250    2.00 |19.250    2.00 |31.250    2.00 | 43.25   13.00
             7.333    2.00 |19.333    2.00 |31.333    2.00 | 43.33   13.00
             7.417    2.00 |19.417    2.00 |31.417    2.00 | 43.42   13.00
             7.500    2.00 |19.500    2.00 |31.500    2.00 | 43.50   13.00
             7.583    2.00 |19.583    2.00 |31.583    2.00 | 43.58   13.00
             7.667    2.00 |19.667    2.00 |31.667    2.00 | 43.67   13.00
             7.750    2.00 |19.750    2.00 |31.750    2.00 | 43.75   13.00
             7.833    2.00 |19.833    2.00 |31.833    2.00 | 43.83   13.00
             7.917    2.00 |19.917    2.00 |31.917    2.00 | 43.92   13.00
             8.000    2.00 |20.000    2.00 |32.000    2.00 | 44.00   13.00
             8.083    2.00 |20.083    2.00 |32.083    2.00 | 44.08   13.00
             8.167    2.00 |20.167    2.00 |32.167    2.00 | 44.17   13.00
             8.250    2.00 |20.250    2.00 |32.250    2.00 | 44.25   13.00
             8.333    2.00 |20.333    2.00 |32.333    2.00 | 44.33   13.00
             8.417    2.00 |20.417    2.00 |32.417    2.00 | 44.42   13.00
             8.500    2.00 |20.500    2.00 |32.500    2.00 | 44.50   13.00
             8.583    2.00 |20.583    2.00 |32.583    2.00 | 44.58   13.00
             8.667    2.00 |20.667    2.00 |32.667    2.00 | 44.67   13.00
             8.750    2.00 |20.750    2.00 |32.750    2.00 | 44.75   13.00
             8.833    2.00 |20.833    2.00 |32.833    2.00 | 44.83   13.00
             8.917    2.00 |20.917    2.00 |32.917    2.00 | 44.92   13.00
             9.000    2.00 |21.000    2.00 |33.000    2.00 | 45.00   13.00
             9.083    2.00 |21.083    2.00 |33.083    2.00 | 45.08   52.95
             9.167    2.00 |21.167    2.00 |33.167    2.00 | 45.17   53.00
```

9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	51.57	
over (min)	5.00	10.00	
Storage Coeff. (min)=	6.55 (ii)	9.36 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.18	0.12	
			TOTALS
PEAK FLOW (cms)=	2.08	0.11	2.186 (iii)
TIME TO PEAK (hrs)=	46.00	46.00	46.00
RUNOFF VOLUME (mm)=	284.00	244.79	282.04
TOTAL RAINFALL (mm)=	285.00	285.00	285.00
RUNOFF COEFFICIENT =	1.00	0.86	0.99

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0007)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	3.37	0.180	45.17	288.18
+ ID2= 2 (0031):	2.88	2.251	45.17	288.04
ID = 3 (0007):	6.25	2.431	45.17	288.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0007)					
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0007):	6.25	2.431	45.17	288.12
+ ID2= 2 (0004):	14.87	2.186	46.00	282.04
ID = 1 (0007):	21.12	4.235	45.17	283.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0007)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0007):	21.12	4.235	45.17	283.84
+ ID2= 2 (0005):	2.03	0.295	46.00	273.02
ID = 3 (0007):	23.15	4.475	45.17	282.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4990	1.4692
	0.0070	0.2185	0.5260	1.5717
	0.0090	0.3744	0.7070	1.7814
	0.0490	0.5385	1.0740	1.9972
	0.2300	0.7995	1.3010	2.1075
	0.3350	0.9822	1.8240	2.3326
	0.3740	1.0761	2.1160	2.4475
	0.4410	1.2692	3.0960	2.8018

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0007)	23.150	4.475	45.17	282.89
OUTFLOW: ID= 1 (0008)	23.150	2.694	47.00	276.21

PEAK FLOW REDUCTION [Qout/Qin](%)= 60.21
TIME SHIFT OF PEAK FLOW (min)=110.00
MAXIMUM STORAGE USED (ha.m.)= 2.6584

ADD HYD (0029)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0011):	0.74	0.039	45.17	285.83
+ ID2= 2 (0013):	3.87	0.207	45.17	288.24
ID = 3 (0029):	4.61	0.246	45.17	287.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0030)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
**** WARNING : FIRST OUTFLOW IS NOT ZERO.				
	0.0001	0.0089	0.0468	0.2012
	0.0080	0.0440	0.0508	0.2137
	0.0177	0.0783	0.0544	0.2247
	0.0235	0.1115	0.0709	0.2342
	0.0292	0.1511	0.0998	0.2429
	0.0388	0.1807	0.1169	0.2472

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0029)	4.615	0.246	45.17	287.85
OUTFLOW: ID= 1 (0030)	3.566	0.117	41.75	285.94
OVERFLOW:ID= 3 (0003)	1.049	0.129	45.17	285.94

TOTAL NUMBER OF SIMULATION OVERFLOW = 99
CUMULATIVE TIME OF OVERFLOW (HOURS) = 8.25
PERCENTAGE OF TIME OVERFLOWING (%) = 6.90

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                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 47.52
                  TIME SHIFT OF PEAK FLOW         (min)=******
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2472

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-------------------
| RESERVOIR(  0064)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0175      0.0792
                         0.0023     0.0112   |   0.0222      0.0973
                         0.0058     0.0278   |   0.0327      0.1273
                         0.0129     0.0595   |   0.0362      0.1357

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0063)     2.595      0.139     45.17     288.18
   OUTFLOW: ID= 1 (  0064)     1.674      0.036     41.75     287.56
   OVERFLOW:ID= 3 (  0003)     0.921      0.103     45.17     287.56

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =   114
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  9.50
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  8.18

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 26.06
                  TIME SHIFT OF PEAK FLOW         (min)=******
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1357

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-------------------
| ADD HYD  (  0065)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):     3.57   0.117    41.75   285.94
     + ID2= 2 (  0064):     1.67   0.036    41.75   287.56
       ================================================
       ID = 3 (  0065):     5.24   0.153    41.75   286.46

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| ADD HYD  (  0066)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):     1.05   0.129    45.17   285.94
     + ID2= 2 (  0064):     0.92   0.103    45.17   287.56
       ================================================
       ID = 3 (  0066):     1.97   0.232    45.17   286.70

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

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0065):     5.24   0.153    41.75   286.46
     + ID2= 2 (  0066):     1.97   0.232    45.17   286.70
       ================================================
       ID = 3 (  0061):     7.21   0.385    45.17   286.52

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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NORTH SITE

EXISTING CONDITIONS

Caledon-Quadreal

Legend

- Assessment Parcel
- Agricultural Tile Drainage
  - Random
  - Systematic
- Soil Name Label
- Soil Code
- Soil Symbol
- Hydrologic Soil Group
  - A - High
  - B - Moderate
  - C - Slow
  - D - Very Slow

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Map Created: 11/10/2023
Map Center: 43.77852 N, -79.80791 W

Project: Quadreal-Caledon
Project No: 160623115
Date: Nov-23
Author: KB

Existing Conditions

Site Soils: Ontario Ministry of Agriculture Food and Rural Affi **Hydrologic Soil Group**
Soil Type C
Sandy Lean Clay Per Hydro-G Report Stantec (Dec. 2023)

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

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. Chin (2000), Water-Resources Engineering, Table 6.13-Curve Numbers for Various Urban Land Uses

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
	Hydrologic Soil Type							
Catchment	A	AB	B	BC	C	CD	D	TOTAL
101					100			100
102					100			100
103					100			100
104					100			100
105					100			100
106					100			100
EXT 1					100			100
EXT 2					100			100
EXT 3					100			100

Stantec

Project: Quadreal-Caledon
Project No: 160623115
Date: Nov-23
Author: KB

Existing Conditions

Site Soils: Ontario Ministry of Agriculture Food and Rural Affiars
Soil Type C
Sandy Lean Clay Per Hydro-G Report Stantec (Dec. 2023)

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101	0	0	0	0	0	100	0	0	0	100.00
102	0	0	0	0	0	100	0	0	0	100.00
103	0	0	0	0	0	100	0	0	0	100.00
104	0	0	0	0	21	65	0	14	0	100.00
105	0	0	0	0	47	45	0	8	0	100.00
106	0	0	0	0	0	100	0	0	0	100.00
EXT 1	0	0	0	0	0	56	0	44	0	100.00
EXT 2	0	0	0	0	0	95	0	5	0	100.00
EXT 3	0	0	0	0	0	100	0	0	0	100.00

CURVE NUMBER (CN) - Existing Conditions												
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Weighted CN	IA	Manning's 'n'
101	0.0	0.0	0.0	0.0	0.0	82.0	0.0	0.0	0.0	82	11.15	0.13
102	0.0	0.0	0.0	0.0	0.0	82.0	0.0	0.0	0.0	82	11.15	0.13
103	0.0	0.0	0.0	0.0	0.0	82.0	0.0	0.0	0.0	82	11.15	0.13
104	0.0	0.0	0.0	0.0	16.2	53.0	0.0	11.3	0.0	81	11.92	0.16
105	0.0	0.0	0.0	0.0	35.4	37.0	0.0	6.7	0.0	79	13.50	0.16
106	0.0	0.0	0.0	0.0	0.0	82.0	0.0	0.0	0.0	82	11.15	0.13
EXT 1	0.0	0.0	0.0	0.0	0.0	46.1	0.0	35.4	0.0	82	11.15	0.18
EXT 2	0.0	0.0	0.0	0.0	0.0	77.8	0.0	4.2	0.0	82	11.15	0.14
EXT 3	0.0	0.0	0.0	0.0	0.0	82.0	0.0	0.0	0.0	82	11.15	0.13

Stantec

Project: Quadreal-Caledon
Project No: 160623115
Date: Nov-23
Author: KB

Existing Conditions
NRSC (SCS) Modified Curve Number Calculation: Existing Conditions

		Input Values										
Step	Subcatchment:	101		101	102	103	104	105	106	EXT 1	EXT 2	EXT 3
1	**CN (AMC II):**	**82**		**82**	**82**	**82**	**81**	**79**	**82**	**82**	**82**	**82**
2	CN (AMC III) =	92		92	92	92	92	91	92	92	92	92
3	100 Year Precipitation, P =	89.87	mm	89.87	89.87	89.87	89.87	89.87	89.87	89.87	89.87	89.87

$Q = \frac{(P - Ia)^2}{(P - Ia) + S}$ $S = \frac{(P - Ia)^2}{Q} - (P - Ia)$ Q = rainfall excess or runoff, mm; S = potential maximum retention or available storage, mm

$CN = \frac{25400}{S + 254}$ $S = \frac{25400}{CN} - 254$

CN* = modified SCS curve # that better reflects Ia conditions in Ontario

	Subcatchment:	101		101	102	103	104	105	106	EXT 1	EXT 2	EXT 3
	S_{III} =	22.09	mm	22.09	22.09	22.09	22.09	25.12	22.09	22.09	22.09	22.09
	SCS Assumption of 0.2 S = Ia =	4.42	mm	4.42	4.42	4.42	4.42	5.02	4.42	4.42	4.42	4.42
4	Q_{III} =	67.90	mm	67.90	67.90	67.90	67.90	65.46	67.90	67.90	67.90	67.90
	Preferred Initial Abstraction, Ia =	1.5	mm	1.5	1.5	1.5	1.5	1.5	1.5	3.5	3.5	3.5
5	S^*_{III} =	26.64	mm	26.64	26.64	26.64	26.64	30.92	26.64	23.49	23.49	23.49
6	CN^*_{III} =	90.51	mm	90.51	90.51	90.51	90.51	89.15	90.51	91.53	91.53	91.53
	CN^*_{III}=	**91**	Rounded	**91**	**91**	**91**	**91**	**89**	**91**	**92**	**92**	**92**
7	**CN^*_{II}=**	**80**	convert	**80**	**80**	**80**	**80**	**77**	**80**	**82**	**82**	**82**
	CN^*_{II}=	**82**	0.9 CN^*_{III}	**82**	**82**	**82**	**82**	**80**	**82**	**83**	**83**	**83**

Explanation of Procedure

1 Determine CN based on typical AMC II conditions (from our normal spreadsheet).
2 Convert CN from AMC II to AMC III conditions (standard SCS tables, as shown at side)
3 Get precipitation depth P for 100 year storm
4 Using CN_{III} with Ia = 0.2S, compute Q_{III} for 100 year precipitation
5 For the same Q_{III}, compute S^*_{III} using Ia=1.5mm (or otherwise determined from studies)
6 Compute CN^*_{III} using S^*_{III}
7 Calculate CN^*_{II} using standard SCS conversion table

Stantec

Project: Quadreal-Caledon
Project No: 160623115
Date: 12/13/2023
Author: KB

Peak Time Calculations

									C> 0.40	C < 0.40			Uplands Method						
									Bransby Williams	Airport Equation	Hyns Equation	Kirpish Equation	Forest & Meadow	Woodland	Pasture	Straight Row	Bare Soil	Grassed Waterway	Paved Areas
Catchment Number	Area (ha)	Runoff Coefficient C	Flow Path Length (m)	High Point (m)	Low Point (m)	Slope (%)	Height (m)	Log Slope (%)	Time to C (min)	Time to C (min)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)	Time to Peak (hr)
101	3.29	0.25	257.04	268.38	266.19	0.9	2.2	-0.1	13.43	46.84	0.21	0.28	0.69	0.35	*0.25*	*0.19*	0.18	0.12	0.09
102	6.05	0.25	489.14	270.06	266.17	0.8	3.9	-0.1	24.38	66.10	0.27	0.48	1.36	0.69	*0.48*	*0.38*	0.35	0.23	0.17
103	9.81	0.25	532.16	269.94	265.45	0.8	4.5	-0.1	24.97	67.61	0.32	0.50	1.43	0.73	*0.51*	*0.40*	0.37	0.24	0.18
104	11.23	0.25	872.27	270.39	260.07	1.2	10.3	0.1	37.75	77.42	0.29	0.61	1.98	1.01	*0.71*	*0.56*	0.51	0.33	0.25
105	15.65	0.25	1133.77	270.89	259.07	1.0	11.8	0.0	48.68	92.03	0.35	0.80	2.74	1.40	*0.98*	*0.78*	0.70	0.46	0.34
106	11.73	0.25	931.74	270.40	258.56	1.3	11.8	0.1	39.58	78.15	0.28	0.62	2.04	1.04	*0.73*	*0.58*	0.52	0.34	0.26
EXT 1	14.12	0.25	591.77	274.07	270.00	0.7	4.1	-0.2	27.90	76.27	0.40	0.60	1.76	0.90	*0.63*	*0.50*	0.45	0.30	0.22
EXT 2	57.79	0.25	1737.66	280.64	269.96	0.6	10.7	-0.2	72.77	135.64	0.73	1.44	5.48	2.80	*1.95*	*1.54*	1.39	0.92	0.69
EXT 3	19.05	0.25	1542.51	280.19	271.27	0.6	8.9	-0.2	73.06	130.39	0.49	1.36	5.02	2.56	*1.78*	*1.41*	1.27	0.84	0.63

Governing Time to Peak					
Catchment Number	Time to C (min)	Time to C (hr)	Time of P (min)	Time of P (hr)	Method
101	46.84	0.78	31.38	0.52	Airport
102	66.10	1.10	44.29	0.74	Airport
103	67.61	1.13	45.30	0.75	Airport
104	77.42	1.29	51.87	0.86	Airport
105	92.03	1.53	61.66	1.03	Airport
106	78.15	1.30	52.36	0.87	Airport
EXT 1	76.27	1.27	51.10	0.85	Airport
EXT 2	135.64	2.26	90.88	1.51	Airport
EXT 3	130.39	2.17	87.36	1.46	Airport

Time to Peak should be calculated as tp = 0.67 tc, where tc is Time of Concentration.

Stantec

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/13/2023
Author: KB

Existing Conditions

		Existing Conditions Peak Flow (m^3/s)						
Cathcment	Area	Hazel	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
101	3.29	0.400	0.318	0.264	0.216	0.153	0.109	0.055
102	6.05	0.669	0.452	0.376	0.308	0.218	0.157	0.078
103	9.81	1.083	0.725	0.603	0.495	0.351	0.252	0.126
104	11.23	1.201	0.748	0.623	0.512	0.362	0.261	0.130
105	15.65	1.568	0.831	0.689	0.563	0.396	0.284	0.139
106	11.73	1.251	0.774	0.644	0.529	0.375	0.270	0.135

PROPOSED CONDITIONS

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/13/2023
Author: KB

Unit Flow Relationships as per the TRCA Humber River Watershed Equation F

Return Period	Equation F Sub-Basin 36
100-Year	Q=29.912-2-316 * ln(A)
50-Year	Q=26.566-2.082 * ln(A)
25-Year	Q=22.639-1.741 * ln(A)
10-Year	Q=17.957-1.373 * ln(A)
5-Year	Q=14.652-1.136 * ln(A)
2-Year	Q= 9.506-0.719 * ln(A)

Q = L/s/ha, A = Area (ha)

		Release Rate as per Equation F Sub-Basin 36 (L/s/ha)					
Cathcment	Area (ha)	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
101	3.287	27.16	24.09	20.57	16.32	13.30	8.65
102	6.045	25.74	22.82	19.51	15.49	12.61	8.21
103	9.812	24.62	21.81	18.66	14.82	12.06	7.86
104	11.232	24.31	21.53	18.43	14.64	11.90	7.77
105	15.648	23.54	20.84	17.85	14.18	11.53	7.53
106	11.726	24.21	21.44	18.35	14.58	11.86	7.74

		Release Rate as per Equation F Sub-Basin 36 (m^3/s/ha)					
Cathcment	Area	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
101	3.287	0.027	0.024	0.021	0.016	0.013	0.009
102	6.045	0.026	0.023	0.020	0.015	0.013	0.008
103	9.812	0.025	0.022	0.019	0.015	0.012	0.008
104	11.232	0.024	0.022	0.018	0.015	0.012	0.008
105	15.648	0.024	0.021	0.018	0.014	0.012	0.008
106	11.726	0.024	0.021	0.018	0.015	0.012	0.008

		Allowable Release Rate (m^3/s)					
Cathcment	Area (ha)	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
101	3.287	0.09	0.08	0.07	0.05	0.04	0.03
102	6.045	0.16	0.14	0.12	0.09	0.08	0.05
103	9.812	0.24	0.21	0.18	0.15	0.12	0.08
104	11.232	0.27	0.24	0.21	0.16	0.13	0.09
105	15.648	0.37	0.33	0.28	0.22	0.18	0.12
106	11.726	0.28	0.25	0.22	0.17	0.14	0.09

Allowable Release Rates

		Allowable Release Rate (m^3/s)						
Cathcment	Area	Hazel Existing	100-Year	50-Year	25-Year	10-Year	5-Year	2-Year
101	3.287	0.40	0.09	0.08	0.07	0.05	0.04	0.03
102	6.045	0.67	0.16	0.14	0.12	0.09	0.08	0.05
103	9.812	1.08	0.24	0.21	0.18	0.15	0.12	0.08
104	11.232	1.20	0.27	0.24	0.21	0.16	0.13	0.09
105	15.648	1.57	0.37	0.33	0.28	0.22	0.18	0.12
106	11.726	1.25	0.28	0.25	0.22	0.17	0.14	0.09
Total Site	57.75	6.17	1.41	1.25	1.07	0.85	0.69	0.45
Total Site Developed	44.64	4.77	1.09	0.97	0.83	0.66	0.53	0.35
Total Site Undeveloped	13.11	1.40	0.32	0.28	0.24	0.19	0.16	0.10

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/4/2024
Author: KB

Proposed Conditions

Outlet 1 to the Tributary of West Humber River

Outlet 1 Flow	
Storm	**Controlled Flow Outlet 1 (m^3/s)**
Hazel Existing	**3.777**
100-Year	**1.075**
50-Year	**0.934**
25-Year	**0.696**
10-Year	**0.266**
5-Year	**0.117**
2-Year	**0.054**
Extended Det.	**0.048**

Outlet 2 to Headwater Draiange Feature

Outlet 2 Flow			
Storm	Storm Tanks Controlled Outflow (m^3/s)	Storm Tanks Overflow (m^3/s)	**Controlled Outlet 2 Outflow (m^3/s)**
Hazel Existing	0.78915	0.000	**0.78915**
100-Year	0.00145	0.000	**0.00145**
50-Year	0.00144	0.000	**0.00144**
25-Year	0.00142	0.000	**0.00142**
10-Year	0.00135	0.000	**0.00135**
5-Year	0.00124	0.000	**0.00124**
2-Year	0.00107	0.000	**0.00107**
Extended Det.	0.00091	0.000	**0.00091**

Total Site Flow

Total Site Flow		
Storm	**Total Site Flow (m^3/s) Hazel = 3.777 + 0.789 = 4.566**	**Allowable Site Flow (m^3/s)**
Hazel Existing	**4.566**	**4.770**
100-Year	**1.076**	**1.091**
50-Year	**0.936**	**0.967**
25-Year	**0.697**	**0.827**
10-Year	**0.267**	**0.657**
5-Year	**0.118**	**0.534**
2-Year	**0.055**	**0.349**
Extended Det.	**0.049**	**0.053**

WATER QUANTITY

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/13/2023
Author: KB

Water Quality

Catchment	Area (ha)	Initial Treatment Train Approach and Effectiveness	Secondary Treatment Train Approach and Effectiveness	Total TSS Removal
Building 1	10.08	Clean roof flow TSS removal is	Infiltration Galleries TSS removal is	85%
		80%	25%	
Building 2	8.80	Clean roof flow TSS removal is	Infiltration Galleries TSS removal is	85%
		80%	25%	
Paved Areas	24.65	SWM Pond + OGS TSS removal is	N/A	80%
		80%	0%	
Pond Block	1.12	SWM Pond + OGS TSS removal is	N/A	80%
		80%	0%	
Total	**44.65**		**Total**	**82%**

WATER QUANTITY

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/13/2023
Author: KB

Roof Control

Catchment	Area (ha)	Ponding Depth (m)	Volume (m^3)	Max Release* (m^3/s)	Notes	Reciever
Buildign 1	10.08	0.04	4032	0.423	Roof Controls dischrge to Storm Tanks Roof overflows to Pond	Controlled Tank Flows to Outlet 2 to Headwater Drainage Feature Roof overflows to Outlet 1 to the Tributary of West Humber
Building 2	8.80	0.04	3520	0.370		

*Max roof release rate set at 42 L/s/ha

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/4/2024
Author: KB

Tank Summary

Tanks A to G	Volume (m^3)	Elevation (m)
Total Volume	15,090	264.17
Volume required for Water Balance	1,134	262.90
Active Storage Volume Required	13,956	262.9 - 264.17
Top of Stone	15,090	264.17
Top of Tanks	14,270	263.99
Bottom of Tanks	635	262.65
Bottom of Stone	0	262.47

Footprint (m^2)	19,422

Storm Trap Double Trap	Volume (m^3)	Elevation (m)
Total Volume	15,070	263.15
Volume required for Water Balance	N/A	N/A
Top of Tank	15,070	263.15
Bottom of Tank	0	260.10

Footprint (m^2)	5,481

WATER BALANCE & ESC

Project: Quadreal-Caledon
Project No: 160623114
Date: Dec-24
Author: KB

Erosion and Water Balance Control Summary
(5mm on-site retention)

Volume Requirements

Development Zone	Area (ha)	Retention Depth (mm)	Required Retention Volume (m^3)	Required Retention Volume (m^3)	Erosion Control
Building 1	10.08	5	504	944	Infiltration provided within Tanks D,E,G
Building 2	8.8	5	440		
Paved Areas	24.65	5	1233	1289	Provided with Pond
Pond Block	1.12	5	56		
Total	44.65	5.00	2233		

Proposed Strategy and Volume Provided

Development Zone	Area (ha)	Provided Retention Volume (m^3)	%Target
Tanks D,E & G (Roof of Building 1 and 2)	18.88	1136	51%
Total	**18.88**	**1136**	**51%**

Equivalent Retention Across All Roofs: 6.02 mm

Stantec

INFILTRATION GALLERY

Project: Quadreal-Caledon
Project No: 160623114
Date: Dec-2024
Author: KB

Erosion and Water Balance Control Strategy - (5mm on-site retention)

Zone	Area (ha)	Retention Depth (mm)	Available Retention Volume (m^3)	Total Retention Target (m^3)
Building 1 and 2 Roof	18.88	6.0	1136	2233
Total	18.88	6.0	1136	

Stone Infiltration Gallery Calculations

Existing Soil Type =	Sandy Lean Clay	Per Hydro-G Report Stantec	
Infiltration Rate i =	15.0	mm/hr	
Infiltration Rate (with FS 3.5) = i =	4.3	mm/hr	
Drawdown Time = t =	72	hrs	
Porosity of Storage Media = n =	0.4		
Gallery Details			
Surface Area of infiltration gallery = A =	7663	m^2	
Max water depth = $d_{c\,max}$ = I x (ts - dp/i) /n =	771	mm	Per: LID SWM Planning and Design Guide, p 4-87
Infiltration Gallery Volume			
Porosity of Storage Media = n =	0.4		
Surface Area of infiltration gallery = A =	7663	m^2	
Depth of Stone below outlet =	0.152	m	
Void Space Available in Gallery = n x A x d =	467	m^3	
Drawdown Time = $d_{c\,max}$ * n / i =	14.2	hr	

Open Chamber Infiltration Gallery Calculations

Existing Soil Type =	Sandy Lean Clay	Per Hydro-G Report Stantec (Dec. 2023)	
Infiltration Rate (with FS 3.5) = i =	4.3	mm/hr	
Drawdown Time = t =	72	hrs	
Porosity of Storage Media = n =	0.85		
Gallery Details			
Surface Area of infiltration gallery = A =	7663	m	
Max water depth = $d_{c\,max}$ = I x (ts - dp/i) /n =	363	mm	Per: LID SWM Planning and Design Guide, p 4-87
Infiltration Gallery Volume			
Porosity of Storage Media = n =	0.85		
Surface Area of infiltration gallery = A =	7663	m^2	
Depth below outlet =	0.102	m	
Void Space Available in Gallery = n x A x d =	669	m^3	
Drawdown Time = $d_{c\,max}$ * n / i =	20.2	hr	
Total Volume =	**1136**	**m^3**	
Percentage of Required Storage Volume =	**51%**		
Drawdown Time =	**34**	**hr**	
Draiange Area =	**18.88**	**ha**	
Equivalent Event Across Infiltration Drainage Area =	**6.02**	**mm**	

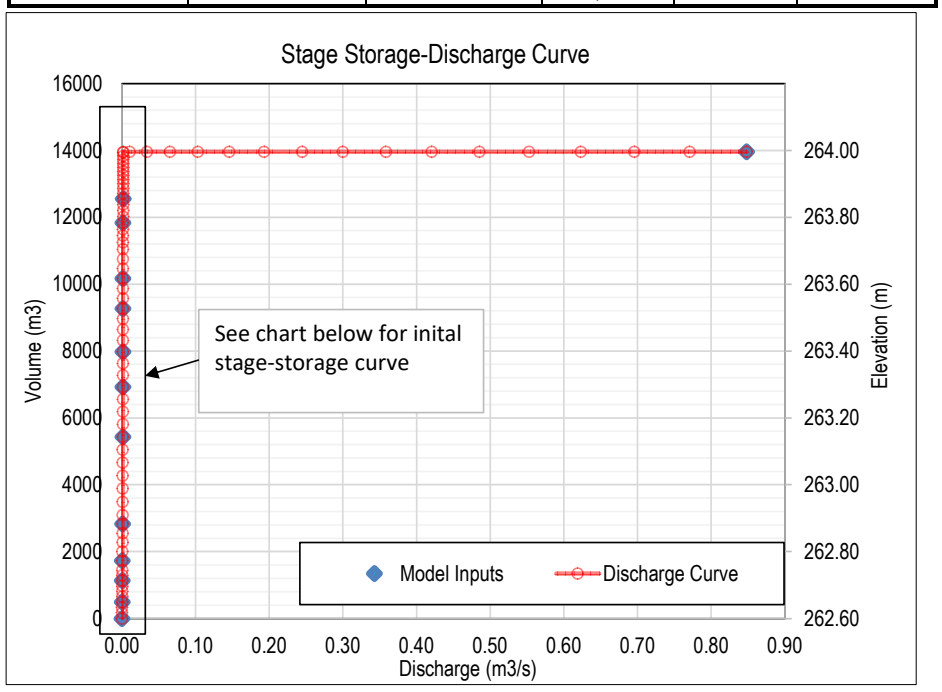
TANK OUTLET DETAILS AND STAGE STORAGE CURVE

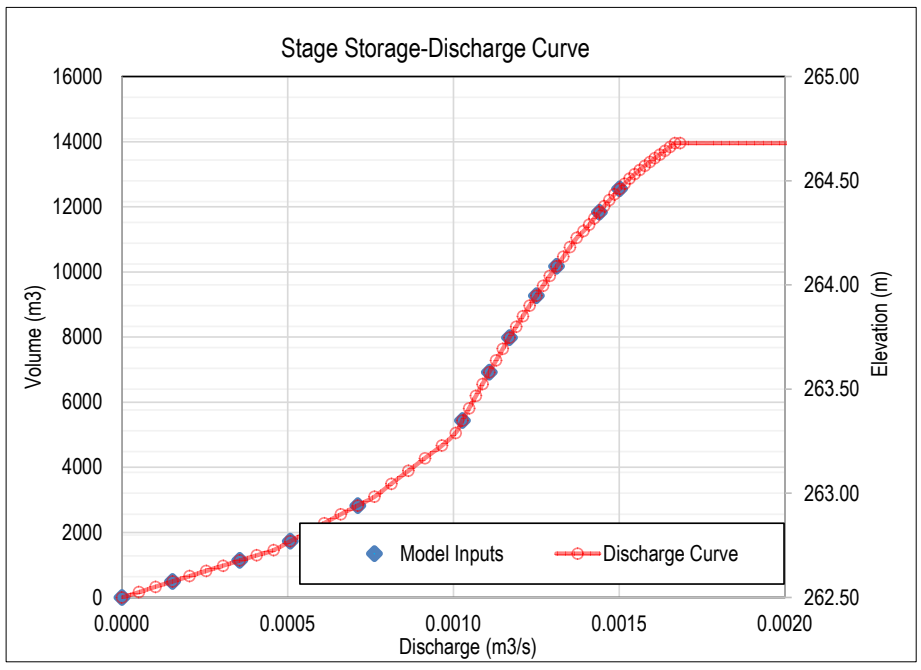
Project: Quadreal-Caledon
Project No: 160623115
Date: 12/4/2024
Author: KB

Stage Storage Discharge Curve - Storm Tanks A-G

Upstream Elevation	Orifice/Weir 3 Outflow	Ipex Flow 40mm ICD	Total Flow	Storage	Detention Time
(m)	(m^3/s)	(cms)	(cms)	(m^3)	(hrs)
262.72	0.00	0.00000	0.00000	0	0.0
262.75	0.00	0.00005	0.00005	165	0.0
262.77	0.00	0.00010	0.00010	329	0.0
262.80	0.00	0.00015	0.00015	493	0.0
262.82	0.00	0.00020	0.00020	655	0.0
262.85	0.00	0.00025	0.00025	817	0.0
262.87	0.00	0.00030	0.00030	978	0.0
262.90	0.00	0.00036	0.00036	1138	0.0
262.92	0.00	0.00041	0.00041	1297	0.0
262.95	0.00	0.00046	0.00046	1454	0.0
262.97	0.00	0.00051	0.00051	1731	0.0
263.00	0.00	0.00056	0.00056	2007	0.0
263.02	0.00	0.00061	0.00061	2281	0.0
263.05	0.00	0.00066	0.00066	2554	0.0
263.08	0.00	0.00071	0.00071	2826	0.0
263.10	0.00	0.00076	0.00076	3096	0.0
263.13	0.00	0.00081	0.00081	3494	0.0
263.15	0.00	0.00086	0.00086	3888	0.0
263.18	0.00	0.00091	0.00091	4280	0.0
263.20	0.00	0.00097	0.00097	4669	0.0
263.23	0.00	0.00101	0.00101	5054	108.6
263.25	0.00	0.00103	0.00103	5436	213.0
263.28	0.00	0.00105	0.00105	5815	314.3
263.30	0.00	0.00107	0.00107	6189	412.6
263.33	0.00	0.00109	0.00109	6558	507.9
263.36	0.00	0.00111	0.00111	6923	600.2
263.38	0.00	0.00113	0.00113	7283	689.6
263.41	0.00	0.00115	0.00115	7636	775.8
263.43	0.00	0.00117	0.00117	7983	858.9
263.46	0.00	0.00119	0.00119	8320	938.4
263.48	0.00	0.00121	0.00121	8645	1013.6
263.51	0.00	0.00123	0.00123	8962	1085.9
263.53	0.00	0.00125	0.00125	9272	1155.2
263.56	0.00	0.00127	0.00127	9574	1221.9
263.58	0.00	0.00129	0.00129	9875	1287.0
263.61	0.00	0.00131	0.00131	10172	1350.6
263.63	0.00	0.00133	0.00133	10468	1412.6
263.66	0.00	0.00135	0.00135	10760	1473.2
263.69	0.00	0.00137	0.00137	11049	1532.2
263.71	0.00	0.00139	0.00139	11251	1572.8
263.74	0.00	0.00141	0.00141	11450	1612.1
263.76	0.00	0.00142	0.00142	11645	1650.3
263.79	0.00	0.00144	0.00144	11836	1687.4
263.81	0.00	0.00146	0.00146	12022	1723.2
263.84	0.00	0.00147	0.00147	12204	1757.7
263.86	0.00	0.00149	0.00149	12381	1790.9
263.89	0.00	0.00150	0.00150	12551	1822.6
263.91	0.00	0.00152	0.00152	12714	1852.6
263.94	0.00	0.00153	0.00153	12867	1880.5
263.96	0.00	0.00155	0.00155	13005	1905.4
263.99	0.00	0.00156	0.00156	13136	1928.8
264.02	0.00	0.00158	0.00158	13260	1950.6
264.04	0.00	0.00159	0.00159	13376	1971.0
264.07	0.00	0.00161	0.00161	13492	1991.1
264.09	0.00	0.00162	0.00162	13608	2011.1
264.12	0.00	0.00164	0.00164	13724	2030.9
264.14	0.00	0.00165	0.00165	13840	2050.5
264.17	0.00	0.00167	0.00167	13956	2069.9
264.19	0.00	0.00168	0.00168	13957	2070.0
264.22	0.01	0.00170	0.01055	13957	2070.0
264.24	0.03	0.00171	0.03383	13958	2069.99
264.27	0.06	0.00173	0.06518	13958	2070.00
264.29	0.10	0.00174	0.10277	13959	2070.00
264.32	0.14	0.00176	0.14561	13959	2070.00
264.35	0.19	0.00178	0.19303	13960	2070.00
264.37	0.24	0.00179	0.24455	13960	2070.00
264.40	0.30	0.00181	0.29980	13961	2070.00
264.42	0.36	0.00182	0.35848	13961	2070.00
264.45	0.42	0.00184	0.42033	13962	2070.00
264.47	0.48	0.00185	0.48515	13962	2070.00
264.50	0.55	0.00187	0.55274	13963	2070.00
264.52	0.62	0.00188	0.62295	13963	2070.00
264.55	0.69	0.00190	0.69563	13964	2070.00
264.57	0.77	0.00191	0.77064	13964	2070.00
264.60	0.85	0.00193	0.84788	13965	2070.00

Return Storm (Years)	Actual Outflow (cms)	Target Outlfow (cms)	Storage (m^3)	Elevation (m)	Detention Time (hrs)
Hazel Existing	0.793000	1.171	12,835	264.60	2070.0
100-Year	0.001455	0.275	12,014	263.81	1721.6
50-Year	0.001436	0.244	11,782	263.78	1676.9
25-Year	0.001418	0.209	11,560	263.75	1633.7
10-Year	0.001351	0.166	10,741	263.66	1469.2
5-Year	0.001235	0.135	9,043	263.51	1103.9
2-Year	0.001067	0.088	6,173	263.30	408.5





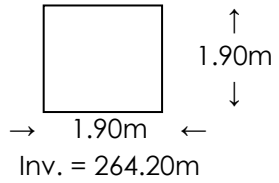
Project: Quadreal-Caledon
Project No: 160623115
Date: Nov-23
Author: KB

MH 102 - Tanks A to G Outlet Control Structure Design Details

Control Structure Location: MH102

Orifice 3

	Square		
Invert =	264.20	m	
Length =	1.90	m	
C =	0.62		
Obvert =	266.10	m	
Midpoint=	265.15		
Height =	1.90	m	
Numbr of Contractions =	2.00		Note this is the number of end contractions.
P=	0.7	m	Note P is the distance from the orifice invert to the normal water level.
B=	50	m	Note B is the approximate pond block width at the face of the outlet structure.



*Note this outlet structure acts as a sharp crested constricted rectangular weir until it is submerged (from the invert to the obvert). Above the obvert the outlet structure acts as an orifice.

Stantec

POND DETAILS AND STAGE STORAGE CURVE

Project: Quadreal-Caledon
Project No: 160623115
Date: Dec-23
Author: KB

Permanent Pool and Extended Detention Sizing Calculations

Minor Draiange Area

Landuse	Area (ha)	C (Runoff Coef.)**	C (weighted value)	Imperviousness (%)***	Imperviousness (Weighted Value)
Paved Areas	24.65	0.90	22.19	94	2328
Pond Block	1.12	0.70	0.78	72	81
Total	25.77		**0.89**		**93%**

** Assumed C values
*** Assumed percent impervious (I) converted from C values based on Simple Method, C = 0.05 + 0.009(I); (Schueler, 1987)

Protection Level	Enhanced	Choose Level Enhanced (80%), Normal (70%) or Basic (60%)
Pond Type	Wet Pond	Choose Infiltration, Wet Pond, Wetland, Hybrid, or Dry Pond (Basic Only)
Imperviousness %	93	

MOECC 2003 Table 3.2 Volume	250	m^3/ha	
	210	m^3/ha	Less 40 m^3/ha for active storage

Protection and Pond Type	Permanent Pool	Active Pond *		Est. Release Rate
	Wet Pond	MOE Guideline	Extended Detention	
	(m^3)	(m^3)	(m^3)	(m^3/s)
Enhanced Wet Pond	5412	1031	6095	0.053

* The greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using:
RV = 23.65 mm >>>> (For minimum of 48 hr extended detention)
** Runoff volume obtained from VO modeling

Major Drainage Areas

Landuse	Area (ha)	C (Runoff Coef.)**	C (weighted value)	Imperviousness (%)***	Imperviousness (Weighted Value)
Building 1	10.08	0.95	9.58	100	1008
Building 2	8.80	0.95	8.36	100	880
Paved Areas	24.65	0.95	23.42	100	2465
Pond Block	1.12	0.70	0.78	72	81
Total	44.65		**0.94**		**99%**

** Assumed C values
*** Assumed percent impervious (I) converted from C values based on Simple Method, C = 0.05 + 0.009(I); (Schueler, 1987)

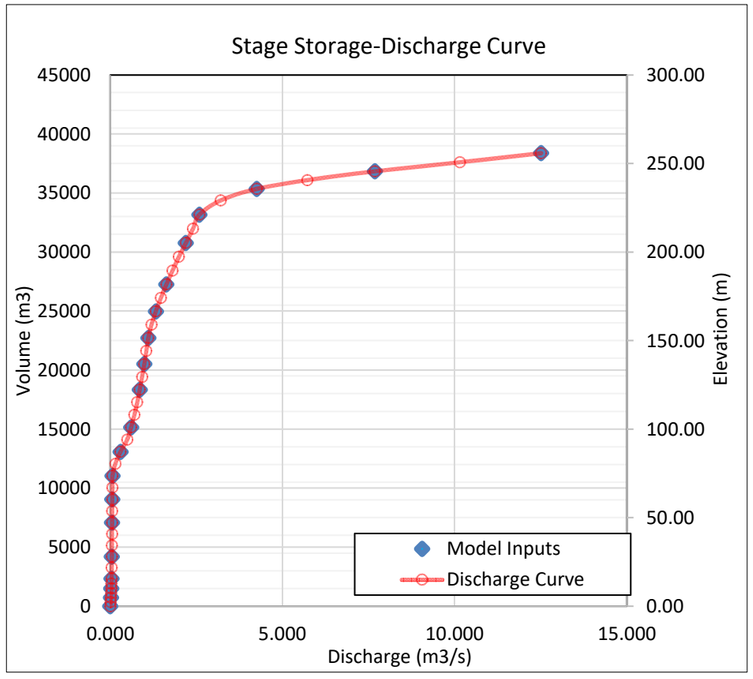
Stantec

Project: Quadreal-Caledon
Project No: 160623115
Date: Dec-23
Author: KB

Stage Storage Discharge Curve - Storm Pond

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Orifice/Weir 3 Outflow (m^3/s)	Weir 1 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)
259.50	0.000	0.000	0.00	0.000	259.50	0.000	0	0.0
259.60	0.007	0.000	0.00	0.000	259.60	0.007	361	26.9
259.70	0.018	0.000	0.00	0.000	259.70	0.018	734	34.9
259.80	0.024	0.000	0.00	0.000	259.80	0.024	1119	40.0
259.90	0.029	0.000	0.00	0.000	259.90	0.029	1515	44.1
260.00	0.034	0.000	0.00	0.000	260.00	0.034	1924	47.6
260.10	0.037	0.000	0.00	0.000	260.10	0.037	2343	50.9
260.20	0.041	0.000	0.00	0.000	260.20	0.041	3269	57.5
260.30	0.044	0.000	0.00	0.000	260.30	0.044	4206	63.6
260.40	0.047	0.000	0.00	0.000	260.40	0.047	5155	69.4
260.50	0.050	0.000	0.00	0.000	260.50	0.050	6115	74.9
260.60	0.052	0.000	0.00	0.000	260.60	0.052	7083	80.2
260.70	0.055	0.000	0.00	0.000	260.70	0.055	8061	85.2
260.80	0.057	0.000	0.00	0.000	260.80	0.057	9048	90.1
260.90	0.060	0.000	0.00	0.000	260.90	0.060	10044	94.9
261.00	0.062	0.000	0.00	0.000	261.00	0.062	11049	99.5
261.10	0.064	0.000	0.08	0.000	261.10	0.145	12063	102.2
261.20	0.066	0.000	0.23	0.000	261.20	0.296	13087	103.5
261.30	0.068	0.000	0.42	0.000	261.30	0.490	14119	104.2
261.40	0.070	0.000	0.53	0.000	261.40	0.604	15162	104.7
261.50	0.072	0.000	0.63	0.000	261.50	0.699	16213	105.2
261.60	0.074	0.000	0.71	0.000	261.60	0.782	17275	105.6
261.70	0.075	0.000	0.78	0.000	261.70	0.856	18346	105.9
261.80	0.077	0.000	0.85	0.000	261.80	0.924	19427	106.3
261.90	0.079	0.000	0.91	0.000	261.90	0.987	20518	106.6
262.00	0.081	0.000	0.97	0.000	262.00	1.046	21618	106.9
262.10	0.082	0.000	1.02	0.000	262.10	1.102	22728	107.2
262.20	0.084	0.041	1.07	0.000	262.20	1.196	23848	107.5
262.30	0.086	0.116	1.12	0.000	262.30	1.322	24978	107.7
262.40	0.087	0.213	1.17	0.000	262.40	1.468	26118	107.9
262.50	0.089	0.328	1.21	0.000	262.50	1.629	27268	108.1
262.60	0.090	0.458	1.26	0.000	262.60	1.805	28429	108.3
262.70	0.092	0.603	1.30	0.000	262.70	1.993	29599	108.5
262.80	0.093	0.759	1.34	0.000	262.80	2.192	30780	108.7
262.90	0.094	0.928	1.38	0.000	262.90	2.401	31971	108.8
263.00	0.096	1.074	1.42	0.000	263.00	2.588	33173	108.9
263.10	0.097	1.182	1.46	0.476	263.10	3.210	34384	109.0
263.20	0.099	1.280	1.49	1.384	263.20	4.255	35359	109.1

Return Storm	Actual Outflow	Target Outlfow	Storage	Elevation	Detention
(Years)	(cms)	(cms)	(m^3)	(m)	Time (hrs)
Hazel Existing	3.777	3.978	34913	263.15	109.1
100-Year	1.075	1.093	22183	262.05	107.0
50-Year	0.934	0.968	19606	261.82	106.3
25-Year	0.696	0.829	16180	261.50	105.2
10-Year	0.266	0.658	12882	261.18	103.2
5-Year	0.117	0.536	11717	261.07	101.3
2-Year	0.054	0.350	7862	260.68	84.2
Extended Det.	0.048	0.053	5523	260.44	71.5



Stantec

Project: Quadreal-Caledon
Project No: 160623115
Date: Dec-23
Author: KB

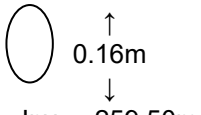
MH 4 - Pond Outlet Control Structure Design Details

Control Structure Location: MH4

Orifice 1

(Round Only)

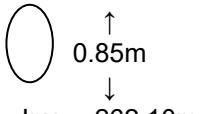
Invert =	259.50	m
Size =	0.155	m
C=	0.62	
Obvert =	259.655	m



Orifice 2

(Round Only)

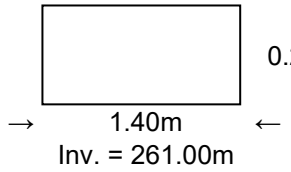
Invert =	262.10	m
Size =	0.850	m
C =	0.62	
Obvert =	262.95	m



Orifice 3

Square

Invert =	261.00	m
Length =	1.40	m
C =	0.62	
Obvert =	261.27	m
Midpoint=	261.14	
Height =	0.27	m
Numbr of Contractions =	0.10	
P=	0.7	m
B=	50	m

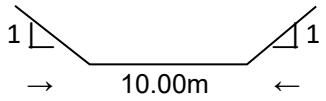


*Note this outlet structure acts as a sharp crested constricted rectangular weir until it is submerged (from the invert to the obvert). Above the obvert the outlet structure acts as an orifice.

Note this is the number of end contractions.
Note P is the distance from the orifice invert to the normal water level.
Note B is the approximate pond block width at the face of the outlet structure.

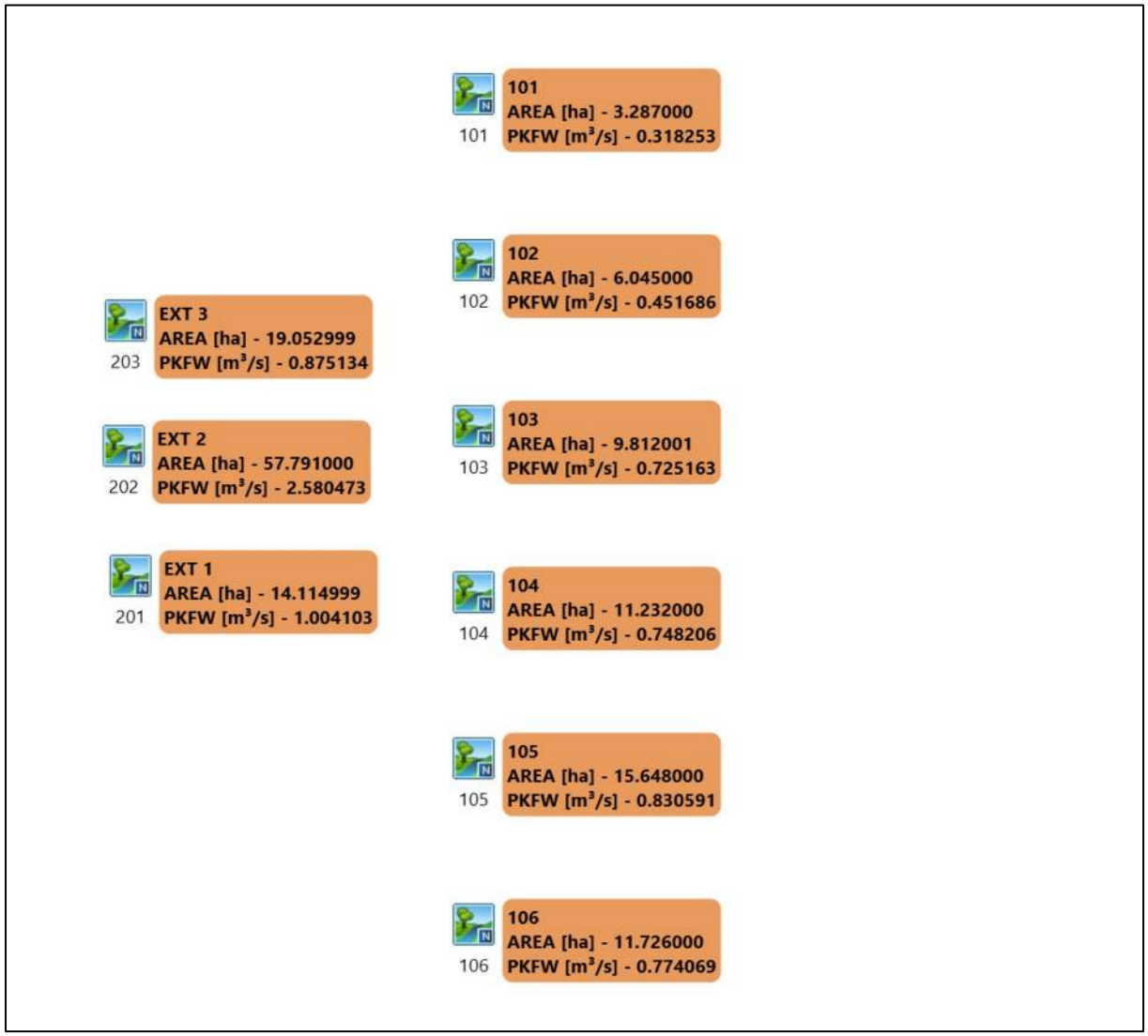
Broad Crested Weir 1

Length =	10.00	m
Elevation =	263.00	m
Side Slp =	3.00	
(0 = vertical, 1 = 1H to 1V, 3 = 3H to 1 v)		
Breadth =	0.45	m



Stantec

EXISTING AND PROPOSED STORMWATER MODELING



EXISTING CONDITIONS SCHEMATIC

2YR 4HR CHICAGO STORM SIMULATION

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

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


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DATE: 11/15/2023                          TIME: 12:58:43

USER:


COMMENTS: _____________________________________________________
```

```
  ************************************************
  ** SIMULATION : A_2yr 4hr 10min Chicago       **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1070.000
| Ptotal= 34.22 mm |                          B=   7.850
--------------------                          C=   0.876
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    1.53 |  1.00   19.60 |  2.00    4.48 |  3.00    1.89
                0.17    1.81 |  1.17   85.72 |  2.17    3.65 |  3.17    1.73
                0.33    2.22 |  1.33   26.59 |  2.33    3.08 |  3.33    1.59
                0.50    2.87 |  1.50   12.64 |  2.50    2.66 |  3.50    1.47
                0.67    4.06 |  1.67    7.99 |  2.67    2.34 |  3.67    1.37
                0.83    6.86 |  1.83    5.76 |  2.83    2.10 |  3.83    1.29


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0107)|   Area     (ha)=  12.69   Curve Number    (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
```



```
                0.083    1.53 | 1.083   19.60 | 2.083    4.48 |  3.08    1.89
                0.167    1.53 | 1.167   19.60 | 2.167    4.48 |  3.17    1.89
                0.250    1.81 | 1.250   85.72 | 2.250    3.65 |  3.25    1.73
                0.333    1.81 | 1.333   85.72 | 2.333    3.65 |  3.33    1.73
                0.417    2.22 | 1.417   26.59 | 2.417    3.08 |  3.42    1.59
                0.500    2.22 | 1.500   26.59 | 2.500    3.08 |  3.50    1.59
                0.583    2.87 | 1.583   12.64 | 2.583    2.66 |  3.58    1.47
                0.667    2.87 | 1.667   12.64 | 2.667    2.66 |  3.67    1.47
                0.750    4.06 | 1.750    7.99 | 2.750    2.34 |  3.75    1.37
                0.833    4.06 | 1.833    7.99 | 2.833    2.34 |  3.83    1.37
                0.917    6.86 | 1.917    5.76 | 2.917    2.10 |  3.92    1.29
                1.000    6.86 | 2.000    5.76 | 3.000    2.10 |  4.00    1.29

     Unit Hyd Qpeak  (cms)=   1.183

     PEAK FLOW       (cms)=   0.249 (i)
     TIME TO PEAK    (hrs)=   1.833
     RUNOFF VOLUME    (mm)=   9.206
     TOTAL RAINFALL   (mm)=  34.218
     RUNOFF COEFFICIENT   =   0.269

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0108)|   Area     (ha)=  29.56   Curve Number    (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.68

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    1.53 | 1.083   19.60 | 2.083    4.48 |  3.08    1.89
                0.167    1.53 | 1.167   19.60 | 2.167    4.48 |  3.17    1.89
                0.250    1.81 | 1.250   85.72 | 2.250    3.65 |  3.25    1.73
                0.333    1.81 | 1.333   85.72 | 2.333    3.65 |  3.33    1.73
                0.417    2.22 | 1.417   26.59 | 2.417    3.08 |  3.42    1.59
                0.500    2.22 | 1.500   26.59 | 2.500    3.08 |  3.50    1.59
                0.583    2.87 | 1.583   12.64 | 2.583    2.66 |  3.58    1.47
                0.667    2.87 | 1.667   12.64 | 2.667    2.66 |  3.67    1.47
                0.750    4.06 | 1.750    7.99 | 2.750    2.34 |  3.75    1.37
                0.833    4.06 | 1.833    7.99 | 2.833    2.34 |  3.83    1.37
                0.917    6.86 | 1.917    5.76 | 2.917    2.10 |  3.92    1.29
                1.000    6.86 | 2.000    5.76 | 3.000    2.10 |  4.00    1.29

     Unit Hyd Qpeak  (cms)=   1.660

     PEAK FLOW       (cms)=   0.408 (i)
     TIME TO PEAK    (hrs)=   2.167
     RUNOFF VOLUME    (mm)=   9.207
     TOTAL RAINFALL   (mm)=  34.218
     RUNOFF COEFFICIENT   =   0.269

     (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 (  0107):    12.69   0.249     1.83     9.21
     + ID2= 2 (  0108):    29.56   0.408     2.17     9.21
       ================================================
       ID = 3 (  0001):    42.25   0.623     2.00     9.21

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|   Area     (ha)=   3.29   Curve Number    (CN)= 80.0
```

