Adelaide Road Subdivision
22805 Adelaide Road
Mount Brydges

Township of Strathroy-Caradoc
County of Middlesex
Project No. 17-D-5463

FUNCTIONAL PLANNING REPORT
STORMWATER MANAGEMENT COMPONENT

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1.0 INTRODUCTION

The proposed Adelaide Road Subdivision is located on Lots 18