|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.52

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 0.241

PEAK FLOW (cms)= 0.055 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 9.207
TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.269

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

CALIB
NASHYD (0102) | Area (ha)= 6.05 Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.74

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 0.312

PEAK FLOW (cms)= 0.078 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 9.207
TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.269

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

CALIB
NASHYD (0103) | Area (ha)= 9.81 Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.75

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 0.500

PEAK FLOW (cms)= 0.126 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 9.207
TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.269

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

ADD HYD (0003) |		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0101):		3.29	0.055	1.92	9.21
+ ID2= 2 (0102):		6.05	0.078	2.25	9.21
ID = 3 (0003):		9.33	0.130	2.08	9.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003) |		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0003):		9.33	0.130	2.08	9.21
+ ID2= 2 (0103):		9.81	0.126	2.25	9.21
ID = 1 (0003):		19.14	0.254	2.17	9.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0104) | Area (ha)= 11.23 Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.86

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37

0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 0.499

PEAK FLOW (cms)= 0.130 (i)
TIME TO PEAK (hrs)= 2.417
RUNOFF VOLUME (mm)= 9.207
TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.269

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

CALIB					
NASHYD (0105)	Area	(ha)= 15.65	Curve Number	(CN)= 77.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 5.00	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 1.03			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 0.580

PEAK FLOW (cms)= 0.139 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 8.123
TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.237

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

CALIB					
NASHYD (0106)	Area	(ha)= 11.73	Curve Number	(CN)= 80.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 5.00	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 0.87			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 0.515

PEAK FLOW (cms)= 0.135 (i)
TIME TO PEAK (hrs)= 2.417
RUNOFF VOLUME (mm)= 9.207
TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.269

(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 (0104):	11.23	0.130	2.42	9.21
	+ ID2= 2 (0105):	15.65	0.139	2.58	8.12
	ID = 3 (0002):	26.88	0.268	2.50	8.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0002)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0002):	26.88	0.268	2.50	8.58
	+ ID2= 2 (0106):	11.73	0.135	2.42	9.21
	ID = 1 (0002):	38.61	0.402	2.50	8.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0004)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0002):	38.61	0.402	2.50	8.77
	+ ID2= 2 (0003):	19.14	0.254	2.17	9.21
	ID = 3 (0004):	57.75	0.645	2.33	8.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0201)	Area	(ha)= 14.11	Curve Number	(CN)= 82.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 5.00	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 0.85			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 0.634

PEAK FLOW (cms)= 0.181 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 10.046
TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.294

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

CALIB								
NASHYD (0202)	Area (ha)= 57.79	Curve Number (CN)= 82.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 1.51							

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 1.462

PEAK FLOW (cms)= 0.478 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 10.046
TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.294

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

CALIB								
NASHYD (0203)	Area (ha)= 19.05	Curve Number (CN)= 82.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 1.46							

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 0.498

PEAK FLOW (cms)= 0.162 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 10.046

TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.294

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

CALIB								
NASHYD (0205)	Area (ha)= 3.32	Curve Number (CN)= 84.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.40							

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 0.317

PEAK FLOW (cms)= 0.080 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 11.000
TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.321

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

CALIB								
NASHYD (0204)	Area (ha)= 12.40	Curve Number (CN)= 84.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.50							

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Unit Hyd Qpeak (cms)= 0.947

PEAK FLOW (cms)= 0.258 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 11.001
TOTAL RAINFALL (mm)= 34.218
RUNOFF COEFFICIENT = 0.321

5YR 4HR CHICAGO STORM SIMULATION

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

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


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DATE: 11/15/2023                          TIME: 12:58:44

USER:


COMMENTS: _____________________________________________________


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  ** SIMULATION : B_5yr 4hr 10min Chicago       **
  ************************************************

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| CHICAGO STORM    |    IDF curve parameters: A=1593.000
| Ptotal= 49.55 mm |                          B=  11.000
--------------------                          C=   0.879
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.35 |  1.00   30.47 |  2.00    7.17 |  3.00    2.93
                0.17    2.80 |  1.17  109.68 |  2.17    5.81 |  3.17    2.67
                0.33    3.46 |  1.33   40.71 |  2.33    4.87 |  3.33    2.45
                0.50    4.52 |  1.50   20.28 |  2.50    4.19 |  3.50    2.26
                0.67    6.48 |  1.67   12.91 |  2.67    3.67 |  3.67    2.10
                0.83   11.07 |  1.83    9.28 |  2.83    3.26 |  3.83    1.96


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--------------------
| CALIB            |
| NASHYD   (  0107)|   Area    (ha)=  12.69   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

        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   2.35 | 1.083   30.47 | 2.083    7.17 |  3.08    2.93
                0.167   2.35 | 1.167   30.47 | 2.167    7.17 |  3.17    2.93
                0.250   2.80 | 1.250  109.68 | 2.250    5.81 |  3.25    2.67
                0.333   2.80 | 1.333  109.68 | 2.333    5.81 |  3.33    2.67
                0.417   3.46 | 1.417   40.71 | 2.417    4.87 |  3.42    2.45
                0.500   3.46 | 1.500   40.71 | 2.500    4.87 |  3.50    2.45
                0.583   4.52 | 1.583   20.28 | 2.583    4.19 |  3.58    2.26
                0.667   4.52 | 1.667   20.28 | 2.667    4.19 |  3.67    2.26
                0.750   6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
                0.833   6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
                0.917  11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
                1.000  11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

    Unit Hyd Qpeak  (cms)=   1.183

    PEAK FLOW       (cms)=   0.495 (i)
    TIME TO PEAK    (hrs)=   1.833
    RUNOFF VOLUME    (mm)=  18.368
    TOTAL RAINFALL   (mm)=  49.553
    RUNOFF COEFFICIENT   =   0.371

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

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--------------------
| CALIB            |
| NASHYD   (  0108)|   Area    (ha)=  29.56   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.68

        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   2.35 | 1.083   30.47 | 2.083    7.17 |  3.08    2.93
                0.167   2.35 | 1.167   30.47 | 2.167    7.17 |  3.17    2.93
                0.250   2.80 | 1.250  109.68 | 2.250    5.81 |  3.25    2.67
                0.333   2.80 | 1.333  109.68 | 2.333    5.81 |  3.33    2.67
                0.417   3.46 | 1.417   40.71 | 2.417    4.87 |  3.42    2.45
                0.500   3.46 | 1.500   40.71 | 2.500    4.87 |  3.50    2.45
                0.583   4.52 | 1.583   20.28 | 2.583    4.19 |  3.58    2.26
                0.667   4.52 | 1.667   20.28 | 2.667    4.19 |  3.67    2.26
                0.750   6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
                0.833   6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
                0.917  11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
                1.000  11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

    Unit Hyd Qpeak  (cms)=   1.660

    PEAK FLOW       (cms)=   0.816 (i)
    TIME TO PEAK    (hrs)=   2.167
    RUNOFF VOLUME    (mm)=  18.370
    TOTAL RAINFALL   (mm)=  49.553
    RUNOFF COEFFICIENT   =   0.371

    (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 (  0107):    12.69   0.495     1.83    18.37
     + ID2= 2 (  0108):    29.56   0.816     2.17    18.37
       ==========================================================
       ID = 3 (  0001):    42.25   1.243     2.00    18.37

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| CALIB            |
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| NASHYD (0101)| Area (ha)= 3.29 Curve Number (CN)= 80.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.52

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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.241

PEAK FLOW (cms)= 0.109 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 18.369
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.371

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

| CALIB |
| NASHYD (0102)| Area (ha)= 6.05 Curve Number (CN)= 80.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.74

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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.312

PEAK FLOW (cms)= 0.157 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 18.370
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.371

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

| CALIB |
| NASHYD (0103)| Area (ha)= 9.81 Curve Number (CN)= 80.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.75

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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.500

PEAK FLOW (cms)= 0.252 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 18.370
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.371

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

| ADD HYD (0003)|
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	3.29	0.109	1.92	18.37
+ ID2= 2 (0102):	6.05	0.157	2.25	18.37
ID = 3 (0003):	9.33	0.259	2.08	18.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0003)|
| 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0003):	9.33	0.259	2.08	18.37
+ ID2= 2 (0103):	9.81	0.252	2.25	18.37
ID = 1 (0003):	19.14	0.509	2.17	18.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0104)| Area (ha)= 11.23 Curve Number (CN)= 80.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.86

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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26

```
             0.750    6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
             0.833    6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
             0.917   11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
             1.000   11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

     Unit Hyd Qpeak  (cms)=   0.499

     PEAK FLOW       (cms)=   0.261 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=  18.370
     TOTAL RAINFALL   (mm)=  49.553
     RUNOFF COEFFICIENT   =   0.371

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

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--------------------
| CALIB            |
| NASHYD   (  0105)|   Area    (ha)=  15.65   Curve Number   (CN)= 77.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.03

         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    2.35 | 1.083   30.47 | 2.083    7.17 |  3.08    2.93
             0.167    2.35 | 1.167   30.47 | 2.167    7.17 |  3.17    2.93
             0.250    2.80 | 1.250  109.68 | 2.250    5.81 |  3.25    2.67
             0.333    2.80 | 1.333  109.68 | 2.333    5.81 |  3.33    2.67
             0.417    3.46 | 1.417   40.71 | 2.417    4.87 |  3.42    2.45
             0.500    3.46 | 1.500   40.71 | 2.500    4.87 |  3.50    2.45
             0.583    4.52 | 1.583   20.28 | 2.583    4.19 |  3.58    2.26
             0.667    4.52 | 1.667   20.28 | 2.667    4.19 |  3.67    2.26
             0.750    6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
             0.833    6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
             0.917   11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
             1.000   11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

     Unit Hyd Qpeak  (cms)=   0.580

     PEAK FLOW       (cms)=   0.284 (i)
     TIME TO PEAK    (hrs)=   2.583
     RUNOFF VOLUME    (mm)=  16.483
     TOTAL RAINFALL   (mm)=  49.553
     RUNOFF COEFFICIENT   =   0.333

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0106)|   Area    (ha)=  11.73   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.87

         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    2.35 | 1.083   30.47 | 2.083    7.17 |  3.08    2.93
             0.167    2.35 | 1.167   30.47 | 2.167    7.17 |  3.17    2.93
             0.250    2.80 | 1.250  109.68 | 2.250    5.81 |  3.25    2.67
             0.333    2.80 | 1.333  109.68 | 2.333    5.81 |  3.33    2.67
             0.417    3.46 | 1.417   40.71 | 2.417    4.87 |  3.42    2.45
             0.500    3.46 | 1.500   40.71 | 2.500    4.87 |  3.50    2.45
             0.583    4.52 | 1.583   20.28 | 2.583    4.19 |  3.58    2.26
             0.667    4.52 | 1.667   20.28 | 2.667    4.19 |  3.67    2.26
             0.750    6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
             0.833    6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
             0.917   11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
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             1.000   11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

     Unit Hyd Qpeak  (cms)=   0.515

     PEAK FLOW       (cms)=   0.270 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=  18.370
     TOTAL RAINFALL   (mm)=  49.553
     RUNOFF COEFFICIENT   =   0.371

     (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 (  0104):    11.23   0.261     2.42    18.37
      + ID2= 2 (  0105):    15.65   0.284     2.58    16.48
        ==================================================
        ID = 3 (  0002):    26.88   0.541     2.50    17.27

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

--------------------
| ADD HYD  (  0002)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0002):    26.88   0.541     2.50    17.27
      + ID2= 2 (  0106):    11.73   0.270     2.42    18.37
        ==================================================
        ID = 1 (  0002):    38.61   0.810     2.50    17.61

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0004)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0002):    38.61   0.810     2.50    17.61
      + ID2= 2 (  0003):    19.14   0.509     2.17    18.37
        ==================================================
        ID = 3 (  0004):    57.75   1.297     2.33    17.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0201)|   Area    (ha)=  14.11   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.85

         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    2.35 | 1.083   30.47 | 2.083    7.17 |  3.08    2.93
             0.167    2.35 | 1.167   30.47 | 2.167    7.17 |  3.17    2.93
             0.250    2.80 | 1.250  109.68 | 2.250    5.81 |  3.25    2.67
             0.333    2.80 | 1.333  109.68 | 2.333    5.81 |  3.33    2.67
             0.417    3.46 | 1.417   40.71 | 2.417    4.87 |  3.42    2.45
             0.500    3.46 | 1.500   40.71 | 2.500    4.87 |  3.50    2.45
             0.583    4.52 | 1.583   20.28 | 2.583    4.19 |  3.58    2.26
             0.667    4.52 | 1.667   20.28 | 2.667    4.19 |  3.67    2.26
             0.750    6.48 | 1.750   12.91 | 2.750    3.67 |  3.75    2.10
             0.833    6.48 | 1.833   12.91 | 2.833    3.67 |  3.83    2.10
             0.917   11.07 | 1.917    9.28 | 2.917    3.26 |  3.92    1.96
             1.000   11.07 | 2.000    9.28 | 3.000    3.26 |  4.00    1.96

     Unit Hyd Qpeak  (cms)=   0.634
```

PEAK FLOW (cms)= 0.358 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 19.788
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.399

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

CALIB								
NASHYD (0202)	Area (ha)= 57.79	Curve Number (CN)= 82.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 1.51							

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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 1.462

PEAK FLOW (cms)= 0.946 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 19.789
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.399

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

CALIB								
NASHYD (0203)	Area (ha)= 19.05	Curve Number (CN)= 82.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 1.46							

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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.498

PEAK FLOW (cms)= 0.320 (i)
TIME TO PEAK (hrs)= 3.083

RUNOFF VOLUME (mm)= 19.789
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.399

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

CALIB								
NASHYD (0205)	Area (ha)= 3.32	Curve Number (CN)= 84.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.40							

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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.317

PEAK FLOW (cms)= 0.155 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 21.356
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.431

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

CALIB								
NASHYD (0204)	Area (ha)= 12.40	Curve Number (CN)= 84.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.50							

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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Unit Hyd Qpeak (cms)= 0.947

PEAK FLOW (cms)= 0.500 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 21.358
TOTAL RAINFALL (mm)= 49.553
RUNOFF COEFFICIENT = 0.431

10YR 4HR CHICAGO STORM SIMULATION

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```


***** 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\apalmer\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\61d32b4e-8e57-46fa-9019-74f975ccf734\scen
Summary filename: C:\Users\apalmer\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\61d32b4e-8e57-46fa-9019-74f975ccf734\scen

DATE: 11/15/2023 TIME: 12:58:43

USER:

COMMENTS: _____

** SIMULATION : C_10yr 4hr 10min Chicago **

CHICAGO STORM
Ptotal= 58.62 mm

IDF curve parameters: A=2221.000
B= 12.000
C= 0.908
used in: INTENSITY = A / (t + B)^C

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.39	1.00	37.17	2.00	8.06	3.00	3.05
0.17	2.89	1.17	134.16	2.17	6.42	3.17	2.75
0.33	3.65	1.33	50.03	2.33	5.30	3.33	2.50
0.50	4.89	1.50	24.37	2.50	4.50	3.50	2.29
0.67	7.23	1.67	15.14	2.67	3.89	3.67	2.11
0.83	12.87	1.83	10.64	2.83	3.42	3.83	1.96

CALIB	
NASHYD (0107)	Area (ha)= 12.69 Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.41

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 1.183

PEAK FLOW (cms)= 0.695 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 24.543
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.419

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

CALIB	
NASHYD (0108)	Area (ha)= 29.56 Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.68

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 1.660

PEAK FLOW (cms)= 1.136 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 24.545
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.419

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

ADD HYD (0001)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0107):	12.69	0.695	1.83	24.54
+ ID2= 2 (0108):	29.56	1.136	2.17	24.55
ID = 3 (0001):	42.25	1.738	2.00	24.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
NASHYD (0101)|	Area (ha)= 3.29 Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min |	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.52

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.241

PEAK FLOW (cms)= 0.153 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 24.544
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.419

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

CALIB	
NASHYD (0102)|	Area (ha)= 6.05 Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min |	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.74

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.312

PEAK FLOW (cms)= 0.218 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 24.545
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.419

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

CALIB	
NASHYD (0103)|	Area (ha)= 9.81 Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min |	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.75

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.500

PEAK FLOW (cms)= 0.351 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 24.545
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.419

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

ADD HYD (0003)|				
1 + 2 = 3 |	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	3.29	0.153	1.92	24.54
+ ID2= 2 (0102):	6.05	0.218	2.25	24.55
ID = 3 (0003):	9.33	0.362	2.08	24.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)|				
3 + 2 = 1 |	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0003):	9.33	0.362	2.08	24.54
+ ID2= 2 (0103):	9.81	0.351	2.25	24.55
ID = 1 (0003):	19.14	0.708	2.17	24.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
NASHYD (0104)|	Area (ha)= 11.23 Curve Number (CN)= 80.0
ID= 1 DT= 5.0 min |	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.86

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29

0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.499

PEAK FLOW (cms)= 0.362 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 24.545
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.419

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

CALIB							
NASHYD (0105)	Area (ha)= 15.65	Curve Number (CN)= 77.0					
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00					
	U.H. Tp(hrs)= 1.03						

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.580

PEAK FLOW (cms)= 0.396 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 22.200
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.379

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

CALIB							
NASHYD (0106)	Area (ha)= 11.73	Curve Number (CN)= 80.0					
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00					
	U.H. Tp(hrs)= 0.87						

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11

0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.515

PEAK FLOW (cms)= 0.375 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 24.545
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.419

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

ADD HYD (0002)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0104):	11.23	0.362	2.33	24.55
+ ID2= 2 (0105):	15.65	0.396	2.58	22.20
ID = 3 (0002):	26.88	0.751	2.50	23.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0002)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0002):	26.88	0.751	2.50	23.18
+ ID2= 2 (0106):	11.73	0.375	2.33	24.55
ID = 1 (0002):	38.61	1.125	2.42	23.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0004)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	38.61	1.125	2.42	23.59
+ ID2= 2 (0003):	19.14	0.708	2.17	24.54
ID = 3 (0004):	57.75	1.801	2.33	23.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB							
NASHYD (0201)	Area (ha)= 14.11	Curve Number (CN)= 82.0					
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00					
	U.H. Tp(hrs)= 0.85						

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.634

PEAK FLOW (cms)= 0.494 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 26.283
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.448

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

CALIB								
NASHYD (0202)	Area (ha)= 57.79	Curve Number (CN)= 82.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 1.51							

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 1.462

PEAK FLOW (cms)= 1.284 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 26.283
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.448

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

CALIB								
NASHYD (0203)	Area (ha)= 19.05	Curve Number (CN)= 82.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 1.46							

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.498

PEAK FLOW (cms)= 0.435 (i)

TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 26.283
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.448

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

CALIB								
NASHYD (0205)	Area (ha)= 3.32	Curve Number (CN)= 84.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.40							

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.317

PEAK FLOW (cms)= 0.216 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 28.180
TOTAL RAINFALL (mm)= 58.616
RUNOFF COEFFICIENT = 0.481

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

CALIB								
NASHYD (0204)	Area (ha)= 12.40	Curve Number (CN)= 84.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.50							

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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

Unit Hyd Qpeak (cms)= 0.947

PEAK FLOW (cms)= 0.692 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 28.182
TOTAL RAINFALL (mm)= 58.616

RUNOFF COEFFICIENT = 0.481

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

25YR 4HR CHICAGO STORM SIMULATION

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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```

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\apalmer\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\7d772523-f9b4-4e69-89fe-dbad6d794a52\scen
Summary filename: C:\Users\apalmer\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\7d772523-f9b4-4e69-89fe-dbad6d794a52\scen

DATE: 11/15/2023 TIME: 12:58:44

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : D_25yr 4hr 10min Chicago      **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=3158.000
| Ptotal= 71.59 mm |                          B=  15.000
--------------------                          C=   0.933
                       used in:   INTENSITY =  A / (t + B)^C

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.68	1.00	47.76	2.00	10.11	3.00	3.51
0.17	3.31	1.17	156.47	2.17	7.92	3.17	3.13
0.33	4.28	1.33	63.86	2.33	6.44	3.33	2.81
0.50	5.90	1.50	31.72	2.50	5.38	3.50	2.55
0.67	9.00	1.67	19.56	2.67	4.59	3.67	2.33
0.83	16.53	1.83	13.56	2.83	3.99	3.83	2.15

```
--------------------
| CALIB            |
| NASHYD  ( 0107)| Area    (ha)=  12.69  Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min | Ia      (mm)=   5.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.41

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

                        ---- TRANSFORMED HYETOGRAPH ----
```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

```
        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    2.68 | 1.083   47.76 | 2.083   10.11 |  3.08    3.51
               0.167    2.68 | 1.167   47.76 | 2.167   10.11 |  3.17    3.51
               0.250    3.31 | 1.250  156.47 | 2.250    7.92 |  3.25    3.13
               0.333    3.31 | 1.333  156.47 | 2.333    7.92 |  3.33    3.13
               0.417    4.28 | 1.417   63.86 | 2.417    6.44 |  3.42    2.81
               0.500    4.28 | 1.500   63.86 | 2.500    6.44 |  3.50    2.81
               0.583    5.90 | 1.583   31.72 | 2.583    5.38 |  3.58    2.55
               0.667    5.90 | 1.667   31.72 | 2.667    5.38 |  3.67    2.55
               0.750    9.00 | 1.750   19.56 | 2.750    4.59 |  3.75    2.33
               0.833    9.00 | 1.833   19.56 | 2.833    4.59 |  3.83    2.33
               0.917   16.53 | 1.917   13.56 | 2.917    3.99 |  3.92    2.15
               1.000   16.53 | 2.000   13.56 | 3.000    3.99 |  4.00    2.15

    Unit Hyd Qpeak  (cms)=   0.500

    PEAK FLOW       (cms)=   0.495 (i)
    TIME TO PEAK    (hrs)=   2.250
    RUNOFF VOLUME    (mm)=  34.085
    TOTAL RAINFALL   (mm)=  71.589
    RUNOFF COEFFICIENT   =   0.476

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

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0101):      3.29   0.216     1.92    34.08
     + ID2= 2 (  0102):      6.05   0.308     2.17    34.08
       ===============================================
       ID = 3 (  0003):      9.33   0.511     2.08    34.08

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

--------------------
| ADD HYD  (  0003)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
       ID1= 3 (  0003):      9.33   0.511     2.08    34.08
     + ID2= 2 (  0103):      9.81   0.495     2.25    34.08
       ===============================================
       ID = 1 (  0003):     19.14   1.000     2.17    34.08

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0104)|   Area    (ha)=  11.23   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.86

        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    2.68 | 1.083   47.76 | 2.083   10.11 |  3.08    3.51
               0.167    2.68 | 1.167   47.76 | 2.167   10.11 |  3.17    3.51
               0.250    3.31 | 1.250  156.47 | 2.250    7.92 |  3.25    3.13
               0.333    3.31 | 1.333  156.47 | 2.333    7.92 |  3.33    3.13
               0.417    4.28 | 1.417   63.86 | 2.417    6.44 |  3.42    2.81
               0.500    4.28 | 1.500   63.86 | 2.500    6.44 |  3.50    2.81
               0.583    5.90 | 1.583   31.72 | 2.583    5.38 |  3.58    2.55
               0.667    5.90 | 1.667   31.72 | 2.667    5.38 |  3.67    2.55
```



```
               0.750    9.00 | 1.750   19.56 | 2.750    4.59 |  3.75    2.33
               0.833    9.00 | 1.833   19.56 | 2.833    4.59 |  3.83    2.33
               0.917   16.53 | 1.917   13.56 | 2.917    3.99 |  3.92    2.15
               1.000   16.53 | 2.000   13.56 | 3.000    3.99 |  4.00    2.15

    Unit Hyd Qpeak  (cms)=   0.499

    PEAK FLOW       (cms)=   0.512 (i)
    TIME TO PEAK    (hrs)=   2.333
    RUNOFF VOLUME    (mm)=  34.085
    TOTAL RAINFALL   (mm)=  71.589
    RUNOFF COEFFICIENT   =   0.476

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0105)|   Area    (ha)=  15.65   Curve Number   (CN)= 77.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.03

        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    2.68 | 1.083   47.76 | 2.083   10.11 |  3.08    3.51
               0.167    2.68 | 1.167   47.76 | 2.167   10.11 |  3.17    3.51
               0.250    3.31 | 1.250  156.47 | 2.250    7.92 |  3.25    3.13
               0.333    3.31 | 1.333  156.47 | 2.333    7.92 |  3.33    3.13
               0.417    4.28 | 1.417   63.86 | 2.417    6.44 |  3.42    2.81
               0.500    4.28 | 1.500   63.86 | 2.500    6.44 |  3.50    2.81
               0.583    5.90 | 1.583   31.72 | 2.583    5.38 |  3.58    2.55
               0.667    5.90 | 1.667   31.72 | 2.667    5.38 |  3.67    2.55
               0.750    9.00 | 1.750   19.56 | 2.750    4.59 |  3.75    2.33
               0.833    9.00 | 1.833   19.56 | 2.833    4.59 |  3.83    2.33
               0.917   16.53 | 1.917   13.56 | 2.917    3.99 |  3.92    2.15
               1.000   16.53 | 2.000   13.56 | 3.000    3.99 |  4.00    2.15

    Unit Hyd Qpeak  (cms)=   0.580

    PEAK FLOW       (cms)=   0.563 (i)
    TIME TO PEAK    (hrs)=   2.583
    RUNOFF VOLUME    (mm)=  31.125
    TOTAL RAINFALL   (mm)=  71.589
    RUNOFF COEFFICIENT   =   0.435

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0106)|   Area    (ha)=  11.73   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.87

        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    2.68 | 1.083   47.76 | 2.083   10.11 |  3.08    3.51
               0.167    2.68 | 1.167   47.76 | 2.167   10.11 |  3.17    3.51
               0.250    3.31 | 1.250  156.47 | 2.250    7.92 |  3.25    3.13
               0.333    3.31 | 1.333  156.47 | 2.333    7.92 |  3.33    3.13
               0.417    4.28 | 1.417   63.86 | 2.417    6.44 |  3.42    2.81
               0.500    4.28 | 1.500   63.86 | 2.500    6.44 |  3.50    2.81
               0.583    5.90 | 1.583   31.72 | 2.583    5.38 |  3.58    2.55
               0.667    5.90 | 1.667   31.72 | 2.667    5.38 |  3.67    2.55
               0.750    9.00 | 1.750   19.56 | 2.750    4.59 |  3.75    2.33
               0.833    9.00 | 1.833   19.56 | 2.833    4.59 |  3.83    2.33
               0.917   16.53 | 1.917   13.56 | 2.917    3.99 |  3.92    2.15
```

1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Unit Hyd Qpeak (cms)= 0.515

PEAK FLOW (cms)= 0.529 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 34.085
TOTAL RAINFALL (mm)= 71.589
RUNOFF COEFFICIENT = 0.476

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

ADD HYD (0002)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0104):	11.23	0.512	2.33	34.08
+ ID2= 2 (0105):	15.65	0.563	2.58	31.13
ID = 3 (0002):	26.88	1.066	2.42	32.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0002)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0002):	26.88	1.066	2.42	32.36
+ ID2= 2 (0106):	11.73	0.529	2.33	34.08
ID = 1 (0002):	38.61	1.594	2.42	32.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0004)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	38.61	1.594	2.42	32.89
+ ID2= 2 (0003):	19.14	1.000	2.17	34.08
ID = 3 (0004):	57.75	2.548	2.33	33.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0201)	Area (ha)= 14.11	Curve Number (CN)= 82.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.85				

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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Unit Hyd Qpeak (cms)= 0.634

PEAK FLOW (cms)= 0.693 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 36.242
TOTAL RAINFALL (mm)= 71.589
RUNOFF COEFFICIENT = 0.506

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

CALIB					
NASHYD (0202)	Area (ha)= 57.79	Curve Number (CN)= 82.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 1.51				

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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Unit Hyd Qpeak (cms)= 1.462

PEAK FLOW (cms)= 1.794 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 36.242
TOTAL RAINFALL (mm)= 71.589
RUNOFF COEFFICIENT = 0.506

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

CALIB					
NASHYD (0203)	Area (ha)= 19.05	Curve Number (CN)= 82.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 1.46				

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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Unit Hyd Qpeak (cms)= 0.498

PEAK FLOW (cms)= 0.608 (i)
TIME TO PEAK (hrs)= 3.083

RUNOFF VOLUME (mm)= 36.242
TOTAL RAINFALL (mm)= 71.589
RUNOFF COEFFICIENT = 0.506

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

CALIB								
NASHYD (0205)	Area (ha)= 3.32	Curve Number (CN)= 84.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.40							

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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Unit Hyd Qpeak (cms)= 0.317

PEAK FLOW (cms)= 0.299 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 38.562
TOTAL RAINFALL (mm)= 71.589
RUNOFF COEFFICIENT = 0.539

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

CALIB								
NASHYD (0204)	Area (ha)= 12.40	Curve Number (CN)= 84.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.50							

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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Unit Hyd Qpeak (cms)= 0.947

PEAK FLOW (cms)= 0.961 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 38.565
TOTAL RAINFALL (mm)= 71.589
RUNOFF COEFFICIENT = 0.539

50YR 4HR CHICAGO STORM SIMULATION

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
```


***** 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\apalmer\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\7b3f2381-423d-4bcc-8fdd-e3939f69df02\scen
Summary filename: C:\Users\apalmer\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\7b3f2381-423d-4bcc-8fdd-e3939f69df02\scen

DATE: 11/15/2023 TIME: 12:58:44

USER:

COMMENTS: _____

** SIMULATION : E_50yr 4hr 10min Chicago **

CHICAGO STORM	IDF curve parameters: A=3886.000
Ptotal= 80.32 mm	B= 16.000
	C= 0.950

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

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.76	1.00	54.62	2.00	11.20	3.00	3.68
0.17	3.46	1.17	176.19	2.17	8.68	3.17	3.25
0.33	4.54	1.33	73.10	2.33	6.99	3.33	2.91
0.50	6.37	1.50	36.22	2.50	5.78	3.50	2.62
0.67	9.92	1.67	22.14	2.67	4.89	3.67	2.38
0.83	18.63	1.83	15.18	2.83	4.21	3.83	2.18

CALIB								
NASHYD (0107)	Area (ha)= 12.69	Curve Number (CN)= 80.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.41							

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 1.183

PEAK FLOW (cms)= 1.196 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.862
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.509

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

CALIB					
NASHYD (0108)	Area (ha)= 29.56	Curve Number (CN)= 80.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.68				

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 1.660

PEAK FLOW (cms)= 1.955 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 40.866
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.509

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

ADD HYD (0001)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0107):	12.69	1.196	1.83	40.86
+ ID2= 2 (0108):	29.56	1.955	2.08	40.87
ID = 3 (0001):	42.25	2.994	2.00	40.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0101)	Area (ha)= 3.29	Curve Number (CN)= 80.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.52				

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.241

PEAK FLOW (cms)= 0.264 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 40.864
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.509

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

CALIB					
NASHYD (0102)	Area (ha)= 6.05	Curve Number (CN)= 80.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.74				

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.312

PEAK FLOW (cms)= 0.376 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 40.866
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.509

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

CALIB					
NASHYD (0103)	Area (ha)= 9.81	Curve Number (CN)= 80.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			

---------- U.H. Tp(hrs)= 0.75

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.500

PEAK FLOW (cms)= 0.603 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 40.866
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.509

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

ADD HYD (0003)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	3.29	0.264	1.92	40.86
+ ID2= 2 (0102):	6.05	0.376	2.17	40.87
ID = 3 (0003):	9.33	0.623	2.08	40.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0003):	9.33	0.623	2.08	40.87
+ ID2= 2 (0103):	9.81	0.603	2.25	40.87
ID = 1 (0003):	19.14	1.219	2.17	40.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0104)	Area (ha)=	11.23	Curve Number (CN)=	80.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.86			

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62

0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.499

PEAK FLOW (cms)= 0.623 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 40.866
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.509

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

CALIB					
NASHYD (0105)	Area (ha)=	15.65	Curve Number (CN)=	77.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	1.03			

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.580

PEAK FLOW (cms)= 0.689 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 37.522
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.467

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

CALIB					
NASHYD (0106)	Area (ha)=	11.73	Curve Number (CN)=	80.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.87			

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38

0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.515

PEAK FLOW (cms)= 0.644 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 40.866
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.509

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

ADD HYD (0002)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0104):	11.23	0.623	2.33	40.87
+ ID2= 2 (0105):	15.65	0.689	2.58	37.52
ID = 3 (0002):	26.88	1.301	2.42	38.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0002)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0002):	26.88	1.301	2.42	38.92
+ ID2= 2 (0106):	11.73	0.644	2.33	40.87
ID = 1 (0002):	38.61	1.943	2.42	39.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0004)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	38.61	1.943	2.42	39.51
+ ID2= 2 (0003):	19.14	1.219	2.17	40.87
ID = 3 (0004):	57.75	3.104	2.33	39.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0201)	Area (ha)=	14.11	Curve Number (CN)=	82.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.85			

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.634

PEAK FLOW (cms)= 0.840 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 43.280
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.539

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

CALIB					
NASHYD (0202)	Area (ha)=	57.79	Curve Number (CN)=	82.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	1.51			

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 1.462

PEAK FLOW (cms)= 2.165 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 43.281
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.539

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

CALIB					
NASHYD (0203)	Area (ha)=	19.05	Curve Number (CN)=	82.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	1.46			

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.498

PEAK FLOW (cms)= 0.734 (i)

TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 43.280
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.539

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

CALIB									
NASHYD (0205)	Area (ha)= 3.32	Curve Number (CN)= 84.0							
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00							
	U.H. Tp(hrs)= 0.40								

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.317

PEAK FLOW (cms)= 0.363 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 45.855
TOTAL RAINFALL (mm)= 80.320
RUNOFF COEFFICIENT = 0.571

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

CALIB									
NASHYD (0204)	Area (ha)= 12.40	Curve Number (CN)= 84.0							
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00							
	U.H. Tp(hrs)= 0.50								

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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Unit Hyd Qpeak (cms)= 0.947

PEAK FLOW (cms)= 1.163 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 45.859
TOTAL RAINFALL (mm)= 80.320

RUNOFF COEFFICIENT = 0.571

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

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Unit Hyd Qpeak (cms)= 1.183

PEAK FLOW (cms)= 0.980 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 34.081
TOTAL RAINFALL (mm)= 71.589
RUNOFF COEFFICIENT = 0.476

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

CALIB							
NASHYD (0108)	Area (ha)= 29.56	Curve Number (CN)= 80.0					
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00					
	U.H. Tp(hrs)= 0.68						

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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Unit Hyd Qpeak (cms)= 1.660

PEAK FLOW (cms)= 1.604 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 34.084
TOTAL RAINFALL (mm)= 71.589
RUNOFF COEFFICIENT = 0.476

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

ADD HYD (0001)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0107):	12.69	0.980	1.83	34.08
+ ID2= 2 (0108):	29.56	1.604	2.17	34.08
ID = 3 (0001):	42.25	2.454	2.00	34.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB

NASHYD (0101)	Area (ha)= 3.29	Curve Number (CN)= 80.0					
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00					
	U.H. Tp(hrs)= 0.52						

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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Unit Hyd Qpeak (cms)= 0.241

PEAK FLOW (cms)= 0.216 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 34.083
TOTAL RAINFALL (mm)= 71.589
RUNOFF COEFFICIENT = 0.476

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

CALIB							
NASHYD (0102)	Area (ha)= 6.05	Curve Number (CN)= 80.0					
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00					
	U.H. Tp(hrs)= 0.74						

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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Unit Hyd Qpeak (cms)= 0.312

PEAK FLOW (cms)= 0.308 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 34.084
TOTAL RAINFALL (mm)= 71.589
RUNOFF COEFFICIENT = 0.476

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

CALIB							
NASHYD (0103)	Area (ha)= 9.81	Curve Number (CN)= 80.0					
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00					
	U.H. Tp(hrs)= 0.75						

100YR 4HR CHICAGO STORM SIMULATION

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

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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\apalmer\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\b06e4a69-
9401-4c94-a29a-e8f6ad08fca0\scen
  Summary filename: C:\Users\apalmer\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\b06e4a69-
9401-4c94-a29a-e8f6ad08fca0\scen


DATE: 11/15/2023                          TIME: 12:58:44

USER:


COMMENTS: _____________________________________________________


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  ************************************************
  ** SIMULATION : F_100yr 4hr 10min Chicago     **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=4688.000
| Ptotal= 89.87 mm |                          B=  17.000
--------------------                          C=   0.962
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.89 |  1.00   62.12 |  2.00   12.48 |  3.00    3.91
                0.17    3.67 |  1.17  196.54 |  2.17    9.60 |  3.17    3.44
                0.33    4.88 |  1.33   83.09 |  2.33    7.66 |  3.33    3.05
                0.50    6.96 |  1.50   41.25 |  2.50    6.29 |  3.50    2.73
                0.67   11.02 |  1.67   25.07 |  2.67    5.28 |  3.67    2.47
                0.83   21.03 |  1.83   17.06 |  2.83    4.51 |  3.83    2.24


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--------------------
| CALIB            |
| NASHYD   (  0107)|   Area    (ha)=  12.69   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
```



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                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    2.89 | 1.083   62.12 | 2.083   12.48 |  3.08    3.91
                0.167    2.89 | 1.167   62.12 | 2.167   12.48 |  3.17    3.91
                0.250    3.67 | 1.250  196.54 | 2.250    9.60 |  3.25    3.44
                0.333    3.67 | 1.333  196.54 | 2.333    9.60 |  3.33    3.44
                0.417    4.88 | 1.417   83.09 | 2.417    7.66 |  3.42    3.05
                0.500    4.88 | 1.500   83.09 | 2.500    7.66 |  3.50    3.05
                0.583    6.96 | 1.583   41.25 | 2.583    6.29 |  3.58    2.73
                0.667    6.96 | 1.667   41.25 | 2.667    6.29 |  3.67    2.73
                0.750   11.02 | 1.750   25.07 | 2.750    5.28 |  3.75    2.47
                0.833   11.02 | 1.833   25.07 | 2.833    5.28 |  3.83    2.47
                0.917   21.03 | 1.917   17.06 | 2.917    4.51 |  3.92    2.24
                1.000   21.03 | 2.000   17.06 | 3.000    4.51 |  4.00    2.24

     Unit Hyd Qpeak  (cms)=   1.183

     PEAK FLOW       (cms)=   1.440 (i)
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  48.541
     TOTAL RAINFALL   (mm)=  89.870
     RUNOFF COEFFICIENT   =   0.540

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

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--------------------
| CALIB            |
| NASHYD   (  0108)|   Area    (ha)=  29.56   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.68

        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    2.89 | 1.083   62.12 | 2.083   12.48 |  3.08    3.91
                0.167    2.89 | 1.167   62.12 | 2.167   12.48 |  3.17    3.91
                0.250    3.67 | 1.250  196.54 | 2.250    9.60 |  3.25    3.44
                0.333    3.67 | 1.333  196.54 | 2.333    9.60 |  3.33    3.44
                0.417    4.88 | 1.417   83.09 | 2.417    7.66 |  3.42    3.05
                0.500    4.88 | 1.500   83.09 | 2.500    7.66 |  3.50    3.05
                0.583    6.96 | 1.583   41.25 | 2.583    6.29 |  3.58    2.73
                0.667    6.96 | 1.667   41.25 | 2.667    6.29 |  3.67    2.73
                0.750   11.02 | 1.750   25.07 | 2.750    5.28 |  3.75    2.47
                0.833   11.02 | 1.833   25.07 | 2.833    5.28 |  3.83    2.47
                0.917   21.03 | 1.917   17.06 | 2.917    4.51 |  3.92    2.24
                1.000   21.03 | 2.000   17.06 | 3.000    4.51 |  4.00    2.24

     Unit Hyd Qpeak  (cms)=   1.660

     PEAK FLOW       (cms)=   2.351 (i)
     TIME TO PEAK    (hrs)=   2.083
     RUNOFF VOLUME    (mm)=  48.546
     TOTAL RAINFALL   (mm)=  89.870
     RUNOFF COEFFICIENT   =   0.540

     (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 (  0107):    12.69   1.440     1.75    48.54
     + ID2= 2 (  0108):    29.56   2.351     2.08    48.55
       ==========================================================
       ID = 3 (  0001):    42.25   3.599     2.00    48.54

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
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| NASHYD (0101)| Area (ha)= 3.29 Curve Number (CN)= 80.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.52

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.241

PEAK FLOW (cms)= 0.318 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 48.544
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.540

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

| CALIB |
| NASHYD (0102)| Area (ha)= 6.05 Curve Number (CN)= 80.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.74

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.312

PEAK FLOW (cms)= 0.452 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 48.546
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.540

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

| CALIB |
| NASHYD (0103)| Area (ha)= 9.81 Curve Number (CN)= 80.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.75

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.500

PEAK FLOW (cms)= 0.725 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 48.546
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.540

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

| ADD HYD (0003)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
--- (ha) (cms) (hrs) (mm)
ID1= 1 (0101): 3.29 0.318 1.92 48.54
+ ID2= 2 (0102): 6.05 0.452 2.17 48.55
==========
ID = 3 (0003): 9.33 0.749 2.08 48.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0003)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
--- (ha) (cms) (hrs) (mm)
ID1= 3 (0003): 9.33 0.749 2.08 48.55
+ ID2= 2 (0103): 9.81 0.725 2.17 48.55
==========
ID = 1 (0003): 19.14 1.464 2.17 48.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0104)| Area (ha)= 11.23 Curve Number (CN)= 80.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.86

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73

0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.499

PEAK FLOW (cms)= 0.748 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 48.546
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.540

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

CALIB							
NASHYD (0105)	Area (ha)= 15.65		Curve Number (CN)= 77.0				
ID= 1 DT= 5.0 min	Ia (mm)= 5.00		# of Linear Res.(N)= 3.00				
	U.H. Tp(hrs)= 1.03						

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.580

PEAK FLOW (cms)= 0.831 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 44.810
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.499

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

CALIB							
NASHYD (0106)	Area (ha)= 11.73		Curve Number (CN)= 80.0				
ID= 1 DT= 5.0 min	Ia (mm)= 5.00		# of Linear Res.(N)= 3.00				
	U.H. Tp(hrs)= 0.87						

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24

1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.515

PEAK FLOW (cms)= 0.774 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 48.546
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.540

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

ADD HYD (0002)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0104):	11.23	0.748	2.33	48.55
+ ID2= 2 (0105):	15.65	0.831	2.50	44.81
ID = 3 (0002):	26.88	1.567	2.42	46.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0002)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0002):	26.88	1.567	2.42	46.37
+ ID2= 2 (0106):	11.73	0.774	2.33	48.55
ID = 1 (0002):	38.61	2.337	2.42	47.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0004)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	38.61	2.337	2.42	47.03
+ ID2= 2 (0003):	19.14	1.464	2.17	48.55
ID = 3 (0004):	57.75	3.735	2.25	47.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB							
NASHYD (0201)	Area (ha)= 14.11		Curve Number (CN)= 82.0				
ID= 1 DT= 5.0 min	Ia (mm)= 5.00		# of Linear Res.(N)= 3.00				
	U.H. Tp(hrs)= 0.85						

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.634

PEAK FLOW (cms)= 1.004 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 51.220
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.570

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

CALIB								
NASHYD (0202)	Area (ha)= 57.79	Curve Number (CN)= 82.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 1.51							

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 1.462

PEAK FLOW (cms)= 2.580 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 51.220
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.570

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

CALIB								
NASHYD (0203)	Area (ha)= 19.05	Curve Number (CN)= 82.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 1.46							

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.498

PEAK FLOW (cms)= 0.875 (i)
TIME TO PEAK (hrs)= 3.000

RUNOFF VOLUME (mm)= 51.220
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.570

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

CALIB								
NASHYD (0205)	Area (ha)= 3.32	Curve Number (CN)= 84.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.40							

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.317

PEAK FLOW (cms)= 0.433 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 54.048
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.601

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

CALIB								
NASHYD (0204)	Area (ha)= 12.40	Curve Number (CN)= 84.0						
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00						
	U.H. Tp(hrs)= 0.50							

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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Unit Hyd Qpeak (cms)= 0.947

PEAK FLOW (cms)= 1.386 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 54.052
TOTAL RAINFALL (mm)= 89.870
RUNOFF COEFFICIENT = 0.601

HAZEL 48HR REGIONAL STORM SIMULATION

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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\apalmer\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\92bf236c-6f56-4450-96b1-e7a65e4f8616\scen
Summary filename: C:\Users\apalmer\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\92bf236c-6f56-4450-96b1-e7a65e4f8616\scen

DATE: 11/15/2023 TIME: 12:58:44

USER:

COMMENTS: _____

** SIMULATION : Hzl48h15 **

READ STORM	Filename: C:\Users\apalmer\AppData\Local\Temp\0330f6fa-e33f-47e1-8439-79e5a7e546f7\39ccfdd4
Ptotal=285.00 mm	Comments: Hzl48h15

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.00	12.00	2.00	24.00	2.00	36.00	6.00
0.25	2.00	12.25	2.00	24.25	2.00	36.25	6.00
0.50	2.00	12.50	2.00	24.50	2.00	36.50	6.00
0.75	2.00	12.75	2.00	24.75	2.00	36.75	6.00
1.00	2.00	13.00	2.00	25.00	2.00	37.00	4.00
1.25	2.00	13.25	2.00	25.25	2.00	37.25	4.00
1.50	2.00	13.50	2.00	25.50	2.00	37.50	4.00
1.75	2.00	13.75	2.00	25.75	2.00	37.75	4.00
2.00	2.00	14.00	2.00	26.00	2.00	38.00	6.00
2.25	2.00	14.25	2.00	26.25	2.00	38.25	6.00
2.50	2.00	14.50	2.00	26.50	2.00	38.50	6.00
2.75	2.00	14.75	2.00	26.75	2.00	38.75	6.00
3.00	2.00	15.00	2.00	27.00	2.00	39.00	13.00
3.25	2.00	15.25	2.00	27.25	2.00	39.25	13.00
3.50	2.00	15.50	2.00	27.50	2.00	39.50	13.00
3.75	2.00	15.75	2.00	27.75	2.00	39.75	13.00
4.00	2.00	16.00	2.00	28.00	2.00	40.00	17.00
4.25	2.00	16.25	2.00	28.25	2.00	40.25	17.00
4.50	2.00	16.50	2.00	28.50	2.00	40.50	17.00
4.75	2.00	16.75	2.00	28.75	2.00	40.75	17.00
5.00	2.00	17.00	2.00	29.00	2.00	41.00	13.00
5.25	2.00	17.25	2.00	29.25	2.00	41.25	13.00
5.50	2.00	17.50	2.00	29.50	2.00	41.50	13.00
5.75	2.00	17.75	2.00	29.75	2.00	41.75	13.00
6.00	2.00	18.00	2.00	30.00	2.00	42.00	23.00
6.25	2.00	18.25	2.00	30.25	2.00	42.25	23.00
6.50	2.00	18.50	2.00	30.50	2.00	42.50	23.00
6.75	2.00	18.75	2.00	30.75	2.00	42.75	23.00
7.00	2.00	19.00	2.00	31.00	2.00	43.00	13.00
7.25	2.00	19.25	2.00	31.25	2.00	43.25	13.00
7.50	2.00	19.50	2.00	31.50	2.00	43.50	13.00
7.75	2.00	19.75	2.00	31.75	2.00	43.75	13.00
8.00	2.00	20.00	2.00	32.00	2.00	44.00	13.00
8.25	2.00	20.25	2.00	32.25	2.00	44.25	13.00
8.50	2.00	20.50	2.00	32.50	2.00	44.50	13.00
8.75	2.00	20.75	2.00	32.75	2.00	44.75	13.00
9.00	2.00	21.00	2.00	33.00	2.00	45.00	53.00
9.25	2.00	21.25	2.00	33.25	2.00	45.25	53.00
9.50	2.00	21.50	2.00	33.50	2.00	45.50	53.00
9.75	2.00	21.75	2.00	33.75	2.00	45.75	53.00
10.00	2.00	22.00	2.00	34.00	2.00	46.00	38.00
10.25	2.00	22.25	2.00	34.25	2.00	46.25	38.00
10.50	2.00	22.50	2.00	34.50	2.00	46.50	38.00
10.75	2.00	22.75	2.00	34.75	2.00	46.75	38.00
11.00	2.00	23.00	2.00	35.00	3.00	47.00	13.00
11.25	2.00	23.25	2.00	35.25	3.00	47.25	13.00
11.50	2.00	23.50	2.00	35.50	3.00	47.50	13.00
11.75	2.00	23.75	2.00	35.75	3.00	47.75	13.00

CALIB			
NASHYD (0107)	Area (ha)= 12.69	Curve Number (CN)= 80.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.41		

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00

2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95

9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 1.183

PEAK FLOW (cms)= 1.637 (i)
TIME TO PEAK (hrs)= 46.167
RUNOFF VOLUME (mm)= 228.213
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.801

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

CALIB					
NASHYD (0108)	Area (ha)=	29.56	Curve Number (CN)=	80.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.68		

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00

1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00

7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 1.660

PEAK FLOW (cms)= 3.344 (i)
TIME TO PEAK (hrs)= 46.583
RUNOFF VOLUME (mm)= 228.235
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.801

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

ADD HYD (0001) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0107):	12.69	1.637	46.17	228.21
+ ID2= 2 (0108):	29.56	3.344	46.58	228.24
ID = 3 (0001):	42.25	4.859	46.42	228.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB           |
| NASHYD  (  0101)|  Area    (ha)=   3.29   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
                    U.H. Tp(hrs)=   0.52
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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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00

5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00

11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.241

PEAK FLOW (cms)= 0.400 (i)
TIME TO PEAK (hrs)= 46.250
RUNOFF VOLUME (mm)= 228.229
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.801

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

CALIB					
NASHYD (0102)	Area (ha)=	6.05	Curve Number (CN)=	80.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.74			

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00

3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00

9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.312

PEAK FLOW (cms)= 0.669 (i)
TIME TO PEAK (hrs)= 46.750
RUNOFF VOLUME (mm)= 228.236
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.801

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

CALIB					
NASHYD (0103)	Area (ha)=	9.81	Curve Number (CN)=	80.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.75			

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00

2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00

8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.500

PEAK FLOW (cms)= 1.083 (i)
TIME TO PEAK (hrs)= 46.750
RUNOFF VOLUME (mm)= 228.236
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.801

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

ADD HYD (0003)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	3.29	0.400	46.25	228.23
+ ID2= 2 (0102):	6.05	0.669	46.75	228.24
ID = 3 (0003):	9.33	1.053	46.50	228.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0003)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0003):	9.33	1.053	46.50	228.23
+ ID2= 2 (0103):	9.81	1.083	46.75	228.24

ID = 1 (0003): 19.14 2.129 46.67 228.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0104)	Area (ha)= 11.23	Curve Number (CN)= 80.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.86		

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00

4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04

11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.499

PEAK FLOW (cms)= 1.201 (i)
TIME TO PEAK (hrs)= 47.000
RUNOFF VOLUME (mm)= 228.237
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.801

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

CALIB			
NASHYD (0105)	Area (ha)= 15.65	Curve Number (CN)= 77.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.03	

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00

3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00

9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.580

PEAK FLOW (cms)= 1.568 (i)
TIME TO PEAK (hrs)= 47.167
RUNOFF VOLUME (mm)= 220.304
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.773

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

CALIB					
NASHYD (0106)	Area (ha)=	11.73	Curve Number (CN)=	80.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.87			

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00

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 1.917    2.00 |13.917    2.00 |25.917    2.00 | 37.92    4.00
 2.000    2.00 |14.000    2.00 |26.000    2.00 | 38.00    4.00
 2.083    2.00 |14.083    2.00 |26.083    2.00 | 38.08    6.00
 2.167    2.00 |14.167    2.00 |26.167    2.00 | 38.17    6.00
 2.250    2.00 |14.250    2.00 |26.250    2.00 | 38.25    6.00
 2.333    2.00 |14.333    2.00 |26.333    2.00 | 38.33    6.00
 2.417    2.00 |14.417    2.00 |26.417    2.00 | 38.42    6.00
 2.500    2.00 |14.500    2.00 |26.500    2.00 | 38.50    6.00
 2.583    2.00 |14.583    2.00 |26.583    2.00 | 38.58    6.00
 2.667    2.00 |14.667    2.00 |26.667    2.00 | 38.67    6.00
 2.750    2.00 |14.750    2.00 |26.750    2.00 | 38.75    6.00
 2.833    2.00 |14.833    2.00 |26.833    2.00 | 38.83    6.00
 2.917    2.00 |14.917    2.00 |26.917    2.00 | 38.92    6.00
 3.000    2.00 |15.000    2.00 |27.000    2.00 | 39.00    6.00
 3.083    2.00 |15.083    2.00 |27.083    2.00 | 39.08   13.00
 3.167    2.00 |15.167    2.00 |27.167    2.00 | 39.17   13.00
 3.250    2.00 |15.250    2.00 |27.250    2.00 | 39.25   13.00
 3.333    2.00 |15.333    2.00 |27.333    2.00 | 39.33   13.00
 3.417    2.00 |15.417    2.00 |27.417    2.00 | 39.42   13.00
 3.500    2.00 |15.500    2.00 |27.500    2.00 | 39.50   13.00
 3.583    2.00 |15.583    2.00 |27.583    2.00 | 39.58   13.00
 3.667    2.00 |15.667    2.00 |27.667    2.00 | 39.67   13.00
 3.750    2.00 |15.750    2.00 |27.750    2.00 | 39.75   13.00
 3.833    2.00 |15.833    2.00 |27.833    2.00 | 39.83   13.00
 3.917    2.00 |15.917    2.00 |27.917    2.00 | 39.92   13.00
 4.000    2.00 |16.000    2.00 |28.000    2.00 | 40.00   13.00
 4.083    2.00 |16.083    2.00 |28.083    2.00 | 40.08   17.00
 4.167    2.00 |16.167    2.00 |28.167    2.00 | 40.17   17.00
 4.250    2.00 |16.250    2.00 |28.250    2.00 | 40.25   17.00
 4.333    2.00 |16.333    2.00 |28.333    2.00 | 40.33   17.00
 4.417    2.00 |16.417    2.00 |28.417    2.00 | 40.42   17.00
 4.500    2.00 |16.500    2.00 |28.500    2.00 | 40.50   17.00
 4.583    2.00 |16.583    2.00 |28.583    2.00 | 40.58   17.00
 4.667    2.00 |16.667    2.00 |28.667    2.00 | 40.67   17.00
 4.750    2.00 |16.750    2.00 |28.750    2.00 | 40.75   17.00
 4.833    2.00 |16.833    2.00 |28.833    2.00 | 40.83   17.00
 4.917    2.00 |16.917    2.00 |28.917    2.00 | 40.92   17.00
 5.000    2.00 |17.000    2.00 |29.000    2.00 | 41.00   17.00
 5.083    2.00 |17.083    2.00 |29.083    2.00 | 41.08   13.00
 5.167    2.00 |17.167    2.00 |29.167    2.00 | 41.17   13.00
 5.250    2.00 |17.250    2.00 |29.250    2.00 | 41.25   13.00
 5.333    2.00 |17.333    2.00 |29.333    2.00 | 41.33   13.00
 5.417    2.00 |17.417    2.00 |29.417    2.00 | 41.42   13.00
 5.500    2.00 |17.500    2.00 |29.500    2.00 | 41.50   13.00
 5.583    2.00 |17.583    2.00 |29.583    2.00 | 41.58   13.00
 5.667    2.00 |17.667    2.00 |29.667    2.00 | 41.67   13.00
 5.750    2.00 |17.750    2.00 |29.750    2.00 | 41.75   13.00
 5.833    2.00 |17.833    2.00 |29.833    2.00 | 41.83   13.00
 5.917    2.00 |17.917    2.00 |29.917    2.00 | 41.92   13.00
 6.000    2.00 |18.000    2.00 |30.000    2.00 | 42.00   13.00
 6.083    2.00 |18.083    2.00 |30.083    2.00 | 42.08   22.99
 6.167    2.00 |18.167    2.00 |30.167    2.00 | 42.17   23.00
 6.250    2.00 |18.250    2.00 |30.250    2.00 | 42.25   23.00
 6.333    2.00 |18.333    2.00 |30.333    2.00 | 42.33   23.00
 6.417    2.00 |18.417    2.00 |30.417    2.00 | 42.42   23.00
 6.500    2.00 |18.500    2.00 |30.500    2.00 | 42.50   23.00
 6.583    2.00 |18.583    2.00 |30.583    2.00 | 42.58   23.00
 6.667    2.00 |18.667    2.00 |30.667    2.00 | 42.67   23.00
 6.750    2.00 |18.750    2.00 |30.750    2.00 | 42.75   23.00
 6.833    2.00 |18.833    2.00 |30.833    2.00 | 42.83   23.00
 6.917    2.00 |18.917    2.00 |30.917    2.00 | 42.92   23.00
 7.000    2.00 |19.000    2.00 |31.000    2.00 | 43.00   23.00
 7.083    2.00 |19.083    2.00 |31.083    2.00 | 43.08   13.01
 7.167    2.00 |19.167    2.00 |31.167    2.00 | 43.17   13.00
 7.250    2.00 |19.250    2.00 |31.250    2.00 | 43.25   13.00
 7.333    2.00 |19.333    2.00 |31.333    2.00 | 43.33   13.00
 7.417    2.00 |19.417    2.00 |31.417    2.00 | 43.42   13.00
 7.500    2.00 |19.500    2.00 |31.500    2.00 | 43.50   13.00
 7.583    2.00 |19.583    2.00 |31.583    2.00 | 43.58   13.00
 7.667    2.00 |19.667    2.00 |31.667    2.00 | 43.67   13.00
 7.750    2.00 |19.750    2.00 |31.750    2.00 | 43.75   13.00
 7.833    2.00 |19.833    2.00 |31.833    2.00 | 43.83   13.00
 7.917    2.00 |19.917    2.00 |31.917    2.00 | 43.92   13.00
 8.000    2.00 |20.000    2.00 |32.000    2.00 | 44.00   13.00
 8.083    2.00 |20.083    2.00 |32.083    2.00 | 44.08   13.00
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 8.167    2.00 |20.167    2.00 |32.167    2.00 | 44.17   13.00
 8.250    2.00 |20.250    2.00 |32.250    2.00 | 44.25   13.00
 8.333    2.00 |20.333    2.00 |32.333    2.00 | 44.33   13.00
 8.417    2.00 |20.417    2.00 |32.417    2.00 | 44.42   13.00
 8.500    2.00 |20.500    2.00 |32.500    2.00 | 44.50   13.00
 8.583    2.00 |20.583    2.00 |32.583    2.00 | 44.58   13.00
 8.667    2.00 |20.667    2.00 |32.667    2.00 | 44.67   13.00
 8.750    2.00 |20.750    2.00 |32.750    2.00 | 44.75   13.00
 8.833    2.00 |20.833    2.00 |32.833    2.00 | 44.83   13.00
 8.917    2.00 |20.917    2.00 |32.917    2.00 | 44.92   13.00
 9.000    2.00 |21.000    2.00 |33.000    2.00 | 45.00   13.00
 9.083    2.00 |21.083    2.00 |33.083    2.00 | 45.08   52.95
 9.167    2.00 |21.167    2.00 |33.167    2.00 | 45.17   53.00
 9.250    2.00 |21.250    2.00 |33.250    2.00 | 45.25   53.00
 9.333    2.00 |21.333    2.00 |33.333    2.00 | 45.33   53.00
 9.417    2.00 |21.417    2.00 |33.417    2.00 | 45.42   53.00
 9.500    2.00 |21.500    2.00 |33.500    2.00 | 45.50   53.00
 9.583    2.00 |21.583    2.00 |33.583    2.00 | 45.58   53.00
 9.667    2.00 |21.667    2.00 |33.667    2.00 | 45.67   53.00
 9.750    2.00 |21.750    2.00 |33.750    2.00 | 45.75   53.00
 9.833    2.00 |21.833    2.00 |33.833    2.00 | 45.83   53.00
 9.917    2.00 |21.917    2.00 |33.917    2.00 | 45.92   53.00
10.000    2.00 |22.000    2.00 |34.000    2.00 | 46.00   53.00
10.083    2.00 |22.083    2.00 |34.083    2.00 | 46.08   38.02
10.167    2.00 |22.167    2.00 |34.167    2.00 | 46.17   38.00
10.250    2.00 |22.250    2.00 |34.250    2.00 | 46.25   38.00
10.333    2.00 |22.333    2.00 |34.333    2.00 | 46.33   38.00
10.417    2.00 |22.417    2.00 |34.417    2.00 | 46.42   38.00
10.500    2.00 |22.500    2.00 |34.500    2.00 | 46.50   38.00
10.583    2.00 |22.583    2.00 |34.583    2.00 | 46.58   38.00
10.667    2.00 |22.667    2.00 |34.667    2.00 | 46.67   38.00
10.750    2.00 |22.750    2.00 |34.750    2.00 | 46.75   38.00
10.833    2.00 |22.833    2.00 |34.833    2.00 | 46.83   38.00
10.917    2.00 |22.917    2.00 |34.917    2.00 | 46.92   38.00
11.000    2.00 |23.000    2.00 |35.000    2.00 | 47.00   38.00
11.083    2.00 |23.083    2.00 |35.083    3.00 | 47.08   13.04
11.167    2.00 |23.167    2.00 |35.167    3.00 | 47.17   13.00
11.250    2.00 |23.250    2.00 |35.250    3.00 | 47.25   13.00
11.333    2.00 |23.333    2.00 |35.333    3.00 | 47.33   13.00
11.417    2.00 |23.417    2.00 |35.417    3.00 | 47.42   13.00
11.500    2.00 |23.500    2.00 |35.500    3.00 | 47.50   13.00
11.583    2.00 |23.583    2.00 |35.583    3.00 | 47.58   13.00
11.667    2.00 |23.667    2.00 |35.667    3.00 | 47.67   13.00
11.750    2.00 |23.750    2.00 |35.750    3.00 | 47.75   13.00
11.833    2.00 |23.833    2.00 |35.833    3.00 | 47.83   13.00
11.917    2.00 |23.917    2.00 |35.917    3.00 | 47.92   13.00
12.000    2.00 |24.000    2.00 |36.000    3.00 | 48.00   13.00

     Unit Hyd Qpeak  (cms)=   0.515

     PEAK FLOW       (cms)=   1.251 (i)
     TIME TO PEAK    (hrs)=  47.000
     RUNOFF VOLUME    (mm)= 228.237
     TOTAL RAINFALL   (mm)= 285.000
     RUNOFF COEFFICIENT   =   0.801

     (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 (  0104):    11.23   1.201    47.00   228.24
      + ID2= 2 (  0105):    15.65   1.568    47.17   220.30
        ====================================================
        ID = 3 (  0002):    26.88   2.764    47.08   223.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0002)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
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--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0002):    26.88   2.764    47.08   223.62
      + ID2= 2 (  0106):    11.73   1.251    47.00   228.24
        ===================================================
        ID = 1 (  0002):    38.61   4.013    47.08   225.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0004)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0002):    38.61   4.013    47.08   225.02
      + ID2= 2 (  0003):    19.14   2.129    46.67   228.23
        ===================================================
        ID = 3 (  0004):    57.75   6.099    47.00   226.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| CALIB            |
| NASHYD   (  0201)|   Area    (ha)=  14.11   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.85

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00

9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.634

PEAK FLOW (cms)= 1.529 (i)
TIME TO PEAK (hrs)= 47.000
RUNOFF VOLUME (mm)= 233.501
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.819

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

CALIB					
NASHYD (0202)	Area (ha)=	57.79	Curve Number (CN)=	82.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	1.51			

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00

2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00

8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 1.462

PEAK FLOW (cms)= 5.153 (i)
TIME TO PEAK (hrs)= 47.583
RUNOFF VOLUME (mm)= 233.503
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.819

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

CALIB					
NASHYD (0203)	Area (ha)=	19.05	Curve Number (CN)=	82.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	1.46			

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00

0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00

6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.498

PEAK FLOW (cms)= 1.723 (i)
TIME TO PEAK (hrs)= 47.500
RUNOFF VOLUME (mm)= 233.503
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.819

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

CALIB							
NASHYD (0205)	Area (ha)= 3.32	Curve Number (CN)= 84.0					
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00					
	U.H. Tp(hrs)= 0.40						

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00

5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00

11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.317

PEAK FLOW (cms)= 0.439 (i)
TIME TO PEAK (hrs)= 46.083
RUNOFF VOLUME (mm)= 238.718
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.838

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

CALIB					
NASHYD (0204)	Area	(ha)= 12.40	Curve Number	(CN)= 84.0
ID= 1 DT= 5.0 min	Ia	(mm)= 5.00	# of Linear Res.	(N)= 3.00
	U.H. Tp	(hrs)= 0.50		

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	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00

3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02

10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.947

PEAK FLOW (cms)= 1.556 (i)
TIME TO PEAK (hrs)= 46.250
RUNOFF VOLUME (mm)= 238.735
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.838

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

FINISH

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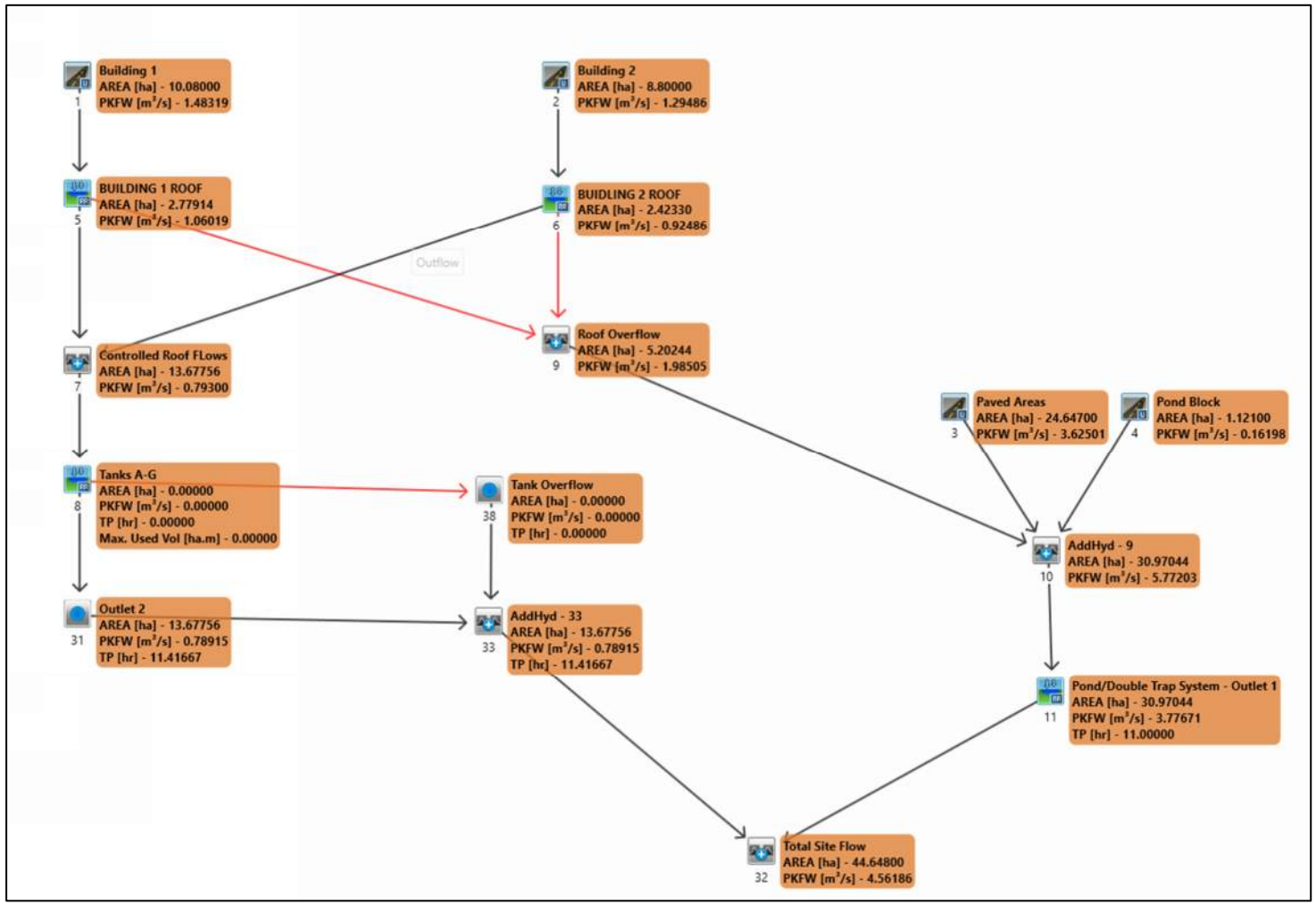

Proposed Conditions Schematic

25mm 4HR SIMULATION STORM

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\517d51c6-
97da-43a3-9a3f-8b09847c4ef6\sce
  Summary filename: C:\Users\kbobinac\AppData\Local\Civica\VH5\6ef93f1c-d546-4e88-820a-9a026779f8f1\517d51c6-
97da-43a3-9a3f-8b09847c4ef6\sce


DATE: 12/04/2024                          TIME: 02:23:00

USER:


COMMENTS: _____________________________________________________

----------------------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : A._25MM4HR                    **
  ************************************************


--------------------
|    READ STORM    |     Filename: C:\Users\kbobinac\AppD
|                  |               ata\Local\Temp\
|                  |               e714ccd0-1da5-4d30-8c97-2210b1da5ab1\30ab2661
| Ptotal= 25.00 mm |    Comments: 25MM4HR
--------------------
                TIME    RAIN  |  TIME    RAIN  |'  TIME    RAIN  |  TIME    RAIN
                 hrs   mm/hr  |   hrs   mm/hr  |'   hrs   mm/hr  |   hrs   mm/hr
                0.00    2.07  |  1.00    5.70  |   2.00    5.19  |  3.00    2.80
                0.17    2.27  |  1.17   10.78  |   2.17    4.47  |  3.17    2.62
                0.33    2.52  |  1.33   50.21  |   2.33    3.95  |  3.33    2.48
                0.50    2.88  |  1.50   13.37  |   2.50    3.56  |  3.50    2.35
                0.67    3.38  |  1.67    8.29  |   2.67    3.25  |  3.67    2.23
                0.83    4.18  |  1.83    6.30  |   2.83    3.01  |  3.83    2.14

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

--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=  10.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.98         0.10
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     259.23        40.00
     Mannings n            =      0.013        0.250

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



```
                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN  |  TIME    RAIN  |'  TIME    RAIN  |  TIME    RAIN
                 hrs   mm/hr  |   hrs   mm/hr  |'   hrs   mm/hr  |   hrs   mm/hr
                0.083   2.07  | 1.083    5.70  | 2.083    5.19  | 3.08    2.80
                0.167   2.07  | 1.167    5.70  | 2.167    5.19  | 3.17    2.80
                0.250   2.27  | 1.250   10.78  | 2.250    4.47  | 3.25    2.62
                0.333   2.27  | 1.333   10.78  | 2.333    4.47  | 3.33    2.62
                0.417   2.52  | 1.417   50.21  | 2.417    3.95  | 3.42    2.48
                0.500   2.52  | 1.500   50.21  | 2.500    3.95  | 3.50    2.48
                0.583   2.88  | 1.583   13.37  | 2.583    3.56  | 3.58    2.35
                0.667   2.88  | 1.667   13.37  | 2.667    3.56  | 3.67    2.35
                0.750   3.38  | 1.750    8.29  | 2.750    3.25  | 3.75    2.23
                0.833   3.38  | 1.833    8.29  | 2.833    3.25  | 3.83    2.23
                0.917   4.18  | 1.917    6.30  | 2.917    3.01  | 3.92    2.14
                1.000   4.18  | 2.000    6.30  | 3.000    3.01  | 4.00    2.14

   Max.Eff.Inten.(mm/hr)=      50.21        14.26
             over (min)        5.00        10.00
   Storage Coeff.  (min)=      5.96 (ii)    7.44 (ii)
   Unit Hyd. Tpeak (min)=      5.00        10.00
   Unit Hyd. peak  (cms)=      0.19         0.13
                                                    *TOTALS*
   PEAK FLOW       (cms)=      1.18         0.00       1.185 (iii)
   TIME TO PEAK    (hrs)=      1.50         1.58         1.50
   RUNOFF VOLUME    (mm)=     24.00         8.08        23.84
   TOTAL RAINFALL   (mm)=     25.00        25.00        25.00
   RUNOFF COEFFICIENT   =      0.96         0.32         0.95


     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
         CN*  =  85.0    Ia = Dep. 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(  0005)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)    |   (cms)      (ha.m.)
                        0.0000     0.0000     |  0.4230      0.4030

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0001)      10.080     1.185      1.50      23.84
   OUTFLOW: ID= 1 (  0005)      10.080     0.148      2.17      23.81
   OVERFLOW:ID= 3 (  0003)       0.000     0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.45
                  TIME SHIFT OF PEAK FLOW          (min)= 40.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  0.1407

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0002)|   Area    (ha)=   8.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.71         0.09
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     242.21        40.00
     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	2.07	1.083	5.70	2.083	5.19	3.08	2.80
0.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
0.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
0.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
0.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
0.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
0.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
0.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
0.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
0.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
0.917	4.18	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.30	3.000	3.01	4.00	2.14

			TOTALS
Max.Eff.Inten.(mm/hr)=	50.21	14.26	
over (min)	5.00	10.00	
Storage Coeff. (min)=	5.72 (ii)	7.20 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.20	0.14	
PEAK FLOW (cms)=	1.05	0.00	1.047 (iii)
TIME TO PEAK (hrs)=	1.50	1.58	1.50
RUNOFF VOLUME (mm)=	24.00	8.08	23.84
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.96	0.32	0.95

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0006)	OVERFLOW IS ON
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3700	0.3520

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	8.800	1.047	1.50	23.84
OUTFLOW: ID= 1 (0006)	8.800	0.129	2.17	23.81
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 12.32
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 0.1228

ADD HYD (0007)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	10.08	0.148	2.17	23.81
+ ID2= 2 (0006):	8.80	0.129	2.17	23.81
ID = 3 (0007):	18.88	0.277	2.17	23.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS ON
IN= 2---> OUT= 1	

DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0012	0.7983
	0.0002	0.0493	0.0012	0.9272
	0.0004	0.1138	0.0013	1.0172
	0.0005	0.1731	0.0014	1.1836
	0.0007	0.2826	0.0015	1.2551
	0.0010	0.5436	0.8479	1.3965
	0.0011	0.6923	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0007)	18.880	0.277	2.17	23.81
OUTFLOW: ID= 1 (0008)	18.880	0.001	18.50	2.74
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.33
TIME SHIFT OF PEAK FLOW (min)=980.00
MAXIMUM STORAGE USED (ha.m.)= 0.4443

Junction Command(0031)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 1(0008)	18.88	0.00	18.50	2.74
OUTFLOW: ID= 2(0031)	18.88	0.00	18.50	2.74

Junction Command(0038)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 3(0008)	0.00	0.00	0.00	0.00
OUTFLOW: ID= 2(0038)	0.00	0.00	0.00	0.00

ADD HYD (0033)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
*** W A R N I N G : HYDROGRAPH 0038 <ID= 2> IS DRY.				
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001				
ID1= 1 (0031):	18.88	0.001	18.50	2.74
+ ID2= 2 (0038):	0.00	0.000	0.00	0.00
ID = 3 (0033):	18.88	0.001	18.50	2.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0009)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
*** W A R N I N G : HYDROGRAPH 0005 <ID= 1> IS DRY.				
*** W A R N I N G : HYDROGRAPH 0006 <ID= 2> IS DRY.				
*** W A R N I N G : HYDROGRAPH 0009 <ID= 3> IS ALSO DRY				

CALIB	
STANDHYD (0004)	Area (ha)= 1.12
ID= 1 DT= 5.0 min	Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

```
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=       0.81         0.31
     Dep. Storage      (mm)=       1.00         1.50
     Average Slope      (%)=       1.00         2.00
     Length             (m)=      86.45        40.00
     Mannings n            =      0.013        0.250

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


                            ---- TRANSFORMED HYETOGRAPH ----
     TIME    RAIN  |  TIME    RAIN  |'  TIME    RAIN  |  TIME    RAIN
      hrs   mm/hr  |   hrs   mm/hr  |'   hrs   mm/hr  |   hrs   mm/hr
    0.083    2.07  | 1.083    5.70  | 2.083    5.19  |  3.08    2.80
    0.167    2.07  | 1.167    5.70  | 2.167    5.19  |  3.17    2.80
    0.250    2.27  | 1.250   10.78  | 2.250    4.47  |  3.25    2.62
    0.333    2.27  | 1.333   10.78  | 2.333    4.47  |  3.33    2.62
    0.417    2.52  | 1.417   50.21  | 2.417    3.95  |  3.42    2.48
    0.500    2.52  | 1.500   50.21  | 2.500    3.95  |  3.50    2.48
    0.583    2.88  | 1.583   13.37  | 2.583    3.56  |  3.58    2.35
    0.667    2.88  | 1.667   13.37  | 2.667    3.56  |  3.67    2.35
    0.750    3.38  | 1.750    8.29  | 2.750    3.25  |  3.75    2.23
    0.833    3.38  | 1.833    8.29  | 2.833    3.25  |  3.83    2.23
    0.917    4.18  | 1.917    6.30  | 2.917    3.01  |  3.92    2.14
    1.000    4.18  | 2.000    6.30  | 3.000    3.01  |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21         9.88
               over (min)        5.00        25.00
     Storage Coeff.  (min)=     3.08 (ii)   20.90 (ii)
     Unit Hyd. Tpeak (min)=      5.00        25.00
     Unit Hyd. peak  (cms)=      0.27         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.11         0.00          0.111 (iii)
     TIME TO PEAK    (hrs)=      1.50         1.83           1.50
     RUNOFF VOLUME    (mm)=     24.00         8.08          19.53
     TOTAL RAINFALL   (mm)=     25.00        25.00          25.00
     RUNOFF COEFFICIENT   =      0.96         0.32           0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0003)|   Area    (ha)=  24.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      24.40         0.25
     Dep. Storage      (mm)=       1.00         1.50
     Average Slope      (%)=       1.00         2.00
     Length             (m)=     405.36        40.00
     Mannings n            =      0.013        0.250

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


                            ---- TRANSFORMED HYETOGRAPH ----
     TIME    RAIN  |  TIME    RAIN  |'  TIME    RAIN  |  TIME    RAIN
      hrs   mm/hr  |   hrs   mm/hr  |'   hrs   mm/hr  |   hrs   mm/hr
    0.083    2.07  | 1.083    5.70  | 2.083    5.19  |  3.08    2.80
    0.167    2.07  | 1.167    5.70  | 2.167    5.19  |  3.17    2.80
    0.250    2.27  | 1.250   10.78  | 2.250    4.47  |  3.25    2.62
    0.333    2.27  | 1.333   10.78  | 2.333    4.47  |  3.33    2.62
    0.417    2.52  | 1.417   50.21  | 2.417    3.95  |  3.42    2.48
    0.500    2.52  | 1.500   50.21  | 2.500    3.95  |  3.50    2.48
    0.583    2.88  | 1.583   13.37  | 2.583    3.56  |  3.58    2.35
    0.667    2.88  | 1.667   13.37  | 2.667    3.56  |  3.67    2.35
```



```
    0.750    3.38  | 1.750    8.29  | 2.750    3.25  |  3.75    2.23
    0.833    3.38  | 1.833    8.29  | 2.833    3.25  |  3.83    2.23
    0.917    4.18  | 1.917    6.30  | 2.917    3.01  |  3.92    2.14
    1.000    4.18  | 2.000    6.30  | 3.000    3.01  |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21        14.26
               over (min)        10.00        10.00
     Storage Coeff.  (min)=      7.79 (ii)    9.27 (ii)
     Unit Hyd. Tpeak (min)=      10.00        10.00
     Unit Hyd. peak  (cms)=      0.13         0.12
                                                    *TOTALS*
     PEAK FLOW       (cms)=      2.30         0.01          2.309 (iii)
     TIME TO PEAK    (hrs)=      1.58         1.58           1.58
     RUNOFF VOLUME    (mm)=     24.00         8.08          23.84
     TOTAL RAINFALL   (mm)=     25.00        25.00          25.00
     RUNOFF COEFFICIENT   =      0.96         0.32           0.95


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------- ---------(ha)----(cms)----(hrs)-----(mm)
       ID1= 1 (  0003):    24.65   2.309     1.58     23.84
     + ID2= 2 (  0004):     1.12   0.111     1.50     19.53
       ==========================================================
       ID = 3 (  0010):    25.77   2.357     1.58     23.65

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0010)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------- ---------(ha)----(cms)----(hrs)-----(mm)
*** W A R N I N G :  HYDROGRAPH   0009 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
       ID1= 3 (  0010):    25.77   2.357     1.58     23.65
     + ID2= 2 (  0009):     0.00   0.000     0.00      2.74
       ==========================================================
       ID = 1 (  0010):    25.77   2.357     1.58     23.65

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0011)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------- ------(cms)-----(ha.m.)---|---(cms)-----(ha.m.)
                       0.0000    0.0000   |  0.8558    1.8346
                       0.0181    0.0734   |  0.9869    2.0518
                       0.0294    0.1515   |  1.1021    2.2728
                       0.0375    0.2343   |  1.3219    2.4978
                       0.0440    0.4206   |  1.6294    2.7268
                       0.0524    0.7083   |  2.1918    3.0780
                       0.0573    0.9048   |  2.5876    3.3173
                       0.0618    1.1049   |  4.2549    3.5359
                       0.2961    1.3087   |  7.6831    3.6846
                       0.6043    1.5162   | 12.5080    3.8377

                                  AREA     QPEAK     TPEAK        R.V.
                                  (ha)     (cms)     (hrs)        (mm)
   INFLOW : ID= 2 (  0010)      25.768     2.357      1.58       23.65
   OUTFLOW: ID= 1 (  0011)      25.768     0.048      4.25       23.61

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.04
                TIME SHIFT OF PEAK FLOW         (min)=160.00
```

MAXIMUM STORAGE USED (ha.m.)= 0.5598

ADD HYD (0032) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0011):	25.77	0.048	4.25	23.61
+ ID2= 2 (0033):	18.88	0.001	18.50	2.74
ID = 3 (0032):	44.65	0.049	4.25	14.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

2YR 4HR CHICAGO STORM SIMULATION

```
************************************************
** SIMULATION : A_2yr 4hr 10min Chicago       **
************************************************
```

| CHICAGO STORM |
| Ptotal= 34.22 mm |

IDF curve parameters: A=1070.000
B= 7.850
C= 0.876
used in: INTENSITY = A / (t + B)^C

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	1.53	1.00	19.60	2.00	4.48	3.00	1.89
0.17	1.81	1.17	85.72	2.17	3.65	3.17	1.73
0.33	2.22	1.33	26.59	2.33	3.08	3.33	1.59
0.50	2.87	1.50	12.64	2.50	2.66	3.50	1.47
0.67	4.06	1.67	7.99	2.67	2.34	3.67	1.37
0.83	6.86	1.83	5.76	2.83	2.10	3.83	1.29

| CALIB |
| STANDHYD (0001) |
| ID= 1 DT= 5.0 min |

Area (ha)= 10.08
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	9.98	0.10
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	259.23	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

				TOTALS
Max.Eff.Inten.(mm/hr)=		85.72	31.78	
over (min)		5.00	10.00	
Storage Coeff.	(min)=	4.81 (ii)	6.01 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.22	0.15	
PEAK FLOW	(cms)=	2.14	0.01	2.147 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	33.22	13.81	33.02
TOTAL RAINFALL	(mm)=	34.22	34.22	34.22
RUNOFF COEFFICIENT	=	0.97	0.40	0.97

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 85.0 Ia = Dep. 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(0005) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.4230	0.4030

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	10.080	2.147	1.33	33.02
OUTFLOW: ID= 1 (0005)	10.080	0.235	1.83	33.00
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.97
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.2245

CALIB STANDHYD (0002) ID= 1 DT= 5.0 min	Area (ha)= 8.80 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.71	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	242.21	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.53	1.083	19.60	2.083	4.48	3.08	1.89
0.167	1.53	1.167	19.60	2.167	4.48	3.17	1.89
0.250	1.81	1.250	85.72	2.250	3.65	3.25	1.73
0.333	1.81	1.333	85.72	2.333	3.65	3.33	1.73
0.417	2.22	1.417	26.59	2.417	3.08	3.42	1.59
0.500	2.22	1.500	26.59	2.500	3.08	3.50	1.59
0.583	2.87	1.583	12.64	2.583	2.66	3.58	1.47
0.667	2.87	1.667	12.64	2.667	2.66	3.67	1.47
0.750	4.06	1.750	7.99	2.750	2.34	3.75	1.37
0.833	4.06	1.833	7.99	2.833	2.34	3.83	1.37
0.917	6.86	1.917	5.76	2.917	2.10	3.92	1.29
1.000	6.86	2.000	5.76	3.000	2.10	4.00	1.29

Max.Eff.Inten.(mm/hr)=		85.72	31.78	
over (min)		5.00	10.00	
Storage Coeff. (min)=		4.62 (ii)	5.81 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.22	0.15	
				TOTALS
PEAK FLOW	(cms)=	1.89	0.01	1.892 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	33.22	13.81	33.02
TOTAL RAINFALL	(mm)=	34.22	34.22	34.22
RUNOFF COEFFICIENT	=	0.97	0.40	0.97

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 85.0 Ia = Dep. 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(0006) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.3700	0.3520

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	8.800	1.892	1.33	33.02
OUTFLOW: ID= 1 (0006)	8.800	0.206	1.83	33.00
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.88
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.1960

ADD HYD (0007) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	10.08	0.235	1.83	33.00
+ ID2= 2 (0006):	8.80	0.206	1.83	33.00
ID = 3 (0007):	18.88	0.441	1.83	33.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.0012	0.7983
		0.0002	0.0493	0.0012	0.9272
		0.0004	0.1138	0.0013	1.0172
		0.0005	0.1731	0.0014	1.1836
		0.0007	0.2826	0.0015	1.2551
		0.0010	0.5436	0.8479	1.3965
		0.0011	0.6923	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0007)	18.880	0.441	1.83	33.00
OUTFLOW: ID= 1 (0008)	18.880	0.001	18.67	3.29
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.24
TIME SHIFT OF PEAK FLOW (min)=******
MAXIMUM STORAGE USED (ha.m.)= 0.6165

Junction Command(0031)

AREA QPEAK TPEAK R.V.

```
                          (ha)      (cms)     (hrs)     (mm)
  INFLOW : ID= 1(  0008)   18.88      0.00    18.67     3.29
  OUTFLOW: ID= 2(  0031)   18.88      0.00    18.67     3.29

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

  --------------------------
  | Junction Command(0038) |
  --------------------------

                           AREA      QPEAK    TPEAK     R.V.
                           (ha)      (cms)    (hrs)     (mm)
  INFLOW : ID= 3(  0008)    0.00      0.00     0.00      0.00
  OUTFLOW: ID= 2(  0038)    0.00      0.00     0.00      0.00

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

--------------------
| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)      (cms)     (hrs)      (mm)
*** W A R N I N G :  HYDROGRAPH   0038 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0031):    18.88    0.001    18.67     3.29
     + ID2= 2 (  0038):     0.00    0.000     0.00     0.00
       ==========================================================
       ID = 3 (  0033):    18.88    0.001    18.67     3.29

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

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)      (cms)     (hrs)      (mm)
*** W A R N I N G :  HYDROGRAPH   0005 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0006 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0009 <ID= 3> IS ALSO DRY
------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area     (ha)=   1.12
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.81         0.31
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      86.45        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
     TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
      hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
    0.083    1.53 | 1.083   19.60 | 2.083    4.48 |  3.08    1.89
    0.167    1.53 | 1.167   19.60 | 2.167    4.48 |  3.17    1.89
    0.250    1.81 | 1.250   85.72 | 2.250    3.65 |  3.25    1.73
    0.333    1.81 | 1.333   85.72 | 2.333    3.65 |  3.33    1.73
    0.417    2.22 | 1.417   26.59 | 2.417    3.08 |  3.42    1.59
    0.500    2.22 | 1.500   26.59 | 2.500    3.08 |  3.50    1.59
    0.583    2.87 | 1.583   12.64 | 2.583    2.66 |  3.58    1.47
    0.667    2.87 | 1.667   12.64 | 2.667    2.66 |  3.67    1.47
    0.750    4.06 | 1.750    7.99 | 2.750    2.34 |  3.75    1.37
    0.833    4.06 | 1.833    7.99 | 2.833    2.34 |  3.83    1.37
    0.917    6.86 | 1.917    5.76 | 2.917    2.10 |  3.92    1.29
    1.000    6.86 | 2.000    5.76 | 3.000    2.10 |  4.00    1.29

     Max.Eff.Inten.(mm/hr)=      85.72        25.86
               over (min)        5.00        15.00
     Storage Coeff.  (min)=     2.49 (ii)   14.61 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
```



```
     Unit Hyd. peak  (cms)=      0.29         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.19         0.01         0.196 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.50          1.33
     RUNOFF VOLUME    (mm)=     33.22        13.81         27.78
     TOTAL RAINFALL   (mm)=     34.22        34.22         34.22
     RUNOFF COEFFICIENT   =      0.97         0.40          0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0003)|   Area     (ha)=  24.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      24.40         0.25
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     405.36        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
     TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
      hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
    0.083    1.53 | 1.083   19.60 | 2.083    4.48 |  3.08    1.89
    0.167    1.53 | 1.167   19.60 | 2.167    4.48 |  3.17    1.89
    0.250    1.81 | 1.250   85.72 | 2.250    3.65 |  3.25    1.73
    0.333    1.81 | 1.333   85.72 | 2.333    3.65 |  3.33    1.73
    0.417    2.22 | 1.417   26.59 | 2.417    3.08 |  3.42    1.59
    0.500    2.22 | 1.500   26.59 | 2.500    3.08 |  3.50    1.59
    0.583    2.87 | 1.583   12.64 | 2.583    2.66 |  3.58    1.47
    0.667    2.87 | 1.667   12.64 | 2.667    2.66 |  3.67    1.47
    0.750    4.06 | 1.750    7.99 | 2.750    2.34 |  3.75    1.37
    0.833    4.06 | 1.833    7.99 | 2.833    2.34 |  3.83    1.37
    0.917    6.86 | 1.917    5.76 | 2.917    2.10 |  3.92    1.29
    1.000    6.86 | 2.000    5.76 | 3.000    2.10 |  4.00    1.29

     Max.Eff.Inten.(mm/hr)=      85.72        31.78
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     6.29 (ii)    7.49 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.19         0.13
                                                        *TOTALS*
     PEAK FLOW       (cms)=      4.86         0.02         4.870 (iii)
     TIME TO PEAK    (hrs)=      1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=     33.22        13.81         33.02
     TOTAL RAINFALL   (mm)=     34.22        34.22         34.22
     RUNOFF COEFFICIENT   =      0.97         0.40          0.97


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)      (cms)     (hrs)      (mm)
       ID1= 1 (  0003):    24.65    4.870     1.33     33.02
```

```
      + ID2= 2 (  0004):     1.12   0.196     1.33    27.78
        ==================================================
        ID = 3 (  0010):    25.77   5.066     1.33    32.80

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

--------------------
| ADD HYD  (  0010)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0009 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
        ID1= 3 (  0010):    25.77   5.066     1.33    32.80
      + ID2= 2 (  0009):     0.00   0.000     0.00     3.29
        ==================================================
        ID = 1 (  0010):    25.77   5.066     1.33    32.80

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0011)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                          0.0000     0.0000    |   0.8558     1.8346
                          0.0181     0.0734    |   0.9869     2.0518
                          0.0294     0.1515    |   1.1021     2.2728
                          0.0375     0.2343    |   1.3219     2.4978
                          0.0440     0.4206    |   1.6294     2.7268
                          0.0524     0.7083    |   2.1918     3.0780
                          0.0573     0.9048    |   2.5876     3.3173
                          0.0618     1.1049    |   4.2549     3.5359
                          0.2961     1.3087    |   7.6831     3.6846
                          0.6043     1.5162    |  12.5080     3.8377

                                AREA     QPEAK     TPEAK      R.V.
                                (ha)     (cms)     (hrs)      (mm)
   INFLOW : ID= 2 (  0010)     25.768     5.066      1.33     32.80
   OUTFLOW: ID= 1 (  0011)     25.768     0.054      4.08     32.76

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.07
                  TIME SHIFT OF PEAK FLOW          (min)=165.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7884
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0032)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
        ID1= 1 (  0011):    25.77   0.054     4.08    32.76
      + ID2= 2 (  0033):    18.88   0.001    18.67     3.29
        ==================================================
        ID = 3 (  0032):    44.65   0.055     4.08    20.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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5YR 4HR CHICAGO STORM SIMULATION

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  ************************************************
  ** SIMULATION : B_5yr 4hr 10min Chicago       **
  ************************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A=1593.000
| Ptotal= 49.55 mm |                           B=  11.000
--------------------                           C=   0.879
                        used in:   INTENSITY =  A / (t + B)^C

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

              TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
               hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
              0.00     2.35 |  1.00    30.47 |'  2.00     7.17 |  3.00     2.93
              0.17     2.80 |  1.17   109.68 |'  2.17     5.81 |  3.17     2.67
              0.33     3.46 |  1.33    40.71 |'  2.33     4.87 |  3.33     2.45
              0.50     4.52 |  1.50    20.28 |'  2.50     4.19 |  3.50     2.26
              0.67     6.48 |  1.67    12.91 |'  2.67     3.67 |  3.67     2.10
              0.83    11.07 |  1.83     9.28 |'  2.83     3.26 |  3.83     1.96

--------------------------------------------------------------------------------
--------------------
| CALIB            |
|  STANDHYD (  0001)|   Area     (ha)=  10.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=         9.98          0.10
     Dep. Storage     (mm)=         1.00          1.50
     Average Slope     (%)=         1.00          2.00
     Length            (m)=       259.23         40.00
     Mannings n          =        0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
               hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
             0.083     2.35 | 1.083    30.47 | 2.083     7.17 | 3.08     2.93
             0.167     2.35 | 1.167    30.47 | 2.167     7.17 | 3.17     2.93
             0.250     2.80 | 1.250   109.68 | 2.250     5.81 | 3.25     2.67
             0.333     2.80 | 1.333   109.68 | 2.333     5.81 | 3.33     2.67
             0.417     3.46 | 1.417    40.71 | 2.417     4.87 | 3.42     2.45
             0.500     3.46 | 1.500    40.71 | 2.500     4.87 | 3.50     2.45
             0.583     4.52 | 1.583    20.28 | 2.583     4.19 | 3.58     2.26
             0.667     4.52 | 1.667    20.28 | 2.667     4.19 | 3.67     2.26
             0.750     6.48 | 1.750    12.91 | 2.750     3.67 | 3.75     2.10
             0.833     6.48 | 1.833    12.91 | 2.833     3.67 | 3.83     2.10
             0.917    11.07 | 1.917     9.28 | 2.917     3.26 | 3.92     1.96
             1.000    11.07 | 2.000     9.28 | 3.000     3.26 | 4.00     1.96

     Max.Eff.Inten.(mm/hr)=      109.68         52.32
               over (min)          5.00         10.00
     Storage Coeff.  (min)=        4.36 (ii)     5.44 (ii)
     Unit Hyd. Tpeak (min)=        5.00         10.00
     Unit Hyd. peak  (cms)=        0.23          0.16
                                                      *TOTALS*
     PEAK FLOW        (cms)=        2.81          0.01          2.823 (iii)
     TIME TO PEAK     (hrs)=        1.33          1.42           1.33
     RUNOFF VOLUME     (mm)=       48.55         24.86          48.32
     TOTAL RAINFALL    (mm)=       49.55         49.55          49.55
     RUNOFF COEFFICIENT   =        0.98          0.50           0.98

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

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. 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(0005)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4230	0.4030

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	10.080	2.823	1.33	48.32
OUTFLOW: ID= 1 (0005)	10.080	0.338	1.92	48.29
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.96
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= 0.3221

CALIB		
STANDHYD (0002)	Area (ha)= 8.80	
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.71	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	242.21	40.00
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	2.35	1.083	30.47	2.083	7.17	3.08	2.93
0.167	2.35	1.167	30.47	2.167	7.17	3.17	2.93
0.250	2.80	1.250	109.68	2.250	5.81	3.25	2.67
0.333	2.80	1.333	109.68	2.333	5.81	3.33	2.67
0.417	3.46	1.417	40.71	2.417	4.87	3.42	2.45
0.500	3.46	1.500	40.71	2.500	4.87	3.50	2.45
0.583	4.52	1.583	20.28	2.583	4.19	3.58	2.26
0.667	4.52	1.667	20.28	2.667	4.19	3.67	2.26
0.750	6.48	1.750	12.91	2.750	3.67	3.75	2.10
0.833	6.48	1.833	12.91	2.833	3.67	3.83	2.10
0.917	11.07	1.917	9.28	2.917	3.26	3.92	1.96
1.000	11.07	2.000	9.28	3.000	3.26	4.00	1.96

Max.Eff.Inten.(mm/hr)=		109.68	52.32	
over (min)		5.00	10.00	
Storage Coeff. (min)=		4.19 (ii)	5.27 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.24	0.16	
				TOTALS
PEAK FLOW	(cms)=	2.47	0.01	2.483 (iii)
TIME TO PEAK	(hrs)=	1.33	1.42	1.33
RUNOFF VOLUME	(mm)=	48.55	24.86	48.32
TOTAL RAINFALL	(mm)=	49.55	49.55	49.55
RUNOFF COEFFICIENT	=	0.98	0.50	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0006)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.3700	0.3520

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	8.800	2.483	1.33	48.32
OUTFLOW: ID= 1 (0006)	8.800	0.295	1.92	48.29
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.88
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= 0.2812

ADD HYD (0007)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	10.08	0.338	1.92	48.29
+ ID2= 2 (0006):	8.80	0.295	1.92	48.29
ID = 3 (0007):	18.88	0.633	1.92	48.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0012	0.7983
	0.0002	0.0493	0.0012	0.9272
	0.0004	0.1138	0.0013	1.0172
	0.0005	0.1731	0.0014	1.1836
	0.0007	0.2826	0.0015	1.2551
	0.0010	0.5436	0.8479	1.3965
	0.0011	0.6923	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0007)	18.880	0.633	1.92	48.29
OUTFLOW: ID= 1 (0008)	18.880	0.001	19.25	3.80
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.20
TIME SHIFT OF PEAK FLOW (min)=******
MAXIMUM STORAGE USED (ha.m.)= 0.9038

Junction Command(0031)

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

```
 INFLOW : ID= 1(  0008)   18.88     0.00   19.25     3.80
 OUTFLOW: ID= 2(  0031)   18.88     0.00   19.25     3.80

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

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 | Junction Command(0038) |
 --------------------------

                          AREA     QPEAK   TPEAK     R.V.
                          (ha)     (cms)    (hrs)    (mm)
 INFLOW : ID= 3(  0008)    0.00     0.00    0.00     0.00
 OUTFLOW: ID= 2(  0038)    0.00     0.00    0.00     0.00

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

--------------------
| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0038 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
        ID1= 1 (  0031):    18.88   0.001    19.25     3.80
      + ID2= 2 (  0038):     0.00   0.000     0.00     0.00
        ==================================================
        ID = 3 (  0033):    18.88   0.001    19.25     3.80

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

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0005 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0006 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0009 <ID= 3> IS ALSO DRY
------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   1.12
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.81         0.31
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       1.00         2.00
    Length            (m)=      86.45        40.00
    Mannings n           =      0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
    TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
     hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
   0.083    2.35 | 1.083   30.47 | 2.083    7.17 | 3.08    2.93
   0.167    2.35 | 1.167   30.47 | 2.167    7.17 | 3.17    2.93
   0.250    2.80 | 1.250  109.68 | 2.250    5.81 | 3.25    2.67
   0.333    2.80 | 1.333  109.68 | 2.333    5.81 | 3.33    2.67
   0.417    3.46 | 1.417   40.71 | 2.417    4.87 | 3.42    2.45
   0.500    3.46 | 1.500   40.71 | 2.500    4.87 | 3.50    2.45
   0.583    4.52 | 1.583   20.28 | 2.583    4.19 | 3.58    2.26
   0.667    4.52 | 1.667   20.28 | 2.667    4.19 | 3.67    2.26
   0.750    6.48 | 1.750   12.91 | 2.750    3.67 | 3.75    2.10
   0.833    6.48 | 1.833   12.91 | 2.833    3.67 | 3.83    2.10
   0.917   11.07 | 1.917    9.28 | 2.917    3.26 | 3.92    1.96
   1.000   11.07 | 2.000    9.28 | 3.000    3.26 | 4.00    1.96

    Max.Eff.Inten.(mm/hr)=     109.68        52.32
              over (min)         5.00        10.00
    Storage Coeff.  (min)=       2.26 (ii)    6.92 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.30         0.14
```



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                                                          *TOTALS*
    PEAK FLOW        (cms)=       0.24         0.03          0.272 (iii)
    TIME TO PEAK     (hrs)=       1.33         1.42           1.33
    RUNOFF VOLUME     (mm)=      48.55        24.86          41.92
    TOTAL RAINFALL    (mm)=      49.55        49.55          49.55
    RUNOFF COEFFICIENT   =       0.98         0.50           0.85

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0003)|   Area    (ha)=  24.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      24.40         0.25
    Dep. Storage     (mm)=       1.00         1.50
    Average Slope     (%)=       1.00         2.00
    Length            (m)=     405.36        40.00
    Mannings n           =      0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
    TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
     hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
   0.083    2.35 | 1.083   30.47 | 2.083    7.17 | 3.08    2.93
   0.167    2.35 | 1.167   30.47 | 2.167    7.17 | 3.17    2.93
   0.250    2.80 | 1.250  109.68 | 2.250    5.81 | 3.25    2.67
   0.333    2.80 | 1.333  109.68 | 2.333    5.81 | 3.33    2.67
   0.417    3.46 | 1.417   40.71 | 2.417    4.87 | 3.42    2.45
   0.500    3.46 | 1.500   40.71 | 2.500    4.87 | 3.50    2.45
   0.583    4.52 | 1.583   20.28 | 2.583    4.19 | 3.58    2.26
   0.667    4.52 | 1.667   20.28 | 2.667    4.19 | 3.67    2.26
   0.750    6.48 | 1.750   12.91 | 2.750    3.67 | 3.75    2.10
   0.833    6.48 | 1.833   12.91 | 2.833    3.67 | 3.83    2.10
   0.917   11.07 | 1.917    9.28 | 2.917    3.26 | 3.92    1.96
   1.000   11.07 | 2.000    9.28 | 3.000    3.26 | 4.00    1.96

    Max.Eff.Inten.(mm/hr)=     109.68        52.32
              over (min)         5.00        10.00
    Storage Coeff.  (min)=       5.70 (ii)    6.78 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.20         0.14
                                                          *TOTALS*
    PEAK FLOW        (cms)=       6.46         0.03          6.486 (iii)
    TIME TO PEAK     (hrs)=       1.33         1.42           1.33
    RUNOFF VOLUME     (mm)=      48.55        24.86          48.32
    TOTAL RAINFALL    (mm)=      49.55        49.55          49.55
    RUNOFF COEFFICIENT   =       0.98         0.50           0.98


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
        ID1= 1 (  0003):    24.65   6.486     1.33    48.32
      + ID2= 2 (  0004):     1.12   0.272     1.33    41.92
```

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       ================================================
       ID = 3 (  0010):    25.77   6.758     1.33    48.04

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

--------------------
| ADD HYD  (  0010)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0009 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
       ID1= 3 (  0010):    25.77   6.758     1.33    48.04
     + ID2= 2 (  0009):     0.00   0.000     0.00     3.80
       ================================================
       ID = 1 (  0010):    25.77   6.758     1.33    48.04

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0011)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE     |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)     |   (cms)     (ha.m.)
                          0.0000     0.0000     |   0.8558     1.8346
                          0.0181     0.0734     |   0.9869     2.0518
                          0.0294     0.1515     |   1.1021     2.2728
                          0.0375     0.2343     |   1.3219     2.4978
                          0.0440     0.4206     |   1.6294     2.7268
                          0.0524     0.7083     |   2.1918     3.0780
                          0.0573     0.9048     |   2.5876     3.3173
                          0.0618     1.1049     |   4.2549     3.5359
                          0.2961     1.3087     |   7.6831     3.6846
                          0.6043     1.5162     |  12.5080     3.8377

                              AREA      QPEAK      TPEAK       R.V.
                               (ha)      (cms)      (hrs)       (mm)
   INFLOW : ID= 2 (  0010)     25.768      6.758      1.33      48.04
   OUTFLOW: ID= 1 (  0011)     25.768      0.117      4.00      48.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.73
                  TIME SHIFT OF PEAK FLOW          (min)=160.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.1531

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

--------------------
| ADD HYD  (  0032)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0011):    25.77   0.117     4.00    48.00
     + ID2= 2 (  0033):    18.88   0.001    19.25     3.80
       ================================================
       ID = 3 (  0032):    44.65   0.118     4.00    29.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
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10YR 4HR CHICAGO STORM SIMULATION

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  ***********************************************
  ** SIMULATION : C_10yr 4hr 10min Chicago      **
  ***********************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A=2221.000
| Ptotal= 58.62 mm |                           B=  12.000
--------------------                           C=   0.908
                          used in:   INTENSITY =  A / (t + B)^C

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

              TIME    RAIN  |  TIME    RAIN  |'  TIME    RAIN  |  TIME    RAIN
               hrs   mm/hr  |   hrs   mm/hr  |'   hrs   mm/hr  |   hrs   mm/hr
              0.00    2.39  |  1.00   37.17  |'  2.00    8.06  |  3.00    3.05
              0.17    2.89  |  1.17  134.16  |'  2.17    6.42  |  3.17    2.75
              0.33    3.65  |  1.33   50.03  |'  2.33    5.30  |  3.33    2.50
              0.50    4.89  |  1.50   24.37  |'  2.50    4.50  |  3.50    2.29
              0.67    7.23  |  1.67   15.14  |'  2.67    3.89  |  3.67    2.11
              0.83   12.87  |  1.83   10.64  |'  2.83    3.42  |  3.83    1.96

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0001)|   Area    (ha)=  10.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.98         0.10
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     259.23        40.00
     Mannings n           =      0.013        0.250

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

                              ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN  |  TIME    RAIN  |'  TIME    RAIN  |  TIME    RAIN
               hrs   mm/hr  |   hrs   mm/hr  |'   hrs   mm/hr  |   hrs   mm/hr
             0.083    2.39  | 1.083   37.17  | 2.083    8.06  | 3.08     3.05
             0.167    2.39  | 1.167   37.17  | 2.167    8.06  | 3.17     3.05
             0.250    2.89  | 1.250  134.16  | 2.250    6.42  | 3.25     2.75
             0.333    2.89  | 1.333  134.16  | 2.333    6.42  | 3.33     2.75
             0.417    3.65  | 1.417   50.03  | 2.417    5.30  | 3.42     2.50
             0.500    3.65  | 1.500   50.03  | 2.500    5.30  | 3.50     2.50
             0.583    4.89  | 1.583   24.37  | 2.583    4.50  | 3.58     2.29
             0.667    4.89  | 1.667   24.37  | 2.667    4.50  | 3.67     2.29
             0.750    7.23  | 1.750   15.14  | 2.750    3.89  | 3.75     2.11
             0.833    7.23  | 1.833   15.14  | 2.833    3.89  | 3.83     2.11
             0.917   12.87  | 1.917   10.64  | 2.917    3.42  | 3.92     1.96
             1.000   12.87  | 2.000   10.64  | 3.000    3.42  | 4.00     1.96

     Max.Eff.Inten.(mm/hr)=     134.16        71.15
           over (min)             5.00        10.00
     Storage Coeff.  (min)=       4.02 (ii)    5.02 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.24         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=       3.49         0.02       3.505 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42         1.33
     RUNOFF VOLUME    (mm)=      57.62        32.00        57.36
     TOTAL RAINFALL   (mm)=      58.62        58.62        58.62
     RUNOFF COEFFICIENT   =       0.98         0.55         0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
```

CN* = 85.0 Ia = Dep. 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(0005) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.4230	0.4030

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	10.080	3.505	1.33	57.36
OUTFLOW: ID= 1 (0005)	10.080	0.409	1.83	57.34
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.68
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.3906

CALIB STANDHYD (0002) ID= 1 DT= 5.0 min	Area (ha)= 8.80 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	8.71	0.09
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	242.21	40.00
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	2.39	1.083	37.17	2.083	8.06	3.08	3.05
0.167	2.39	1.167	37.17	2.167	8.06	3.17	3.05
0.250	2.89	1.250	134.16	2.250	6.42	3.25	2.75
0.333	2.89	1.333	134.16	2.333	6.42	3.33	2.75
0.417	3.65	1.417	50.03	2.417	5.30	3.42	2.50
0.500	3.65	1.500	50.03	2.500	5.30	3.50	2.50
0.583	4.89	1.583	24.37	2.583	4.50	3.58	2.29
0.667	4.89	1.667	24.37	2.667	4.50	3.67	2.29
0.750	7.23	1.750	15.14	2.750	3.89	3.75	2.11
0.833	7.23	1.833	15.14	2.833	3.89	3.83	2.11
0.917	12.87	1.917	10.64	2.917	3.42	3.92	1.96
1.000	12.87	2.000	10.64	3.000	3.42	4.00	1.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	134.16	71.15	
over (min)	5.00	5.00	
Storage Coeff. (min)=	3.86 (ii)	4.86 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.25	0.22	
PEAK FLOW (cms)=	3.07	0.02	3.084 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	57.62	32.00	57.36
TOTAL RAINFALL (mm)=	58.62	58.62	58.62
RUNOFF COEFFICIENT =	0.98	0.55	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 85.0 Ia = Dep. 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(0006) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.3700	0.3520

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	8.800	3.084	1.33	57.36
OUTFLOW: ID= 1 (0006)	8.800	0.358	1.83	57.33
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.61
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.3410

ADD HYD (0007) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	10.08	0.409	1.83	57.34
+ ID2= 2 (0006):	8.80	0.358	1.83	57.33
ID = 3 (0007):	18.88	0.767	1.83	57.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.0012	0.7983
		0.0002	0.0493	0.0012	0.9272
		0.0004	0.1138	0.0013	1.0172
		0.0005	0.1731	0.0014	1.1836
		0.0007	0.2826	0.0015	1.2551
		0.0010	0.5436	0.8479	1.3965
		0.0011	0.6923	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0007)	18.880	0.767	1.83	57.33
OUTFLOW: ID= 1 (0008)	18.880	0.001	19.42	4.15
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.18
TIME SHIFT OF PEAK FLOW (min)=******
MAXIMUM STORAGE USED (ha.m.)= 1.0737

Junction Command(0031)

	AREA	QPEAK	TPEAK	R.V.

```
                          (ha)      (cms)     (hrs)     (mm)
  INFLOW : ID= 1(  0008)   18.88      0.00    19.42     4.15
  OUTFLOW: ID= 2(  0031)   18.88      0.00    19.42     4.15

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

  --------------------------
  | Junction Command(0038) |
  --------------------------

                           AREA      QPEAK    TPEAK     R.V.
                           (ha)      (cms)    (hrs)     (mm)
  INFLOW : ID= 3(  0008)    0.00      0.00     0.00      0.00
  OUTFLOW: ID= 2(  0038)    0.00      0.00     0.00      0.00

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

--------------------
| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)      (cms)     (hrs)      (mm)
*** W A R N I N G :  HYDROGRAPH   0038 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
        ID1= 1 (  0031):    18.88    0.001     19.42      4.15
      + ID2= 2 (  0038):     0.00    0.000      0.00      0.00
        ==================================================
        ID = 3 (  0033):    18.88    0.001     19.42      4.15

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

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)      (cms)     (hrs)      (mm)
*** W A R N I N G :  HYDROGRAPH   0005 <ID= 1> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0006 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0009 <ID= 3> IS ALSO DRY
------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   1.12
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.81         0.31
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      86.45        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
    TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
     hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
   0.083    2.39 | 1.083   37.17 | 2.083    8.06 |  3.08    3.05
   0.167    2.39 | 1.167   37.17 | 2.167    8.06 |  3.17    3.05
   0.250    2.89 | 1.250  134.16 | 2.250    6.42 |  3.25    2.75
   0.333    2.89 | 1.333  134.16 | 2.333    6.42 |  3.33    2.75
   0.417    3.65 | 1.417   50.03 | 2.417    5.30 |  3.42    2.50
   0.500    3.65 | 1.500   50.03 | 2.500    5.30 |  3.50    2.50
   0.583    4.89 | 1.583   24.37 | 2.583    4.50 |  3.58    2.29
   0.667    4.89 | 1.667   24.37 | 2.667    4.50 |  3.67    2.29
   0.750    7.23 | 1.750   15.14 | 2.750    3.89 |  3.75    2.11
   0.833    7.23 | 1.833   15.14 | 2.833    3.89 |  3.83    2.11
   0.917   12.87 | 1.917   10.64 | 2.917    3.42 |  3.92    1.96
   1.000   12.87 | 2.000   10.64 | 3.000    3.42 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     134.16        71.15
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.08 (ii)    6.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
```



```
     Unit Hyd. peak  (cms)=       0.31         0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.30         0.05          0.339 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      57.62        32.00         50.44
     TOTAL RAINFALL   (mm)=      58.62        58.62         58.62
     RUNOFF COEFFICIENT   =       0.98         0.55          0.86

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0003)|   Area    (ha)=  24.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      24.40         0.25
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     405.36        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
    TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
     hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
   0.083    2.39 | 1.083   37.17 | 2.083    8.06 |  3.08    3.05
   0.167    2.39 | 1.167   37.17 | 2.167    8.06 |  3.17    3.05
   0.250    2.89 | 1.250  134.16 | 2.250    6.42 |  3.25    2.75
   0.333    2.89 | 1.333  134.16 | 2.333    6.42 |  3.33    2.75
   0.417    3.65 | 1.417   50.03 | 2.417    5.30 |  3.42    2.50
   0.500    3.65 | 1.500   50.03 | 2.500    5.30 |  3.50    2.50
   0.583    4.89 | 1.583   24.37 | 2.583    4.50 |  3.58    2.29
   0.667    4.89 | 1.667   24.37 | 2.667    4.50 |  3.67    2.29
   0.750    7.23 | 1.750   15.14 | 2.750    3.89 |  3.75    2.11
   0.833    7.23 | 1.833   15.14 | 2.833    3.89 |  3.83    2.11
   0.917   12.87 | 1.917   10.64 | 2.917    3.42 |  3.92    1.96
   1.000   12.87 | 2.000   10.64 | 3.000    3.42 |  4.00    1.96

     Max.Eff.Inten.(mm/hr)=     134.16        71.15
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       5.26 (ii)    6.26 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.21         0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=       8.07         0.04          8.105 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42          1.33
     RUNOFF VOLUME    (mm)=      57.62        32.00         57.36
     TOTAL RAINFALL   (mm)=      58.62        58.62         58.62
     RUNOFF COEFFICIENT   =       0.98         0.55          0.98


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)      (cms)     (hrs)      (mm)
        ID1= 1 (  0003):    24.65    8.105     1.33      57.36
```

```
      + ID2= 2 (  0004):     1.12   0.339     1.33    50.44
        ==================================================
        ID = 3 (  0010):    25.77   8.445     1.33    57.06

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

--------------------
| ADD HYD  (  0010)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
*** W A R N I N G :  HYDROGRAPH   0009 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0001 = HYDROGRAPH 0003
        ID1= 3 (  0010):    25.77   8.445     1.33    57.06
      + ID2= 2 (  0009):     0.00   0.000     0.00     4.15
        ==================================================
        ID = 1 (  0010):    25.77   8.445     1.33    57.06

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0011)|     OVERFLOW IS OFF
|  IN= 2---> OUT= 1|
|  DT=  5.0 min    |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                          0.0000     0.0000    |   0.8558     1.8346
                          0.0181     0.0734    |   0.9869     2.0518
                          0.0294     0.1515    |   1.1021     2.2728
                          0.0375     0.2343    |   1.3219     2.4978
                          0.0440     0.4206    |   1.6294     2.7268
                          0.0524     0.7083    |   2.1918     3.0780
                          0.0573     0.9048    |   2.5876     3.3173
                          0.0618     1.1049    |   4.2549     3.5359
                          0.2961     1.3087    |   7.6831     3.6846
                          0.6043     1.5162    |  12.5080     3.8377

                                AREA     QPEAK     TPEAK      R.V.
                                (ha)     (cms)     (hrs)      (mm)
   INFLOW : ID= 2 (  0010)     25.768     8.445      1.33     57.06
   OUTFLOW: ID= 1 (  0011)     25.768     0.266      2.92     57.02

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.15
                  TIME SHIFT OF PEAK FLOW          (min)= 95.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.2826
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0032)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0011):    25.77   0.266     2.92    57.02
      + ID2= 2 (  0033):    18.88   0.001    19.42     4.15
        ==================================================
        ID = 3 (  0032):    44.65   0.267     2.92    34.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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================================================================================================================
25YR 4HR CHICAGO STORM SIMULATION
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  ***********************************************
  ** SIMULATION : D_25yr 4hr 10min Chicago      **
  ***********************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A=3158.000
| Ptotal= 71.59 mm |                           B=  15.000
--------------------                           C=   0.933
                          used in:   INTENSITY =  A / (t + B)^C

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

          TIME    RAIN  |  TIME    RAIN  |'  TIME    RAIN  |  TIME    RAIN
           hrs   mm/hr  |   hrs   mm/hr  |'   hrs   mm/hr  |   hrs   mm/hr
          0.00    2.68  |  1.00   47.76  |   2.00   10.11  |  3.00    3.51
          0.17    3.31  |  1.17  156.47  |   2.17    7.92  |  3.17    3.13
          0.33    4.28  |  1.33   63.86  |   2.33    6.44  |  3.33    2.81
          0.50    5.90  |  1.50   31.72  |   2.50    5.38  |  3.50    2.55
          0.67    9.00  |  1.67   19.56  |   2.67    4.59  |  3.67    2.33
          0.83   16.53  |  1.83   13.56  |   2.83    3.99  |  3.83    2.15

----------------------------------------------------------------------------------------------------------------
--------------------
| CALIB            |
|  STANDHYD (  0001)|   Area    (ha)=  10.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.98          0.10
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     259.23         40.00
     Mannings n           =      0.013         0.250

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

                              ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN  |  TIME    RAIN  |'  TIME    RAIN  |  TIME    RAIN
           hrs   mm/hr  |   hrs   mm/hr  |'   hrs   mm/hr  |   hrs   mm/hr
         0.083    2.68  | 1.083   47.76  | 2.083   10.11  |  3.08    3.51
         0.167    2.68  | 1.167   47.76  | 2.167   10.11  |  3.17    3.51
         0.250    3.31  | 1.250  156.47  | 2.250    7.92  |  3.25    3.13
         0.333    3.31  | 1.333  156.47  | 2.333    7.92  |  3.33    3.13
         0.417    4.28  | 1.417   63.86  | 2.417    6.44  |  3.42    2.81
         0.500    4.28  | 1.500   63.86  | 2.500    6.44  |  3.50    2.81
         0.583    5.90  | 1.583   31.72  | 2.583    5.38  |  3.58    2.55
         0.667    5.90  | 1.667   31.72  | 2.667    5.38  |  3.67    2.55
         0.750    9.00  | 1.750   19.56  | 2.750    4.59  |  3.75    2.33
         0.833    9.00  | 1.833   19.56  | 2.833    4.59  |  3.83    2.33
         0.917   16.53  | 1.917   13.56  | 2.917    3.99  |  3.92    2.15
         1.000   16.53  | 2.000   13.56  | 3.000    3.99  |  4.00    2.15

     Max.Eff.Inten.(mm/hr)=     156.47         92.44
           over (min)           5.00          5.00
     Storage Coeff.  (min)=     3.78 (ii)     4.72 (ii)
     Unit Hyd. Tpeak (min)=     5.00          5.00
     Unit Hyd. peak  (cms)=     0.25          0.22
                                                      *TOTALS*
     PEAK FLOW       (cms)=     4.12          0.02        4.143 (iii)
     TIME TO PEAK    (hrs)=     1.33          1.33         1.33
     RUNOFF VOLUME    (mm)=    70.59         42.75        70.31
     TOTAL RAINFALL   (mm)=    71.59         71.59        71.59
     RUNOFF COEFFICIENT   =     0.99          0.60         0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
```

CN* = 85.0 Ia = Dep. 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(0005) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.4230	0.4030

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	10.080	4.143	1.33	70.31
OUTFLOW: ID= 1 (0005)	8.611	0.423	1.50	72.21
OVERFLOW:ID= 3 (0003)	1.469	1.851	1.50	72.21

TOTAL NUMBER OF SIMULATION OVERFLOW = 6
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.50
PERCENTAGE OF TIME OVERFLOWING (%) = 2.22

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.21
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= 0.4030

CALIB STANDHYD (0002) ID= 1 DT= 5.0 min	Area (ha)= 8.80 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.71	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	242.21	40.00
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	2.68	1.083	47.76	2.083	10.11	3.08	3.51
0.167	2.68	1.167	47.76	2.167	10.11	3.17	3.51
0.250	3.31	1.250	156.47	2.250	7.92	3.25	3.13
0.333	3.31	1.333	156.47	2.333	7.92	3.33	3.13
0.417	4.28	1.417	63.86	2.417	6.44	3.42	2.81
0.500	4.28	1.500	63.86	2.500	6.44	3.50	2.81
0.583	5.90	1.583	31.72	2.583	5.38	3.58	2.55
0.667	5.90	1.667	31.72	2.667	5.38	3.67	2.55
0.750	9.00	1.750	19.56	2.750	4.59	3.75	2.33
0.833	9.00	1.833	19.56	2.833	4.59	3.83	2.33
0.917	16.53	1.917	13.56	2.917	3.99	3.92	2.15
1.000	16.53	2.000	13.56	3.000	3.99	4.00	2.15

Max.Eff.Inten.(mm/hr)=		156.47	92.44	
over (min)		5.00	5.00	
Storage Coeff. (min)=		3.63 (ii)	4.57 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.25	0.23	
				TOTALS
PEAK FLOW	(cms)=	3.62	0.02	3.638 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	70.59	42.75	70.31
TOTAL RAINFALL	(mm)=	71.59	71.59	71.59
RUNOFF COEFFICIENT	=	0.99	0.60	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 85.0 Ia = Dep. 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(0006) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.3700	0.3520

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	8.800	3.638	1.33	70.31
OUTFLOW: ID= 1 (0006)	7.554	0.370	1.50	71.90
OVERFLOW:ID= 3 (0003)	1.246	1.558	1.50	71.90

TOTAL NUMBER OF SIMULATION OVERFLOW = 6
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.50
PERCENTAGE OF TIME OVERFLOWING (%) = 2.26

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.17
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= 0.3520

ADD HYD (0007) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	8.61	0.423	1.50	72.21
+ ID2= 2 (0006):	7.55	0.370	1.50	71.90
ID = 3 (0007):	16.16	0.793	1.50	72.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.0012	0.7983
		0.0002	0.0493	0.0012	0.9272
		0.0004	0.1138	0.0013	1.0172
		0.0005	0.1731	0.0014	1.1836
		0.0007	0.2826	0.0015	1.2551
		0.0010	0.5436	0.8479	1.3965
		0.0011	0.6923	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0007)	16.165	0.793	1.50	72.06
OUTFLOW: ID= 1 (0008)	16.165	0.001	19.50	5.07
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.18
TIME SHIFT OF PEAK FLOW (min)=******
MAXIMUM STORAGE USED (ha.m.)= 1.1557

Junction Command(0031)

	AREA	QPEAK	TPEAK	R.V.

```
                          (ha)      (cms)     (hrs)     (mm)
  INFLOW : ID= 1(  0008)   16.16     0.00   19.50      5.07
  OUTFLOW: ID= 2(  0031)   16.16     0.00   19.50      5.07

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

  --------------------------
  | Junction Command(0038) |
  --------------------------

                           AREA      QPEAK    TPEAK     R.V.
                           (ha)      (cms)    (hrs)     (mm)
  INFLOW : ID= 3(  0008)    0.00      0.00     0.00      0.00
  OUTFLOW: ID= 2(  0038)    0.00      0.00     0.00      0.00

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| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
*** W A R N I N G :  HYDROGRAPH   0038 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0031):    16.16    0.001     19.50      5.07
     + ID2= 2 (  0038):     0.00    0.000      0.00      0.00
       ==========================================================
       ID = 3 (  0033):    16.16    0.001     19.50      5.07

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
       ID1= 1 (  0005):     1.47     1.851      1.50     72.21
     + ID2= 2 (  0006):     1.25     1.558      1.50     71.90
       ==================================================
       ID = 3 (  0009):     2.72     3.409      1.50     72.07

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| STANDHYD (  0004)|   Area     (ha)=   1.12
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.81         0.31
    Dep. Storage     (mm)=      1.00         1.50
    Average Slope     (%)=      1.00         2.00
    Length            (m)=     86.45        40.00
    Mannings n           =     0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
    TIME     RAIN  |  TIME     RAIN  |'  TIME     RAIN  |  TIME     RAIN
     hrs    mm/hr  |   hrs    mm/hr  |'   hrs    mm/hr  |   hrs    mm/hr
   0.083     2.68  | 1.083    47.76  | 2.083    10.11  |  3.08     3.51
   0.167     2.68  | 1.167    47.76  | 2.167    10.11  |  3.17     3.51
   0.250     3.31  | 1.250   156.47  | 2.250     7.92  |  3.25     3.13
   0.333     3.31  | 1.333   156.47  | 2.333     7.92  |  3.33     3.13
   0.417     4.28  | 1.417    63.86  | 2.417     6.44  |  3.42     2.81
   0.500     4.28  | 1.500    63.86  | 2.500     6.44  |  3.50     2.81
   0.583     5.90  | 1.583    31.72  | 2.583     5.38  |  3.58     2.55
   0.667     5.90  | 1.667    31.72  | 2.667     5.38  |  3.67     2.55
   0.750     9.00  | 1.750    19.56  | 2.750     4.59  |  3.75     2.33
   0.833     9.00  | 1.833    19.56  | 2.833     4.59  |  3.83     2.33
   0.917    16.53  | 1.917    13.56  | 2.917     3.99  |  3.92     2.15
   1.000    16.53  | 2.000    13.56  | 3.000     3.99  |  4.00     2.15

    Max.Eff.Inten.(mm/hr)=    156.47        92.44
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            over (min)        5.00       10.00
     Storage Coeff.  (min)=    1.96 (ii)    6.00 (ii)
     Unit Hyd. Tpeak (min)=    5.00       10.00
     Unit Hyd. peak  (cms)=    0.31        0.15
                                                  *TOTALS*
     PEAK FLOW       (cms)=    0.35        0.06        0.404 (iii)
     TIME TO PEAK    (hrs)=    1.33        1.42        1.33
     RUNOFF VOLUME    (mm)=   70.59       42.75       62.79
     TOTAL RAINFALL   (mm)=   71.59       71.59       71.59
     RUNOFF COEFFICIENT   =    0.99        0.60        0.88

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0003)|   Area     (ha)=  24.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     24.40        0.25
     Dep. Storage     (mm)=      1.00        1.50
     Average Slope     (%)=      1.00        2.00
     Length            (m)=    405.36       40.00
     Mannings n           =     0.013       0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
    TIME     RAIN  |  TIME     RAIN  |'  TIME     RAIN  |  TIME     RAIN
     hrs    mm/hr  |   hrs    mm/hr  |'   hrs    mm/hr  |   hrs    mm/hr
   0.083     2.68  | 1.083    47.76  | 2.083    10.11  |  3.08     3.51
   0.167     2.68  | 1.167    47.76  | 2.167    10.11  |  3.17     3.51
   0.250     3.31  | 1.250   156.47  | 2.250     7.92  |  3.25     3.13
   0.333     3.31  | 1.333   156.47  | 2.333     7.92  |  3.33     3.13
   0.417     4.28  | 1.417    63.86  | 2.417     6.44  |  3.42     2.81
   0.500     4.28  | 1.500    63.86  | 2.500     6.44  |  3.50     2.81
   0.583     5.90  | 1.583    31.72  | 2.583     5.38  |  3.58     2.55
   0.667     5.90  | 1.667    31.72  | 2.667     5.38  |  3.67     2.55
   0.750     9.00  | 1.750    19.56  | 2.750     4.59  |  3.75     2.33
   0.833     9.00  | 1.833    19.56  | 2.833     4.59  |  3.83     2.33
   0.917    16.53  | 1.917    13.56  | 2.917     3.99  |  3.92     2.15
   1.000    16.53  | 2.000    13.56  | 3.000     3.99  |  4.00     2.15

    Max.Eff.Inten.(mm/hr)=    156.47        92.44
            over (min)        5.00       10.00
     Storage Coeff.  (min)=    4.95 (ii)    5.89 (ii)
     Unit Hyd. Tpeak (min)=    5.00       10.00
     Unit Hyd. peak  (cms)=    0.22        0.15
                                                  *TOTALS*
     PEAK FLOW       (cms)=    9.59        0.05        9.635 (iii)
     TIME TO PEAK    (hrs)=    1.33        1.42        1.33
     RUNOFF VOLUME    (mm)=   70.59       42.75       70.31
     TOTAL RAINFALL   (mm)=   71.59       71.59       71.59
     RUNOFF COEFFICIENT   =    0.99        0.60        0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ADD HYD (0010) |
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0003):	24.65	9.635	1.33	70.31
+ ID2= 2 (0004):	1.12	0.404	1.33	62.79
ID = 3 (0010):	25.77	10.039	1.33	69.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0010) |
| 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0010):	25.77	10.039	1.33	69.98
+ ID2= 2 (0009):	2.72	3.409	1.50	72.07
ID = 1 (0010):	28.48	10.039	1.33	70.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(0011) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.8558	1.8346
0.0181	0.0734	0.9869	2.0518
0.0294	0.1515	1.1021	2.2728
0.0375	0.2343	1.3219	2.4978
0.0440	0.4206	1.6294	2.7268
0.0524	0.7083	2.1918	3.0780
0.0573	0.9048	2.5876	3.3173
0.0618	1.1049	4.2549	3.5359
0.2961	1.3087	7.6831	3.6846
0.6043	1.5162	12.5080	3.8377

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0010)	28.483	10.039	1.33	70.18
OUTFLOW: ID= 1 (0011)	28.483	0.696	2.25	70.15

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.93
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 1.6332

| ADD HYD (0032) |
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0011):	28.48	0.696	2.25	70.15
+ ID2= 2 (0033):	16.16	0.001	19.50	5.07
ID = 3 (0032):	44.65	0.697	2.25	46.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

50YR 4HR CHICAGO STORM SIMULATION

** SIMULATION : E_50yr 4hr 10min Chicago **

| CHICAGO STORM |
| Ptotal= 80.32 mm |

IDF curve parameters: A=3886.000
B= 16.000
C= 0.950
used in: INTENSITY = A / (t + B)^C

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.76	1.00	54.62	2.00	11.20	3.00	3.68
0.17	3.46	1.17	176.19	2.17	8.68	3.17	3.25
0.33	4.54	1.33	73.10	2.33	6.99	3.33	2.91
0.50	6.37	1.50	36.22	2.50	5.78	3.50	2.62
0.67	9.92	1.67	22.14	2.67	4.89	3.67	2.38
0.83	18.63	1.83	15.18	2.83	4.21	3.83	2.18

| CALIB |
| STANDHYD (0001) |
| ID= 1 DT= 5.0 min |

Area (ha)= 10.08
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	9.98	0.10
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	259.23	40.00
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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

				TOTALS
Max.Eff.Inten.(mm/hr)=		176.19	110.25	
over (min)		5.00	5.00	
Storage Coeff.	(min)=	3.61 (ii)	4.50 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	5.00	
Unit Hyd. peak	(cms)=	0.25	0.23	
PEAK FLOW	(cms)=	4.67	0.03	4.699 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	79.32	50.25	79.03
TOTAL RAINFALL	(mm)=	80.32	80.32	80.32
RUNOFF COEFFICIENT	=	0.99	0.63	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0005) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.4230	0.4030

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	10.080	4.699	1.33	79.03
OUTFLOW: ID= 1 (0005)	7.556	0.423	1.42	83.88
OVERFLOW:ID= 3 (0003)	2.524	3.105	1.42	83.88

TOTAL NUMBER OF SIMULATION OVERFLOW = 8
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.67
PERCENTAGE OF TIME OVERFLOWING (%) = 2.95

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.00
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= 0.4030

CALIB STANDHYD (0002) ID= 1 DT= 5.0 min	Area (ha)= 8.80 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	8.71	0.09
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	242.21	40.00
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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

			TOTALS
Max.Eff.Inten.(mm/hr)=	176.19	110.25	
over (min)	5.00	5.00	
Storage Coeff. (min)=	3.46 (ii)	4.36 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.26	0.23	
PEAK FLOW (cms)=	4.10	0.03	4.123 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	79.32	50.25	79.03
TOTAL RAINFALL (mm)=	80.32	80.32	80.32
RUNOFF COEFFICIENT =	0.99	0.63	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0006) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.3700	0.3520

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	8.800	4.123	1.33	79.03
OUTFLOW: ID= 1 (0006)	6.643	0.370	1.42	83.32
OVERFLOW:ID= 3 (0003)	2.157	2.601	1.42	83.32

TOTAL NUMBER OF SIMULATION OVERFLOW = 8
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.67
PERCENTAGE OF TIME OVERFLOWING (%) = 3.01

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.97
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= 0.3520

ADD HYD (0007) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	7.56	0.423	1.42	83.88
+ ID2= 2 (0006):	6.64	0.370	1.42	83.32
ID = 3 (0007):	14.20	0.793	1.42	83.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0012	0.7983
	0.0002	0.0493	0.0012	0.9272
	0.0004	0.1138	0.0013	1.0172
	0.0005	0.1731	0.0014	1.1836
	0.0007	0.2826	0.0015	1.2551
	0.0010	0.5436	0.8479	1.3965
	0.0011	0.6923	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0007)	14.199	0.793	1.42	83.62
OUTFLOW: ID= 1 (0008)	14.199	0.001	19.50	5.84
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.18
TIME SHIFT OF PEAK FLOW (min)=******
MAXIMUM STORAGE USED (ha.m.)= 1.1779

Junction Command(0031)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 1(0008)	14.20	0.00	19.50	5.84
OUTFLOW: ID= 2(0031)	14.20	0.00	19.50	5.84

Junction Command(0038)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 3(0008)	0.00	0.00	0.00	0.00
OUTFLOW: ID= 2(0038)	0.00	0.00	0.00	0.00

ADD HYD (0033)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
*** W A R N I N G : HYDROGRAPH 0038 <ID= 2> IS DRY.				
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001				
ID1= 1 (0031):	14.20	0.001	19.50	5.84
+ ID2= 2 (0038):	0.00	0.000	0.00	0.00
ID = 3 (0033):	14.20	0.001	19.50	5.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0009)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	2.52	3.105	1.42	83.88
+ ID2= 2 (0006):	2.16	2.601	1.42	83.32
ID = 3 (0009):	4.68	5.706	1.42	83.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0004) | Area (ha)= 1.12
ID= 1 DT= 5.0 min | Total Imp(%)= 72.00 Dir. Conn.(%)= 72.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.81	0.31
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	86.45	40.00
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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Max.Eff.Inten.(mm/hr)=	176.19	110.25	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.87 (ii)	5.72 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.15	
			TOTALS
PEAK FLOW (cms)=	0.39	0.08	0.461 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	79.32	50.25	71.17
TOTAL RAINFALL (mm)=	80.32	80.32	80.32
RUNOFF COEFFICIENT =	0.99	0.63	0.89

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0003) | Area (ha)= 24.65
ID= 1 DT= 5.0 min | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	24.40	0.25
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	405.36	40.00
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	2.76	1.083	54.62	2.083	11.20	3.08	3.68
0.167	2.76	1.167	54.62	2.167	11.20	3.17	3.68
0.250	3.46	1.250	176.19	2.250	8.68	3.25	3.25
0.333	3.46	1.333	176.19	2.333	8.68	3.33	3.25
0.417	4.54	1.417	73.10	2.417	6.99	3.42	2.91
0.500	4.54	1.500	73.10	2.500	6.99	3.50	2.91
0.583	6.37	1.583	36.22	2.583	5.78	3.58	2.62
0.667	6.37	1.667	36.22	2.667	5.78	3.67	2.62
0.750	9.92	1.750	22.14	2.750	4.89	3.75	2.38
0.833	9.92	1.833	22.14	2.833	4.89	3.83	2.38
0.917	18.63	1.917	15.18	2.917	4.21	3.92	2.18
1.000	18.63	2.000	15.18	3.000	4.21	4.00	2.18

Max.Eff.Inten.(mm/hr)=	176.19	110.25	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.72 (ii)	5.61 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.22	0.15	
			TOTALS
PEAK FLOW (cms)=	10.92	0.06	10.970 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	79.32	50.25	79.03
TOTAL RAINFALL (mm)=	80.32	80.32	80.32
RUNOFF COEFFICIENT =	0.99	0.63	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 --------------------
 | ADD HYD  (  0010)|
 |  1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
 --------------------         (ha)    (cms)    (hrs)      (mm)
         ID1= 1 (  0003):    24.65  10.970     1.33    79.03
       + ID2= 2 (  0004):     1.12   0.461     1.33    71.17
         ===================================================
         ID = 3 (  0010):    25.77  11.431     1.33    78.69

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

 --------------------
 | ADD HYD  (  0010)|
 |  3 +  2 =  1     |         AREA    QPEAK    TPEAK     R.V.
 --------------------         (ha)    (cms)    (hrs)      (mm)
         ID1= 3 (  0010):    25.77  11.431     1.33    78.69
       + ID2= 2 (  0009):     4.68   5.706     1.42    83.62
         ===================================================
         ID = 1 (  0010):    30.45  13.045     1.42    79.45

      NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
 -------------------------------------------------------------------------------
 --------------------
 | RESERVOIR(  0011)|     OVERFLOW IS OFF
 | IN= 2---> OUT= 1 |
 | DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 --------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000    |   0.8558      1.8346
                          0.0181     0.0734    |   0.9869      2.0518
                          0.0294     0.1515    |   1.1021      2.2728
                          0.0375     0.2343    |   1.3219      2.4978
                          0.0440     0.4206    |   1.6294      2.7268
                          0.0524     0.7083    |   2.1918      3.0780
                          0.0573     0.9048    |   2.5876      3.3173
                          0.0618     1.1049    |   4.2549      3.5359
                          0.2961     1.3087    |   7.6831      3.6846
                          0.6043     1.5162    |  12.5080      3.8377

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0010)     30.449    13.045      1.42      79.45
   OUTFLOW: ID= 1 (  0011)     30.449     0.934      2.08      79.41

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.16
                   TIME SHIFT OF PEAK FLOW         (min)= 40.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  1.9646

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 --------------------
 | ADD HYD  (  0032)|
 |  1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
 --------------------         (ha)    (cms)    (hrs)      (mm)
         ID1= 1 (  0011):    30.45   0.934     2.08    79.41
       + ID2= 2 (  0033):    14.20   0.001    19.50     5.84
         ===================================================
         ID = 3 (  0032):    44.65   0.935     2.08    56.02

      NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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100YR 4HR CHICAGO STORM SIMULATION

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   ************************************************
   ** SIMULATION : F_100yr 4hr 10min Chicago     **
   ************************************************

 --------------------
 | CHICAGO STORM    |    IDF curve parameters: A=4688.000
 | Ptotal= 89.87 mm |                          B=  17.000
 --------------------                          C=   0.962
                         used in:   INTENSITY =  A / (t + B)^C

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

                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.00    2.89 |  1.00   62.12 |  2.00   12.48 |  3.00    3.91
                  0.17    3.67 |  1.17  196.54 |  2.17    9.60 |  3.17    3.44
                  0.33    4.88 |  1.33   83.09 |  2.33    7.66 |  3.33    3.05
                  0.50    6.96 |  1.50   41.25 |  2.50    6.29 |  3.50    2.73
                  0.67   11.02 |  1.67   25.07 |  2.67    5.28 |  3.67    2.47
                  0.83   21.03 |  1.83   17.06 |  2.83    4.51 |  3.83    2.24

 --------------------------------------------------------------------------------
 --------------------
 | CALIB            |
 | STANDHYD (  0001)|   Area    (ha)=  10.08
 |ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
 --------------------
                           IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=      9.98          0.10
      Dep. Storage     (mm)=      1.00          1.50
      Average Slope     (%)=      1.00          2.00
      Length            (m)=    259.23         40.00
      Mannings n           =     0.013         0.250

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


                               ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.083    2.89 | 1.083   62.12 | 2.083   12.48 |  3.08    3.91
                 0.167    2.89 | 1.167   62.12 | 2.167   12.48 |  3.17    3.91
                 0.250    3.67 | 1.250  196.54 | 2.250    9.60 |  3.25    3.44
                 0.333    3.67 | 1.333  196.54 | 2.333    9.60 |  3.33    3.44
                 0.417    4.88 | 1.417   83.09 | 2.417    7.66 |  3.42    3.05
                 0.500    4.88 | 1.500   83.09 | 2.500    7.66 |  3.50    3.05
                 0.583    6.96 | 1.583   41.25 | 2.583    6.29 |  3.58    2.73
                 0.667    6.96 | 1.667   41.25 | 2.667    6.29 |  3.67    2.73
                 0.750   11.02 | 1.750   25.07 | 2.750    5.28 |  3.75    2.47
                 0.833   11.02 | 1.833   25.07 | 2.833    5.28 |  3.83    2.47
                 0.917   21.03 | 1.917   17.06 | 2.917    4.51 |  3.92    2.24
                 1.000   21.03 | 2.000   17.06 | 3.000    4.51 |  4.00    2.24

      Max.Eff.Inten.(mm/hr)=     196.54       129.47
                 over (min)        5.00         5.00
      Storage Coeff.  (min)=       3.45 (ii)    4.31 (ii)
      Unit Hyd. Tpeak (min)=       5.00         5.00
      Unit Hyd. peak  (cms)=       0.26         0.23
                                                          *TOTALS*
      PEAK FLOW       (cms)=       5.24         0.04         5.274 (iii)
      TIME TO PEAK    (hrs)=       1.33         1.33          1.33
      RUNOFF VOLUME    (mm)=      88.87        58.63         88.57
      TOTAL RAINFALL   (mm)=      89.87        89.87         89.87
      RUNOFF COEFFICIENT   =       0.99         0.65          0.99

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

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
```

CN* = 85.0 Ia = Dep. 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(0005) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.4230	0.4030

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	10.080	5.274	1.33	88.57
OUTFLOW: ID= 1 (0005)	7.295	0.423	1.42	88.56
OVERFLOW:ID= 3 (0003)	2.785	2.594	1.42	88.56

TOTAL NUMBER OF SIMULATION OVERFLOW = 8
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.67
PERCENTAGE OF TIME OVERFLOWING (%) = 2.95

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.02
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= 0.4030

CALIB STANDHYD (0002) ID= 1 DT= 5.0 min	Area (ha)= 8.80 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.71	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	242.21	40.00
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	2.89	1.083	62.12	2.083	12.48	3.08	3.91
0.167	2.89	1.167	62.12	2.167	12.48	3.17	3.91
0.250	3.67	1.250	196.54	2.250	9.60	3.25	3.44
0.333	3.67	1.333	196.54	2.333	9.60	3.33	3.44
0.417	4.88	1.417	83.09	2.417	7.66	3.42	3.05
0.500	4.88	1.500	83.09	2.500	7.66	3.50	3.05
0.583	6.96	1.583	41.25	2.583	6.29	3.58	2.73
0.667	6.96	1.667	41.25	2.667	6.29	3.67	2.73
0.750	11.02	1.750	25.07	2.750	5.28	3.75	2.47
0.833	11.02	1.833	25.07	2.833	5.28	3.83	2.47
0.917	21.03	1.917	17.06	2.917	4.51	3.92	2.24
1.000	21.03	2.000	17.06	3.000	4.51	4.00	2.24

Max.Eff.Inten.(mm/hr)=		196.54	129.47	
over (min)		5.00	5.00	
Storage Coeff. (min)=		3.31 (ii)	4.17 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.26	0.24	
				TOTALS
PEAK FLOW	(cms)=	4.59	0.03	4.625 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	88.87	58.63	88.57
TOTAL RAINFALL	(mm)=	89.87	89.87	89.87
RUNOFF COEFFICIENT	=	0.99	0.65	0.99

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 85.0 Ia = Dep. 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(0006) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.3700	0.3520

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	8.800	4.625	1.33	88.57
OUTFLOW: ID= 1 (0006)	6.373	0.370	1.42	88.59
OVERFLOW:ID= 3 (0003)	2.427	2.233	1.42	88.59

TOTAL NUMBER OF SIMULATION OVERFLOW = 8
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.67
PERCENTAGE OF TIME OVERFLOWING (%) = 3.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.00
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= 0.3520

ADD HYD (0007) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	7.30	0.423	1.42	88.56
+ ID2= 2 (0006):	6.37	0.370	1.42	88.59
ID = 3 (0007):	13.67	0.793	1.42	88.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0008) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS ON	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		0.0000	0.0000	0.0012	0.7983
		0.0002	0.0493	0.0012	0.9272
		0.0004	0.1138	0.0013	1.0172
		0.0005	0.1731	0.0014	1.1836
		0.0007	0.2826	0.0015	1.2551
		0.0010	0.5436	0.8479	1.3965
		0.0011	0.6923	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0007)	13.668	0.793	1.42	88.58
OUTFLOW: ID= 1 (0008)	13.668	0.001	19.50	6.15
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.18
TIME SHIFT OF PEAK FLOW (min)=******
MAXIMUM STORAGE USED (ha.m.)= 1.2011

Junction Command(0031)

	AREA	QPEAK	TPEAK	R.V.

```
                          (ha)      (cms)     (hrs)     (mm)
  INFLOW : ID= 1(  0008)   13.67      0.00    19.50      6.15
  OUTFLOW: ID= 2(  0031)   13.67      0.00    19.50      6.15

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

  --------------------------
  | Junction Command(0038) |
  --------------------------

                           AREA      QPEAK    TPEAK     R.V.
                           (ha)      (cms)    (hrs)     (mm)
  INFLOW : ID= 3(  0008)    0.00      0.00     0.00      0.00
  OUTFLOW: ID= 2(  0038)    0.00      0.00     0.00      0.00

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

--------------------
| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)      (cms)     (hrs)      (mm)
*** W A R N I N G :  HYDROGRAPH   0038 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0031):    13.67    0.001     19.50      6.15
     + ID2= 2 (  0038):     0.00    0.000      0.00      0.00
       ==================================================
       ID = 3 (  0033):    13.67    0.001     19.50      6.15

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

--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)      (cms)     (hrs)      (mm)
       ID1= 1 (  0005):     2.78     2.594      1.42     88.56
     + ID2= 2 (  0006):     2.43     2.233      1.42     88.59
       ================================================
       ID = 3 (  0009):     5.21     4.827      1.42     88.58

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area     (ha)=   1.12
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.81         0.31
    Dep. Storage     (mm)=      1.00         1.50
    Average Slope     (%)=      1.00         2.00
    Length            (m)=     86.45        40.00
    Mannings n           =     0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
    TIME     RAIN   TIME     RAIN  '  TIME     RAIN   TIME     RAIN
     hrs    mm/hr   hrs    mm/hr  '   hrs    mm/hr    hrs    mm/hr
   0.083     2.89  1.083    62.12  2.083    12.48   3.08     3.91
   0.167     2.89  1.167    62.12  2.167    12.48   3.17     3.91
   0.250     3.67  1.250   196.54  2.250     9.60   3.25     3.44
   0.333     3.67  1.333   196.54  2.333     9.60   3.33     3.44
   0.417     4.88  1.417    83.09  2.417     7.66   3.42     3.05
   0.500     4.88  1.500    83.09  2.500     7.66   3.50     3.05
   0.583     6.96  1.583    41.25  2.583     6.29   3.58     2.73
   0.667     6.96  1.667    41.25  2.667     6.29   3.67     2.73
   0.750    11.02  1.750    25.07  2.750     5.28   3.75     2.47
   0.833    11.02  1.833    25.07  2.833     5.28   3.83     2.47
   0.917    21.03  1.917    17.06  2.917     4.51   3.92     2.24
   1.000    21.03  2.000    17.06  3.000     4.51   4.00     2.24

    Max.Eff.Inten.(mm/hr)=     196.54       129.47
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            over (min)        5.00        10.00
    Storage Coeff.  (min)=    1.79 (ii)    5.48 (ii)
    Unit Hyd. Tpeak (min)=    5.00        10.00
    Unit Hyd. peak  (cms)=    0.32         0.16
                                                 *TOTALS*
    PEAK FLOW       (cms)=    0.44         0.09          0.520 (iii)
    TIME TO PEAK    (hrs)=    1.33         1.42          1.33
    RUNOFF VOLUME    (mm)=   88.87        58.63         80.40
    TOTAL RAINFALL   (mm)=   89.87        89.87         89.87
    RUNOFF COEFFICIENT   =    0.99         0.65          0.89

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB            |
| STANDHYD (  0003)|   Area     (ha)=  24.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
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                          IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=     24.40         0.25
    Dep. Storage     (mm)=      1.00         1.50
    Average Slope     (%)=      1.00         2.00
    Length            (m)=    405.36        40.00
    Mannings n           =     0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
    TIME     RAIN   TIME     RAIN  '  TIME     RAIN   TIME     RAIN
     hrs    mm/hr   hrs    mm/hr  '   hrs    mm/hr    hrs    mm/hr
   0.083     2.89  1.083    62.12  2.083    12.48   3.08     3.91
   0.167     2.89  1.167    62.12  2.167    12.48   3.17     3.91
   0.250     3.67  1.250   196.54  2.250     9.60   3.25     3.44
   0.333     3.67  1.333   196.54  2.333     9.60   3.33     3.44
   0.417     4.88  1.417    83.09  2.417     7.66   3.42     3.05
   0.500     4.88  1.500    83.09  2.500     7.66   3.50     3.05
   0.583     6.96  1.583    41.25  2.583     6.29   3.58     2.73
   0.667     6.96  1.667    41.25  2.667     6.29   3.67     2.73
   0.750    11.02  1.750    25.07  2.750     5.28   3.75     2.47
   0.833    11.02  1.833    25.07  2.833     5.28   3.83     2.47
   0.917    21.03  1.917    17.06  2.917     4.51   3.92     2.24
   1.000    21.03  2.000    17.06  3.000     4.51   4.00     2.24

    Max.Eff.Inten.(mm/hr)=     196.54       129.47
            over (min)        5.00        10.00
    Storage Coeff.  (min)=    4.52 (ii)    5.37 (ii)
    Unit Hyd. Tpeak (min)=    5.00        10.00
    Unit Hyd. peak  (cms)=    0.23         0.16
                                                 *TOTALS*
    PEAK FLOW       (cms)=   12.29         0.07         12.357 (iii)
    TIME TO PEAK    (hrs)=    1.33         1.42          1.33
    RUNOFF VOLUME    (mm)=   88.87        58.63         88.57
    TOTAL RAINFALL   (mm)=   89.87        89.87         89.87
    RUNOFF COEFFICIENT   =    0.99         0.65          0.99

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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ADD HYD (0010)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
ID1= 1 (0003):	24.65	12.357	1.33	88.57	
+ ID2= 2 (0004):	1.12	0.520	1.33	80.40	
ID = 3 (0010):	25.77	12.877	1.33	88.21	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)					
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
ID1= 3 (0010):	25.77	12.877	1.33	88.21	
+ ID2= 2 (0009):	5.21	4.827	1.42	88.58	
ID = 1 (0010):	30.98	14.509	1.33	88.27	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0011)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.8558	1.8346
	0.0181	0.0734	0.9869	2.0518
	0.0294	0.1515	1.1021	2.2728
	0.0375	0.2343	1.3219	2.4978
	0.0440	0.4206	1.6294	2.7268
	0.0524	0.7083	2.1918	3.0780
	0.0573	0.9048	2.5876	3.3173
	0.0618	1.1049	4.2549	3.5359
	0.2961	1.3087	7.6831	3.6846
	0.6043	1.5162	12.5080	3.8377

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0010)	30.980	14.509	1.33	88.27
OUTFLOW: ID= 1 (0011)	30.980	1.075	2.08	88.24

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.41
TIME SHIFT OF PEAK FLOW (min)= 45.00
MAXIMUM STORAGE USED (ha.m.)= 2.2207

ADD HYD (0032)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
ID1= 1 (0011):	30.98	1.075	2.08	88.24	
+ ID2= 2 (0033):	13.67	0.001	19.50	6.15	
ID = 3 (0032):	44.65	1.075	2.08	63.11	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

HAZEL STORM SIMULATION

** SIMULATION : H_Hazel **

READ STORM	Filename: C:\Users\kbobinac\AppData\Local\Temp\e714ccd0-1da5-4d30-8c97-2210b1da5ab1\e95a340d
Ptotal=212.00 mm	Comments: Hazel

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.00	3.00	13.00	6.00	23.00	9.00	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00

CALIB		
STANDHYD (0001)	Area (ha)= 10.08	
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00	Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	9.98	0.10
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	259.23	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

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

2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=		53.00	50.33	
over (min)		5.00	10.00	
Storage Coeff. (min)=		5.83 (ii)	7.28 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.20	0.14	
				TOTALS
PEAK FLOW	(cms)=	1.47	0.01	1.483 (iii)
TIME TO PEAK	(hrs)=	10.00	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	173.55	210.63
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	1.00	0.82	0.99

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0005)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS ON

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.4230	0.4030

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (	0001)	10.080	1.483	10.00	210.63
OUTFLOW: ID= 1 (	0005)	7.301	0.423	9.25	212.54
OVERFLOW:ID= 3 (	0003)	2.779	1.060	10.00	212.54

TOTAL NUMBER OF SIMULATION OVERFLOW = 24
CUMULATIVE TIME OF OVERFLOW (HOURS) = 2.00
PERCENTAGE OF TIME OVERFLOWING (%) = 6.30

PEAK FLOW REDUCTION [Qout/Qin](%)= 28.52
TIME SHIFT OF PEAK FLOW (min)=-45.00
MAXIMUM STORAGE USED (ha.m.)= 0.4030

CALIB
STANDHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 8.80
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.71	0.09
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	242.21	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00

1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=		53.00	50.33	
over (min)		5.00	10.00	
Storage Coeff. (min)=		5.60 (ii)	7.05 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.20	0.14	
				TOTALS
PEAK FLOW	(cms)=	1.28	0.01	1.295 (iii)
TIME TO PEAK	(hrs)=	10.00	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	173.55	210.63
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	1.00	0.82	0.99

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. 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(0006)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS ON

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3700	0.3520

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (	0002)	8.800	1.295	10.00	210.63
OUTFLOW: ID= 1 (	0006)	6.377	0.370	9.25	212.54
OVERFLOW:ID= 3 (	0003)	2.423	0.925	10.00	212.54

TOTAL NUMBER OF SIMULATION OVERFLOW = 24
CUMULATIVE TIME OF OVERFLOW (HOURS) = 2.00
PERCENTAGE OF TIME OVERFLOWING (%) = 6.38

PEAK FLOW REDUCTION [Qout/Qin](%)= 28.57
TIME SHIFT OF PEAK FLOW (min)=-45.00
MAXIMUM STORAGE USED (ha.m.)= 0.3520

ADD HYD (0007)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	7.30	0.423	9.25	212.54

```
      + ID2= 2 (  0006):     6.38   0.370     9.25   212.54
        ================================================
        ID = 3 (  0007):    13.68   0.793     9.25   212.54

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0008)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                          0.0000     0.0000    |   0.0012     0.7983
                          0.0002     0.0493    |   0.0012     0.9272
                          0.0004     0.1138    |   0.0013     1.0172
                          0.0005     0.1731    |   0.0014     1.1836
                          0.0007     0.2826    |   0.0015     1.2551
                          0.0010     0.5436    |   0.8479     1.3965
                          0.0011     0.6923    |   0.0000     0.0000

                               AREA      QPEAK     TPEAK       R.V.
                               (ha)      (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0007)    13.678      0.793      9.25     212.54
   OUTFLOW: ID= 1 (  0008)    13.678      0.789     11.42     126.04
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 99.51
                    TIME SHIFT OF PEAK FLOW          (min)=130.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  1.3867
--------------------------------------------------------------------------------
  --------------------------
  | Junction Command(0031) |
  --------------------------

                           AREA      QPEAK    TPEAK     R.V.
                           (ha)      (cms)     (hrs)     (mm)
  INFLOW : ID= 1(  0008)   13.68      0.79    11.42    126.04
  OUTFLOW: ID= 2(  0031)   13.68      0.79    11.42    126.04

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  --------------------------
  | Junction Command(0038) |
  --------------------------

                           AREA      QPEAK    TPEAK     R.V.
                           (ha)      (cms)     (hrs)     (mm)
  INFLOW : ID= 3(  0008)    0.00      0.00     0.00      0.00
  OUTFLOW: ID= 2(  0038)    0.00      0.00     0.00      0.00

  --------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
*** W A R N I N G :  HYDROGRAPH   0038 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH   0003 = HYDROGRAPH 0001
       ID1= 1 (  0031):    13.68   0.789    11.42   126.04
     + ID2= 2 (  0038):     0.00   0.000     0.00     0.00
       ================================================
       ID = 3 (  0033):    13.68   0.789    11.42   126.04

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0009)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
```



```
--------------------          (ha)     (cms)     (hrs)      (mm)
       ID1= 1 (  0005):     2.78   1.060    10.00   212.54
     + ID2= 2 (  0006):     2.42   0.925    10.00   212.54
       ================================================
       ID = 3 (  0009):     5.20   1.985    10.00   212.54

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area     (ha)=   1.12
|ID= 1 DT= 5.0 min |   Total Imp(%)=  72.00   Dir. Conn.(%)=  72.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.81          0.31
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      86.45         40.00
     Mannings n           =      0.013         0.250

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

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

     Max.Eff.Inten.(mm/hr)=      53.00         50.33
               over (min)        5.00         15.00
     Storage Coeff.  (min)=      3.02 (ii)    12.31 (ii)
     Unit Hyd. Tpeak (min)=      5.00         15.00
     Unit Hyd. peak  (cms)=      0.27          0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.12          0.04        0.162 (iii)
     TIME TO PEAK    (hrs)=      9.75         10.00         10.00
     RUNOFF VOLUME    (mm)=    211.00        173.55        200.51
     TOTAL RAINFALL   (mm)=    212.00        212.00        212.00
     RUNOFF COEFFICIENT   =      1.00          0.82          0.95
```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 24.65
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	24.40	0.25
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	405.36	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

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

Max.Eff.Inten.(mm/hr)=		53.00	50.33	
over (min)		10.00	10.00	
Storage Coeff. (min)=		7.63 (ii)	9.07 (ii)	
Unit Hyd. Tpeak (min)=		10.00	10.00	
Unit Hyd. peak (cms)=		0.13	0.12	
				TOTALS
PEAK FLOW	(cms)=	3.59	0.03	3.625 (iii)
TIME TO PEAK	(hrs)=	10.00	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	173.55	210.63

TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.82	0.99

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0010)
1 + 2 = 3

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0003):		24.65	3.625	10.00	210.63
+ ID2= 2 (0004):		1.12	0.162	10.00	200.51
ID = 3 (0010):		25.77	3.787	10.00	210.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)
3 + 2 = 1

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0010):		25.77	3.787	10.00	210.19
+ ID2= 2 (0009):		5.20	1.985	10.00	212.54
ID = 1 (0010):		30.97	5.772	10.00	210.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0011)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.8558	1.8346
0.0181	0.0734	0.9869	2.0518
0.0294	0.1515	1.1021	2.2728
0.0375	0.2343	1.3219	2.4978
0.0440	0.4206	1.6294	2.7268
0.0524	0.7083	2.1918	3.0780
0.0573	0.9048	2.5876	3.3173
0.0618	1.1049	4.2549	3.5359
0.2961	1.3087	7.6831	3.6846
0.6043	1.5162	12.5080	3.8377

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0010)	30.970	5.772	10.00	210.58
OUTFLOW: ID= 1 (0011)	30.970	3.777	11.00	210.55

PEAK FLOW REDUCTION [Qout/Qin](%)= 65.43
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 3.4753

ADD HYD (0032)
1 + 2 = 3

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0011):		30.97	3.777	11.00	210.55
+ ID2= 2 (0033):		13.68	0.789	11.42	126.04
ID = 3 (0032):		44.65	4.562	11.00	184.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FEATURE BASED WATER BALANCE

THORNTHWAITE MATHER ANALYSIS

5 Water Balance

Water balance calculations have been completed to approximate onsite infiltration volumes. A comparison of water balance data under pre- and post-development conditions has been completed to determine the potential impacts of development on the PSA's infiltration function. The methodology for the water balance calculations is provided in Section 5.1. Results of the pre-development water balance analysis are presented in Section 5.2. The comparison of pre- and post-development conditions is presented in Section 6.1.

5.1 Methodology

A water balance is an accounting of the distribution of components of the hydrologic cycle and can be simplified in the following equation:

$$P = ET + S + R + I$$

where:

P = precipitation; ET = evapotranspiration; S = change in groundwater storage;

R = runoff; and I = infiltration

The water balance is used to compare pre- and post-development conditions and to determine what mitigation methods may be required. The key component of the water balance is evapotranspiration (ET), which is calculated using the soil moisture balance model developed by Thornthwaite and Mather (1957). The Thornthwaite and Mather model assumes that different soil textures have a characteristic capacity to hold water. Any deficit to the soil holding capacity must be met before water can infiltrate.

Monthly values of precipitation (rainfall plus snowmelt) and potential evapotranspiration rates are input to the model. Potential evapotranspiration is calculated based on temperature, heat index, and an adjusting factor for latitude. The actual evapotranspiration is calculated using the input precipitation, calculated potential evapotranspiration, and change in soil moisture storage.

Infiltration and runoff are calculated using the water surplus, ground slope, soil type, and ground cover. Values for infiltration and runoff are generated as a depth and are reported in millimetres (mm). These depth values can generate annual volumetric values by inputting known areas for land use under pre- and post-development conditions. An infiltration deficit is calculated as the difference between pre-development infiltration and post-development infiltration.

Temperature and precipitation averages for the region from 1981-2010 climate normals were obtained from the Environment and Climate Change Canada (ECCC) website for the Toronto Lester B. Peason International Airport Climate Station (Climate ID 6158733) climate station, located approximately 18 km to the southeast of the PSA. Stantec has assumed that the monthly average temperature and precipitation collected at the Toronto Lester B. Peason International Airport Climate Station are reflective of the temperature and precipitation trends that have historically occurred at the PSA.

For pre-development condition, soil moisture capacity was set at 250 mm corresponding to predominantly clay loam with pasture / shrubs landscape according to the MECP *SWM Planning Design Manual* (MECP, 2003). Site lands planned for commercial/industrial use under the post-development condition are expected to have approximately 51% of its area converted to impervious surfaces at 12489 Dixie Road and 73% at 12861 Dixie Road. Similarly, the land area being used for stormwater management purposes (i.e., pond) or roadways will have an impervious cover of 100% (i.e., no pervious area). Stantec is assuming that the PSA topography and soils will remain relatively unchanged between the pre- and post-development condition, and the overall imperviousness of the PSA will reflect 51% at 12489 Dixie Road and 73% at 12861 Dixie Road.

Water balance calculations completed for the 12489 Dixie Road parcel are shown in Tables 5.1 and 5.2, and in Tables 6.1 and 6.2 for the 12861 Dixie Road parcel.

A feature-based water balance using the Thornthwaite and Mather (1957) methodology outlined in Section 5.1 was completed with detailed analysis presented in the Functional Servicing and Stormwater Management Report.

TABLE A
PRE-DEVELOPMENT MONTHLY FEATURE-BASED WATER BALANCE

Monthly Water Balance Analysis - Thornthwaite and Mather model
PRE-DEVELOPMENT (DRAINAGE FEATURE)

12861 Dixie Road, Caledon - QuadReal Properties Group

Total Site Area (ha) 29.70 (includes Ext Area, and site Area)

Land Description Factors	Existing Site Conditions								
Topography	0.10								
Soils	0.10								
Cover	0.15								
Sum (Infiltration Factor)	0.35								
Soil Moisture Capacity (mm)	250								
Site area (ha)	29.70								
Impervious Coefficient	0.00								
Impervious Area (ha)	0.00								0.00
Remaining Pervious Area (ha)	29.70								
Total Pervious Site Area (ha)	29.70								29.70
Percentage of Total Site Area	100%								100%

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Climate Data (Toronto Lester B. Pearson Int'l A Climate Station - 6158733, Ontario via Environment Canada Website - Climate Normals from 1981-2010)													
Average Daily Temperature (°C)	-7.8	-6.0	-1.0	6.7	13.1	18.2	21.2	20.3	16.0	9.4	3.4	-3.4	**7.5**
Precipitation (mm)	78	64	63	77	84	93	86	82	98	89	92	80	**987**
Evapotranspiration Analysis (Sub-Area A)													
Heat Index	0.0	0.0	0.0	1.6	4.3	7.1	8.9	8.3	5.8	2.6	0.6	0.0	**39**
Unadjusted Potential Evapotranspiration (mm)	0.0	0.0	0.0	29.1	61.3	88.5	104.8	99.9	76.6	42.4	13.7	0.0	**516**
Potential Evapotranspiration Adjusting Factor for Latitude	0.81	0.92	1.06	1.18	1.27	1.29	1.22	1.11	0.98	0.86	0.76	0.74	
Adjusted Potential Evapotranspiration (mm)	0	0	0	34	78	114	128	111	75	36	10	0	**587**
PET (Malstrom, 1969) (mm/month)	0	0	0	34	78	114	128	111	75	36	10	0	**587**
Precipitation - PET (mm)	78	64	63	43	6	-21	-42	-29	23	53	82	80	**400**
Accumulated Potential Water Loss (APWL)	0	0	0	0	0	-21	-63	-91	-61	-1	0	0	
Storage (S)	250	250	250	250	250	230	194	173	196	249	250	250	
Change in Storage	0	0	0	0	0	-20	-35	-21	23	53	1	0	
Actual Evapotranspiration (mm)	**0**	**0**	**0**	**34**	**78**	**113**	**121**	**103**	**75**	**36**	**10**	**0**	**572**
Recharge/Runoff Analysis													
Water Surplus (mm)	78	64	63	43	6	0	0	0	0	0	80	80	**415**
Potential Infiltration (I)	27	22	22	15	2	0	0	0	0	0	28	28	**145**
Potential Direct Surface Water Runoff (R)	**51**	**42**	**41**	**28**	**4**	**0**	**0**	**0**	**0**	**0**	**52**	**52**	**269**
Infiltration (mm)	**0**	**0**	**0**	**115**	**2**	**0**	**0**	**0**	**0**	**0**	**28**	**0**	**145**
Pervious Evapotranspiration (m^3)	0	0	0	10195	23140	33631	36078	30679	22307	10830	3086	0	169947
Pervious Runoff (m^3)	15135	12394	12162	8258	1194	0	0	0	0	0	15488	15405	80036
Pervious Infiltration (m^3)	0	0	0	34114	643	0	0	0	0	0	8339	0	43096
Impervious Evapotranspiration (mm)	8	6	6	8	8	9	9	8	10	9	9	8	99
Impervious Runoff (mm)	71	58	57	69	76	84	78	74	88	80	83	72	888
Volumetric Impervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	0

Pre-Development Infiltration	**43,096**	**(m^3/yr)**	**145**	**mm/yr**	**1.37**	**L/s**
Pre-Development Runoff	**80,924**	**(m^3/yr)**	**272**	**mm/yr**	**2.56**	**L/s**

TABLE B
POST-DEVELOPMENT MONTHLY FEATURE-BASED WATER BALANCE

Monthly Water Balance Analysis - Thornthwaite and Mather model
POST-DEVELOPMENT (DRAINAGE FEATURE)

12861 Dixie Road, Caledon - QuadReal Properties Group

Total Site Area (ha) 3.97 Undeveloped Greenbelt Area

Land Description Factors	Undeveloped Greenbelt Area								
Topography	0.10								
Soils	0.10								
Cover	0.15								
Sum (Infiltration Factor)	0.35								
Soil Moisture Capacity (mm)	250								
Site area (ha)	3.97								
Impervious Coefficient	0.00								
Impervious Area (ha)	0.00								0.00
Remaining Pervious Area (ha)	3.97								
Total Pervious Site Area (ha)	3.97								3.97
Percentage of Total Site Area	100%								100%

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Climate Data (Toronto Lester B. Pearson Int'l A Climate Station - 6158733, Ontario via Environment Canada Website - Climate Normals from 1981-2010)													
Average Daily Temperature (°C)	-7.8	-6.0	-1.0	6.7	13.1	18.2	21.2	20.3	16.0	9.4	3.4	-3.4	**7.5**
Precipitation (mm)	78	64	63	77	84	93	86	82	98	89	92	80	**987**
Evapotranspiration Analysis (Sub-Area A)													
Heat Index	0.0	0.0	0.0	1.6	4.3	7.1	8.9	8.3	5.8	2.6	0.6	0.0	**39**
Unadjusted Potential Evapotranspiration (mm)	0.0	0.0	0.0	29.1	61.3	88.5	104.8	99.9	76.6	42.4	13.7	0.0	**516**
Potential Evapotranspiration Adjusting Factor for Latitude	0.81	0.92	1.06	1.18	1.27	1.29	1.22	1.11	0.98	0.86	0.76	0.74	
Adjusted Potential Evapotranspiration (mm)	0	0	0	34	78	114	128	111	75	36	10	0	**587**
PET (Malstrom, 1969) (mm/month)	0	0	0	34	78	114	128	111	75	36	10	0	**587**
Precipitation - PET (mm)	78	64	63	43	6	-21	-42	-29	23	53	82	80	**400**
Accumulated Potential Water Loss (APWL)	0	0	0	0	0	-21	-63	-91	-61	-1	0	0	
Storage (S)	250	250	250	250	250	230	194	173	196	249	250	250	
Change in Storage	0	0	0	0	0	-20	-35	-21	23	53	1	0	
Actual Evapotranspiration (mm)	**0**	**0**	**0**	**34**	**78**	**113**	**121**	**103**	**75**	**36**	**10**	**0**	**572**
Recharge/Runoff Analysis													
Water Surplus (mm)	78	64	63	43	6	0	0	0	0	0	80	80	**415**
Potential Infiltration (I)	27	22	22	15	2	0	0	0	0	0	28	28	**145**
Potential Direct Surface Water Runoff (R)	**51**	**42**	**41**	**28**	**4**	**0**	**0**	**0**	**0**	**0**	**52**	**52**	**269**
Infiltration (mm)	**0**	**0**	**0**	**115**	**2**	**0**	**0**	**0**	**0**	**0**	**28**	**0**	**145**
Pervious Evapotranspiration (m^3)	0	0	0	1364	3096	4500	4827	4105	2985	1449	413	0	22740
Pervious Runoff (m^3)	2025	1658	1627	1105	160	0	0	0	0	0	2072	2061	10709
Pervious Infiltration (m^3)	0	0	0	4565	86	0	0	0	0	0	1116	0	5766
Impervious Evapotranspiration (mm)	8	6	6	8	8	9	9	8	10	9	9	8	99
Impervious Runoff (mm)	71	58	57	69	76	84	78	74	88	80	83	72	888
Volumetric Impervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	0

Pre-Development Infiltration	**43,096**	**(m^3/yr)**	**1086**	**mm/yr**	**118**	**m^3/day**
Post-Development Infiltration	**5,766**	**(m^3/yr)**	**145**	**mm/yr**	**16**	**m^3/day**
Infiltration Deficit	**37,330**	**(m^3/yr)**	**940**	**mm/yr**	**102**	**m^3/day**

from Greenbelt Area only

Pre-Development Runoff	**80924**	**(m^3/yr)**
Post-Development Runoff	**11597**	**(m^3/yr)**
Deficit	**69327**	**(m3/yr)**

from Greenbelt Area only

TABLE C
POST-DEVELOPMENT MONTHLY FEATURE-BASED WATER BALANCE

Monthly Water Balance Analysis - Thornthwaite and Mather model
POST-DEVELOPMENT (DRAINAGE FEATURE)

12861 Dixie Road, Caledon - QuadReal Properties Group

Total Site Area (ha) 18.87 Total Roof only

Land Description Factors	Roof Area								
Topography	0.10								
Soils	0.10								
Cover	0.15								
Sum (Infiltration Factor)	0.35								
Soil Moisture Capacity (mm)	250								
Site area (ha)	18.87								
Impervious Coefficient	1.00								
Impervious Area (ha)	18.87								18.87
Remaining Pervious Area (ha)	0.00								
Total Pervious Site Area (ha)	0.00								0.00
Percentage of Total Site Area	0%								0%

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Climate Data (Toronto Lester B. Pearson Int'l A Climate Station - 6158733, Ontario via Environment Canada Website - Climate Normals from 1981-2010)													
Average Daily Temperature (°C)	-7.8	-6.0	-1.0	6.7	13.1	18.2	21.2	20.3	16.0	9.4	3.4	-3.4	**7.5**
Precipitation (mm)	78	64	63	77	84	93	86	82	98	89	92	80	**987**
Evapotranspiration Analysis (Sub-Area A)													
Heat Index	0.0	0.0	0.0	1.6	4.3	7.1	8.9	8.3	5.8	2.6	0.6	0.0	**39**
Unadjusted Potential Evapotranspiration (mm)	0.0	0.0	0.0	29.1	61.3	88.5	104.8	99.9	76.6	42.4	13.7	0.0	**516**
Potential Evapotranspiration Adjusting Factor for Latitude	0.81	0.92	1.06	1.18	1.27	1.29	1.22	1.11	0.98	0.86	0.76	0.74	
Adjusted Potential Evapotranspiration (mm)	0	0	0	34	78	114	128	111	75	36	10	0	**587**
PET (Malstrom, 1969) (mm/month)	0	0	0	34	78	114	128	111	75	36	10	0	**587**
Precipitation - PET (mm)	78	64	63	43	6	-21	-42	-29	23	53	82	80	**400**
Accumulated Potential Water Loss (APWL)	0	0	0	0	0	-21	-63	-91	-61	-1	0	0	
Storage (S)	250	250	250	250	250	230	194	173	196	249	250	250	
Change in Storage	0	0	0	0	0	-20	-35	-21	23	53	1	0	
Actual Evapotranspiration (mm)	**0**	**0**	**0**	**34**	**78**	**113**	**121**	**103**	**75**	**36**	**10**	**0**	**572**
Recharge/Runoff Analysis													
Water Surplus (mm)	78	64	63	43	6	0	0	0	0	0	80	80	**415**
Potential Infiltration (I)	27	22	22	15	2	0	0	0	0	0	28	28	**145**
Potential Direct Surface Water Runoff (R)	**51**	**42**	**41**	**28**	**4**	**0**	**0**	**0**	**0**	**0**	**52**	**52**	**269**
Infiltration (mm)	**0**	**0**	**0**	**115**	**2**	**0**	**0**	**0**	**0**	**0**	**28**	**0**	**145**
Pervious Evapotranspiration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	0
Pervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	0
Pervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	0
Impervious Evapotranspiration (mm)	8	6	6	8	8	9	9	8	10	9	9	8	99
Impervious Runoff (mm)	71	58	57	69	76	84	78	74	88	80	83	72	888
Volumetric Impervious Runoff (m^3)	13315	10904	10700	13095	14283	15778	14640	13978	16593	15116	15642	13553	167597

Pre-Development Infiltration	**43,096**	**(m^3/yr)**	**228**	**mm/yr**	**118**	**m^3/day**
Post-Development Infiltration	**0**	**(m^3/yr)**	**0**	**mm/yr**	**0**	**m^3/day**
Infiltration Deficit	**43,096**	**(m^3/yr)**	**228**	**mm/yr**	**118**	**m^3/day**

Total area to feature from Roof Area only

Mitigation Summary

Pre-Development Runoff to HDF	**80924**	**(m^3/yr)**
Post-Development Runoff from Roof	**167597**	**(m^3/yr)**
Roof Runoff to Infiltration Tanks	**83799**	**(m^3/yr)**
Post-Development Runoff Roof Runoff to HDF	**83799**	**(m^3/yr)**
Post-Development Runoff from Greenbelt Area	**11597**	**(m^3/yr)**
Total Post Develoment Annual Runoff To HDF	**95396**	**(m^3/yr)**
Runoff Surplus	**14472**	**(m^3/yr)**
Infiltration Surplus	**40702**	**(m^3/yr)**

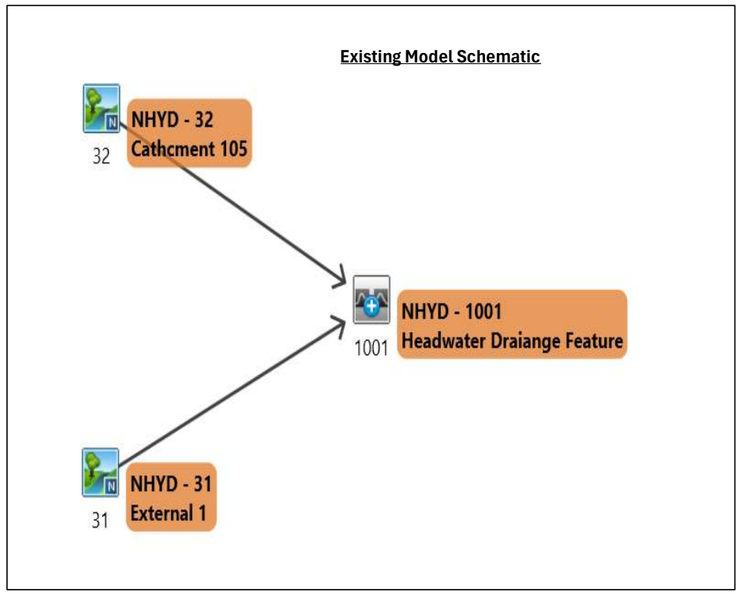
>>>>>>>>> **Infiltration of 6mm from Roof Runoff = 50% of Average Annual Runoff Volume.**
50% of Roof Runoff will be directed to infiltration within the Site and 50% of Roof Runoff will provide runoff mitigation to feature

>>>>>>>>> **Infiltration tanks sized to provide 2.5mm retention for total Site Area. Therefore Infiltration mitigation includes the HDF contribution**

VISUAL OTTHYMO EXISTING AND PROPOSED CONTINOUS FEATURE BASED MODELING

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/4/2024
Author: KB

Existing Conditions Continous Model

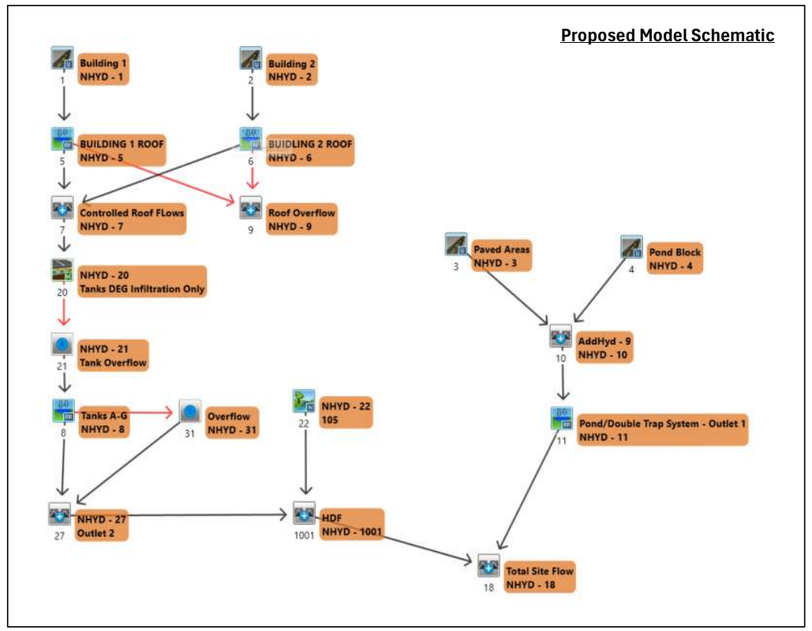


CATHCMENT PARAMENTERS

NHYD	NAME	OUTLET	AREA [ha]	CNII	IA [mm]	TP [hr]	Soil Texture	Total Porosity	Field Capacity	Wilting Point	Saturated K [mm/day]	Land Cover	GI/PAN	VEGK3
31	EXT 1	1001	14.115	82	5	0.85	Clay	0.475	0.378	0.265	4	Crops	1.4	6
32	105	1001	15.648	77	5	1.03	Clay	0.475	0.378	0.265	4	Crops	1.4	6
			29.763											

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/4/2024
Author: KB

Proposed Conditions Continous Model



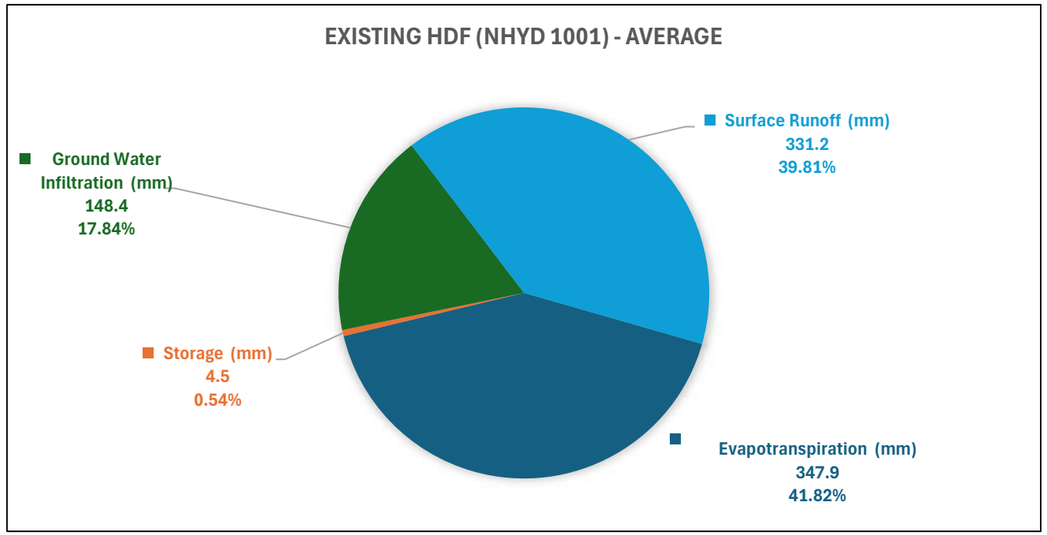
CATHCMENT PARAMENTERS

NHYD	NAME	OUTLET	AREA [ha]	TIMP	CNII	XIMP	IA [mm]	SLPP [%]	Soil Texture	LGP [m]	MNP	Total Porosity	Field Capacity	DPSI [mm]	Wilting Point	SLPI [%]	Saturated K [mm/day]	LGI Type	LGI [m]	MNI	Land Cover	GI/PAN	VEGK3
1	Building 1	5	10.08	0.99	100	0.99	1.5	2	Clay	40	0.25	0.475	0.378	1	0.265	1	4	Auto	259.23	0.013	Crops	1.4	6
2	Building 2	6	8.8	0.99	100	0.99	1.5	2	Clay	40	0.25	0.475	0.378	1	0.265	1	4	Auto	242.21	0.013	Crops	1.4	6
4	Pond Block	10	1.12	0.72	100	0.72	1.5	2	Clay	40	0.25	0.475	0.378	1	0.265	1	4	Auto	86.41	0.013	Crops	1.4	6
3	Paved Areas	10	24.647	0.99	95	0.99	1.5	2	Clay	40	0.25	0.475	0.378	1	0.265	1	4	Auto	405.36	0.013	Crops	1.4	6

NHYD	NAME	OUTLET	AREA [ha]	CNII	IA [mm]	TP [hr]	Soil Texture	Total Porosity	Field Capacity	Wilting Point	Saturated K [mm/day]	Land Cover	GI/PAN	VEGK3
22	Undeveloped 105	1001	3.96	77	5	1.03	Clay	0.475	0.378	0.265	4	Crops	1.4	6

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/4/2024
Author: KB

Existing Conditions Continous Model



Headwater Draiange Feature - NHYD 1001 Output

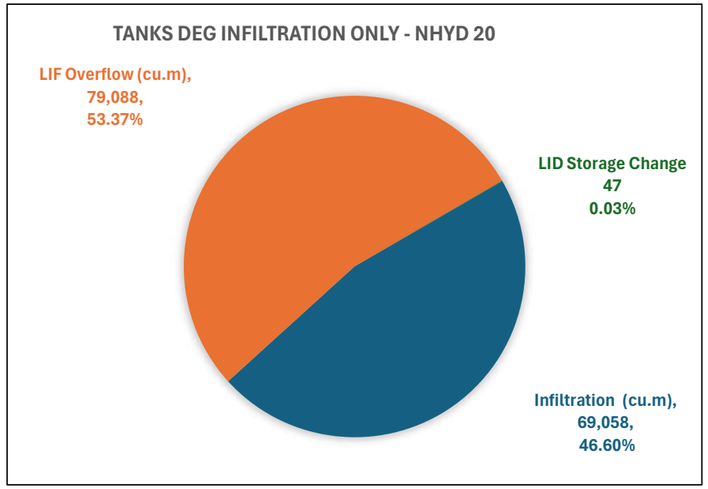
Period	Precip (mm)	Rain (mm)	Snow (mm)	Snowmelt (mm)	ET (mm)	INFIL (mm)	GWI (mm)	Runoff (mm)	∆ Storage	Runoff Coe
1991	751.80	751.80	0.00	0.00	324.68	352.55	88.81	265.63	72.68	0.35
1992	1064.90	1064.90	0.00	0.00	362.87	386.52	192.96	507.06	2.01	0.48
1993	798.70	798.70	0.00	0.00	376.85	336.13	138.77	290.20	-7.12	0.36
1994	754.40	754.40	0.00	0.00	373.38	370.43	129.83	246.73	4.46	0.33
1995	939.00	939.00	0.00	0.00	368.26	375.83	152.00	419.71	-0.97	0.45
1996	1033.90	1033.90	0.00	0.00	350.74	410.80	190.29	486.45	6.43	0.47
1997	761.90	761.90	0.00	0.00	357.64	346.33	142.38	269.74	-7.85	0.35
1998	733.80	733.80	0.00	0.00	345.11	316.87	114.12	277.82	-3.25	0.38
1999	828.00	828.00	0.00	0.00	388.86	370.83	132.39	304.82	1.93	0.37
2000	975.10	975.10	0.00	0.00	379.27	389.14	148.00	440.96	6.88	0.45
2001	744.80	744.80	0.00	0.00	328.77	324.11	144.84	274.99	-3.80	0.37
2002	760.40	760.40	0.00	0.00	326.61	341.61	152.52	280.57	0.70	0.37
2003	914.30	914.30	0.00	0.00	317.01	350.56	189.76	404.01	3.51	0.44
2004	742.30	742.30	0.00	0.00	340.77	350.59	148.13	252.37	1.04	0.34
2005	775.40	775.40	0.00	0.00	331.98	340.39	146.55	296.32	0.55	0.38
2006	944.00	944.00	0.00	0.00	350.76	374.39	190.46	404.22	-1.44	0.43
2007	621.00	621.00	0.00	0.00	290.68	280.37	121.30	208.87	0.15	0.34
Avg	831.98	831.98	0.00	0.00	347.90	353.968	148.42	331.20	4.46	0.40

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/4/2024
Author: KB

Proposed Conditions Continous Model

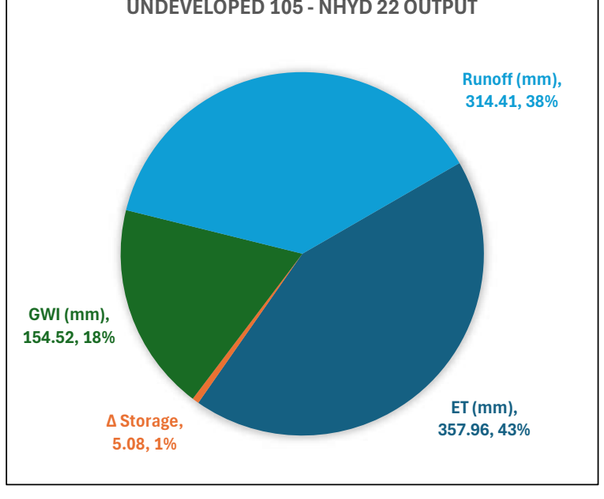
Tanks DEG Infiltration Only - NHYD 20 Output

Period	LID Infilow (cu.m)	Infiltration (cu.m)	LID Outflow (cu.m)	LIF Overflow (cu.m)	LID Underdrain (cu.m)	LID Storage Change
1991	133,477	64,547	0	68,252	0	678
1992	191,044	73,524	0	117,246	0	273
1993	140,011	71,155	0	69,808	0	-951
1994	134,097	67,248	0	65,935	0	914
1995	168,858	68,636	0	101,136	0	-914
1996	186,907	77,594	0	108,179	0	1,134
1997	134,870	72,973	0	62,973	0	-1,075
1998	129,831	61,978	0	67,911	0	-59
1999	147,515	62,488	0	85,027	0	0
2000	175,449	69,790	0	104,713	0	946
2001	132,364	62,910	0	70,400	0	-946
2002	134,584	67,104	0	67,480	0	0
2003	163,518	76,262	0	86,321	0	935
2004	130,665	72,840	0	57,626	0	199
2005	138,003	67,799	0	70,205	0	0
2006	168,551	73,057	0	95,501	0	-8
2007	109,537	64,083	0	45,787	0	-333
Avg	148,193	69,058	0	79,088	0	47



Undeveloped 105 - NHYD 22 Output

Period	Precip (mm)	Rain (mm)	Snowmelt (mm)	ET (mm)	INFIL (mm)	GWI (mm)	Runoff (mm)	Δ Storage	Runoff Coe
1991	751.80	751.80	0.00	337.77	372.52	86.23	245.67	82.13	0.33
1992	1064.90	1064.90	0.00	362.91	401.27	206.90	492.31	2.79	0.46
1993	798.70	798.70	0.00	386.15	350.38	144.38	275.94	-7.78	0.35
1994	754.40	754.40	0.00	387.43	387.83	133.05	229.41	4.52	0.30
1995	939.00	939.00	0.00	381.35	396.52	159.39	398.95	-0.69	0.42
1996	1033.90	1033.90	0.00	350.77	425.79	204.59	471.66	6.89	0.46
1997	761.90	761.90	0.00	367.72	360.26	147.74	255.60	-9.16	0.34
1998	733.80	733.80	0.00	357.42	330.94	118.57	263.75	-5.95	0.36
1999	828.00	828.00	0.00	401.85	390.78	136.00	284.87	5.27	0.34
2000	975.10	975.10	0.00	388.63	405.22	154.40	424.87	7.19	0.44
2001	744.80	744.80	0.00	339.50	340.67	150.59	258.43	-3.71	0.35
2002	760.40	760.40	0.00	339.66	359.22	157.36	262.96	0.43	0.35
2003	914.30	914.30	0.00	327.60	369.99	197.97	384.58	4.15	0.42
2004	742.30	742.30	0.00	350.83	365.51	152.97	237.61	0.90	0.32
2005	775.40	775.40	0.00	342.13	357.07	153.01	279.51	0.75	0.36
2006	944.00	944.00	0.00	362.02	394.13	199.29	384.56	-1.86	0.41
2007	621.00	621.00	0.00	301.67	294.83	124.47	194.32	0.54	0.31
Avg	831.98	831.98	0.00	357.96	370.760	154.52	314.41	5.08	0.38



Draiange Area of Undeveloped 105:	3.96	ha
GWI from 105:	154.52	mm
Annual Inifltraion Volume to Headwater Draiange Feature:	6,119	cu.m

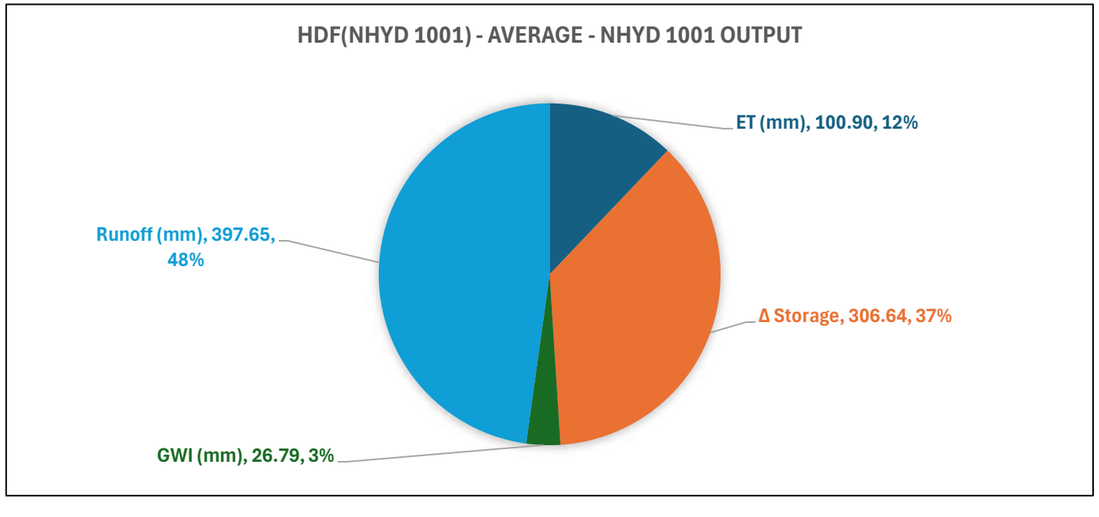
Annual Infiltration Summary

Tanks DEG Infiltration:	69,058	cu.m
Annual Inifltraion Volume to Headwater Draiange Feature:	6,119	cu.m
Total Infiltration Volume:	75,177	cu.m
Target	44,174	cu.m
WB Target %	**170%**	

Stantec

Project: Quadreal-Caledon
Project No: 160623114
Date: 12/4/2024
Author: KB

Proposed Conditions Continous Model



HDF(NHYD 1001) - AVERAGE - NHYD 1001 Output

Period	Precip (mm)	Rain (mm)	Snow (mm)	Snowmelt (mm)	ET (mm)	INFIL (mm)	GWI (mm)	Runoff (mm)	Δ Storage	Runoff Coe
1991	751.80	751.80	0.00	0.00	95.01	347.19	14.95	295.91	345.93	0.39
1992	1064.90	1064.90	0.00	0.00	106.63	391.48	35.87	594.81	327.59	0.56
1993	798.70	798.70	0.00	0.00	114.85	372.28	25.03	362.87	295.95	0.45
1994	754.40	754.40	0.00	0.00	102.13	361.67	23.07	324.42	304.78	0.43
1995	939.00	939.00	0.00	0.00	103.63	369.26	27.63	510.02	297.72	0.54
1996	1033.90	1033.90	0.00	0.00	96.07	413.55	35.47	546.25	356.11	0.53
1997	761.90	761.90	0.00	0.00	104.34	381.96	25.61	342.94	289.01	0.45
1998	733.80	733.80	0.00	0.00	100.11	328.74	20.56	329.51	283.62	0.45
1999	828.00	828.00	0.00	0.00	108.37	341.35	23.58	431.44	264.61	0.52
2000	975.10	975.10	0.00	0.00	105.14	375.82	26.77	516.11	327.09	0.53
2001	744.80	744.80	0.00	0.00	95.23	334.50	26.11	355.97	267.49	0.48
2002	760.40	760.40	0.00	0.00	97.97	356.08	27.28	355.67	279.48	0.47
2003	914.30	914.30	0.00	0.00	96.65	398.05	34.32	424.63	358.69	0.46
2004	742.30	742.30	0.00	0.00	101.42	382.29	26.52	292.88	321.48	0.39
2005	775.40	775.40	0.00	0.00	96.53	358.75	26.53	356.83	295.50	0.46
2006	944.00	944.00	0.00	0.00	104.71	388.20	34.55	494.60	310.13	0.52
2007	621.00	621.00	0.00	0.00	86.58	331.69	21.58	225.11	287.74	0.36
Avg	831.98	831.98	0.00	0.00	100.90	366.639	26.79	397.65	306.64	0.48

Drainage Area to HDF: 22.84 ha
Runoff from HDF: 397.65 mm
Annual Runoff Volume to Headwater Draiange Feature: 90,822 m^3

Annual Runoff Summary

Annual Runoff Volume to Headwater Draiange Feature:	90,822
Target Runoff Volume to Headwater Draiange Feature	98,576
Percent of Target	**92%**
Percent Difference	**-8%**

Stantec

Appendix C Water Supply Analysis

SOUTH SITE

PRELIMINARY ESTIMATE of Expected Water Demand

December, 2023

QuadReal, 12489 Dixie Road

160623114

Caledon, Ontario

Region of Peel

Industrial

Total Site Area	=	58.13	Hectare
Site Regulated Area	=	27.94	Hectare
Site Development Area	=	30.19	Hectare
Population on basis of 70 persons per hectare	=	2113	

Total Population **2113**

TOTAL DESIGN POPULATION = **2113**

Flow Calculation

Flow Rate =	**300**	litres/capita/day		** ICI
For a total population of	**2113**	people,		
The total flow is:	**633,990**	litres/day		
Applying a peaking factor of	**1.40**	(maximum day)		** ICI
Maximum Day Demand =	**887,586**	litres/day		
or,	**616**	litres/minute	**(A)**	
Fire Flow Demand	24,000	litres/minute	**(B)**	

Total Flow = (A) + (B) = **24,616** **litres/minute** **(maximum day demand plus fire flow)**

Check peak hour demand:

The total flow is:	**633,990**	litres/day	
or,	**440**	litres/minute	
Applying a peaking factor of	**3.00**	(peak hour)	** ICI
Peak Hour Demand =	**1,321**	litres/minute	

Total water demand (on basis of maximum day demand plus fire flow) = **24,616** **litres/minute**

** In accordance with Region of Peel Public Works Design, Specifications & Procedures Manual, revised June 2010

PRELIMINARY ESTIMATE of Required Fire Flow ***14-Dec-23***
Fire Underwriters Survey "Water Supply for Public Fire Protection", 2020
QuadReal, 12489 Dixie Road
Caledon, Ontario *Project #160623114*

Proposed Building 1

F = 220 · C · √A

where,

F = the required fire flow in litres per minute

C = 0.8 for non-combustible construction

= **0.80**

A =

The total floor area in square metres (including all storeys, but excluding basements at least 50% below grade) in the building being considered. Note: for fire-resistive buildings, consider the two largest adjoining floors plus 50% of each of any floors immediately above them up to eight, when the vertical openings are inadequately protected. If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors. **

A = **42,912** **sq.m.**

F = 220 · (C) · √(A)

= **36,459** **Lpm**

= **36,000** **Lpm** (Rounded to the nearest 1,000 L/min)

The value obtained above may be reduced by as much as 25% for occupancies having a low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Occupancy Type F2 - High Hazard **25%**

Apply an increase of **25%** , or **9,000** **Lpm**

F = **45,000** **Lpm**

The value obtained above may be reduced by up to 50% for complete automatic sprinkler protection depending upon the adequacy of the system. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards. Additional credit of up to 10% may be granted if the water supply is standard for both the system and fire department hose lines required.

Apply a reduction of **50%** **(compliance assumed)**, or **-22,500** **Lpm**

Reduction = **-22,500** **Lpm**

To the value obtained, a percentage should be added for structures exposed within 30 metres:

North side	-	>30	m	-	**0%**
East side	-	>30	m	-	**0%**
South side	-	>30	m	-	**0%**
West side	-	>30	m	-	**0%**
					0% (not to exceed 75%)

Increase = **0** **Lpm**

F =	45,000	Lpm	
	-22,500		
	0		
	22,500	**Lpm**	
=	**23,000**	**Lpm**	(Rounded to the nearest 1,000 L/min)
=	383	Lps	
=	6,076	USGPM	

PRELIMINARY ESTIMATE of Required Fire Flow ***14-Dec-23***
Fire Underwriters Survey "Water Supply for Public Fire Protection", 2020
QuadReal, 12489 Dixie Road
Caledon, Ontario *Project #160623114*

Proposed Building 2

F = 220 · C · √A

where,

F = the required fire flow in litres per minute

C = 0.8 for non-combustible construction

= **0.80**

A =

The total floor area in square metres (including all storeys, but excluding basements at least 50% below grade) in the building being considered. Note: for fire-resistive buildings, consider the two largest adjoining floors plus 50% of each of any floors immediately above them up to eight, when the vertical openings are inadequately protected. If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors. **

A = **49,269** **sq.m.**

F = 220 · (C) · √(A)

= **39,066** **Lpm**

= **39,000** **Lpm** (Rounded to the nearest 1,000 L/min)

The value obtained above may be reduced by as much as 25% for occupancies having a low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Occupancy Type F2 - High Hazard **25%**

Apply an increase of **25%** , or **9,750** **Lpm**

F = **48,750** **Lpm**

The value obtained above may be reduced by up to 50% for complete automatic sprinkler protection depending upon the adequacy of the system. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards. Additional credit of up to 10% may be granted if the water supply is standard for both the system and fire department hose lines required.

Apply a reduction of **50%** **(compliance assumed)**, or **-24,375** **Lpm**

Reduction = **-24,375** **Lpm**

To the value obtained, a percentage should be added for structures exposed within 30 metres:

North side	-	>30	m	-	**0%**
East side	-	>30	m	-	**0%**
South side	-	>30	m	-	**0%**
West side	-	>30	m	-	**0%**
					0% (not to exceed 75%)

Increase = **0** **Lpm**

F =	48,750	Lpm	
	-24,375		
	0		
	24,375	**Lpm**	
=	**24,000**	**Lpm**	(Rounded to the nearest 1,000 L/min)
=	400	Lps	
=	6,340	USGPM	

PRELIMINARY ESTIMATE of Required Fire Flow ***14-Dec-23***
Fire Underwriters Survey "Water Supply for Public Fire Protection", 2020
QuadReal, 12489 Dixie Road
Caledon, Ontario *Project #160623114*

Proposed Building 3

F = 220 · C · √A

where,

F = the required fire flow in litres per minute

C = 0.8 for non-combustible construction

= **0.80**

A =

The total floor area in square metres (including all storeys, but excluding basements at least 50% below grade) in the building being considered. Note: for fire-resistive buildings, consider the two largest adjoining floors plus 50% of each of any floors immediately above them up to eight, when the vertical openings are inadequately protected. If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors. **

A = **42,384** **sq.m.**

F = 220 · (C) · √(A)

= **36,234** **Lpm**

= **36,000** **Lpm** (Rounded to the nearest 1,000 L/min)

The value obtained above may be reduced by as much as 25% for occupancies having a low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Occupancy Type F2 - High Hazard **25%**

Apply an increase of **25%** , or **9,000** **Lpm**

F = **45,000** **Lpm**

The value obtained above may be reduced by up to 50% for complete automatic sprinkler protection depending upon the adequacy of the system. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards. Additional credit of up to 10% may be granted if the water supply is standard for both the system and fire department hose lines required.

Apply a reduction of **50%** **(compliance assumed)**, or **-22,500** **Lpm**

Reduction = **-22,500** **Lpm**

To the value obtained, a percentage should be added for structures exposed within 30 metres:

North side	-	>30	m	-	**0%**
East side	-	>30	m	-	**0%**
South side	-	>30	m	-	**0%**
West side	-	>30	m	-	**0%**
					0% (not to exceed 75%)

Increase = **0** **Lpm**

F =	45,000	Lpm	
	-22,500		
	0		
	22,500	**Lpm**	
=	**23,000**	**Lpm**	(Rounded to the nearest 1,000 L/min)
=	383	Lps	
=	6,076	USGPM	

Appendix C Water Supply Analysis

NORTH SITE

PRELIMINARY ESTIMATE of Expected Water Demand

December, 2023

QuadReal, 12861 Dixie Road

160623115

Caledon, Ontario

Region of Peel

Industrial

Total Site Area	=	**57.75**	Hectare
Site Regulated Area	=	**13.11**	Hectare
Site Development Area	=	**44.64**	Hectare
Population on basis of 70 persons per hectare	=	3125	
		Total Population	**3125**

TOTAL DESIGN POPULATION = **3125**

Flow Calculation

Flow Rate =	**300**	litres/capita/day		** ICI
For a total population of	**3125**	people,		
The total flow is:	**937,440**	litres/day		
Applying a peaking factor of	**1.40**	(maximum day)		** ICI
Maximum Day Demand =	**1,312,416**	litres/day		
or,	**911**	litres/minute	**(A)**	
Fire Flow Demand	**35,000**	litres/minute	**(B)**	
Total Flow = (A) + (B) =	**35,911**	**litres/minute**		**(maximum day demand plus fire flow)**

Check peak hour demand:

The total flow is:	**937,440**	litres/day	
or,	**651**	litres/minute	
Applying a peaking factor of	**3.00**	(peak hour)	** ICI
Peak Hour Demand =	**1,953**	litres/minute	

Total water demand (on basis of maximum day demand plus fire flow) =	**35,911**	**litres/minute**
	598	**litres/sec**

** In accordance with Region of Peel Public Works Design, Specifications & Procedures Manual, revised June 2010

PRELIMINARY ESTIMATE of Required Fire Flow ***14-Dec-23***
Fire Underwriters Survey "Water Supply for Public Fire Protection", 2020
QuadReal, 12861 Dixie Road
Caledon, Ontario *Project #160623115*

Proposed Building 1

F = 220 · C · √A

where,

F = the required fire flow in litres per minute

C = 0.8 for non-combustible construction

= **0.80**

A =

The total floor area in square metres (including all storeys, but excluding basements at least 50% below grade) in the building being considered. Note: for fire-resistive buildings, consider the two largest adjoining floors plus 50% of each of any floors immediately above them up to eight, when the vertical openings are inadequately protected. If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors. **

A = **100,758** **sq.m.**

F = 220 · (C) · √(A)

= **55,867** **Lpm**

= **56,000** **Lpm** (Rounded to the nearest 1,000 L/min)

The value obtained above may be reduced by as much as 25% for occupancies having a low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Occupancy Type F2 - High Hazard **25%**

Apply an increase of **25%** , or **14,000** **Lpm**

F = **70,000** **Lpm**

The value obtained above may be reduced by up to 50% for complete automatic sprinkler protection depending upon the adequacy of the system. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards. Additional credit of up to 10% may be granted if the water supply is standard for both the system and fire department hose lines required.

Apply a reduction of **50%** **(compliance assumed)**, or **-35,000** **Lpm**

Reduction = **-35,000** **Lpm**

To the value obtained, a percentage should be added for structures exposed within 30 metres:

North side	-	>30	m	-	**0%**
East side	-	>30	m	-	**0%**
South side	-	>30	m	-	**0%**
West side	-	>30	m	-	**0%**
					0% (not to exceed 75%)

Increase = **0** **Lpm**

F =	70,000	Lpm	
	-35,000		
	0		
	35,000	**Lpm**	

= **35,000** **Lpm** (Rounded to the nearest 1,000 L/min)

= 583 Lps

= 9,246 USGPM

PRELIMINARY ESTIMATE of Required Fire Flow ***14-Dec-23***
Fire Underwriters Survey "Water Supply for Public Fire Protection", 2020
QuadReal, 12861 Dixie Road
Caledon, Ontario *Project #160623115*

Proposed Building 2

F = 220 · C · √A

where,

F = the required fire flow in litres per minute

C = 0.8 for non-combustible construction

= **0.80**

A =

The total floor area in square metres (including all storeys, but excluding basements at least 50% below grade) in the building being considered. Note: for fire-resistive buildings, consider the two largest adjoining floors plus 50% of each of any floors immediately above them up to eight, when the vertical openings are inadequately protected. If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors. **

A = **87,960** **sq.m.**

F = 220 · (C) · √(A)

= **52,198** **Lpm**

= **52,000** **Lpm** (Rounded to the nearest 1,000 L/min)

The value obtained above may be reduced by as much as 25% for occupancies having a low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Occupancy Type F2 - High Hazard **25%**

Apply an increase of **25%** , or **13,000** **Lpm**

F = **65,000** **Lpm**

The value obtained above may be reduced by up to 50% for complete automatic sprinkler protection depending upon the adequacy of the system. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards. Additional credit of up to 10% may be granted if the water supply is standard for both the system and fire department hose lines required.

Apply a reduction of **50%** **(compliance assumed)**, or **-32,500** **Lpm**

Reduction = **-32,500** **Lpm**

To the value obtained, a percentage should be added for structures exposed within 30 metres:

North side	-	>30	m	-	**0%**
East side	-	>30	m	-	**0%**
South side	-	>30	m	-	**0%**
West side	-	>30	m	-	**0%**
					0% (not to exceed 75%)

Increase = **0** **Lpm**

F = 65,000 Lpm
-32,500
0
32,500 **Lpm**

= **33,000** **Lpm** (Rounded to the nearest 1,000 L/min)

= 550 Lps

= 8,718 USGPM

Appendix D Sanitary Analysis

SOUTH SITE

ESTIMATE of Proposed Sanitary Flow

QuadReal, 12489 Dixie Road
Caledon, Ontario

12-Dec-23
Project #160623114

SITE DEVELOPMENT TOTALS

Light Industrial:	**Site Area (ha)**	**Persons per Hectare**	**Equivalent Population***
Total Site Area:	58.13		
Site Regulated Area:	27.94		
Site Development Area:	30.19	**70**	2,113

*Equivalent population density is based on the Region of Peel Linear Wastewater Standards (2023)

Total Population **2,113**

TOTAL DESIGN POPULATION = 2,113

Site Development Area: **30.19** ha

Domestic Sewage Flow

Daily per Capita Sanitary Flow = **270** litres/employee/day * For non-residential

*Daily per Capita Sanitary Flow is based on the Region of Peel Linear Wastewater Standards (2023)

for a Total Population of **2,113** people

the Average Daily Dry Weather Flow is: **570,591** litres/day
or, **6.60** litres/second **(A)**

Sanitary Flow Peaking Factor

Harmon's Peaking Factor (M) =1+(14/(4+P^0.5)) (where P is equivalent population expressed in thousands) *

for a Total Population of **2,113** people,

the Peaking Factor is: **3.57** **(B)**

Infiltration Allowance

Inflow/Infiltration allowance calculated on the basis of **0.26** L/sec/ha

for a site development area of **30.19** Ha.,

the Area Infiltration Allowance is: **7.85** L/s **(C)**

Sanitary Design Flow

Sanitary Design Flow = (Domestic Sewage Flow) + (Area Infiltration Allowance) + (Sewer Length Inflow Allowance) **(A)x(B)+(C)**

= **31.41** **L/s**

TOTAL SANITARY DESIGN FLOW = 31.41 L/s

Appendix D Sanitary Analysis

NORTH SITE

ESTIMATE of Proposed Sanitary Flow

QuadReal, 12861 Dixie Road
Caledon, Ontario

13-Dec-23
Project #160623115

SITE DEVELOPMENT TOTALS

Light Industrial:	**Site Area (ha)**	**Persons per Hectare**	**Equivalent Population***
Total Site Area:	57.75		
Site Regulated Area:	13.11		
Site Development Area:	44.64	**70**	3,125

*Equivalent population density is based on the Region of Peel Linear Wastewater Standards (2023)

Total Population **3,125**

TOTAL DESIGN POPULATION = 3,125

Site Development Area: **44.64** ha

Domestic Sewage Flow

Daily per Capita Sanitary Flow = **270** litres/employee/day * For non-residential

*Daily per Capita Sanitary Flow is based on the Region of Peel Linear Wastewater Standards (2023)

for a Total Population of **3,125** people

the Average Daily Dry Weather Flow is: **843,696** litres/day
or, **9.77** litres/second **(A)**

Sanitary Flow Peaking Factor

Harmon's Peaking Factor (M) =1+(14/(4+P^0.5)) (where P is equivalent population expressed in thousands) *

for a Total Population of **3,125** people,

the Peaking Factor is: **3.43** **(B)**

Infiltration Allowance

Inflow/Infiltration allowance calculated on the basis of **0.26** L/sec/ha

for a site development area of **44.64** Ha.,

the Area Infiltration Allowance is: **11.61** L/s **(C)**

Sanitary Design Flow

Sanitary Design Flow = (Domestic Sewage Flow) + (Area Infiltration Allowance) + (Sewer Length Inflow Allowance) **(A)x(B)+(C)**

= **45.07** **L/s**

TOTAL SANITARY DESIGN FLOW = 45.07 L/s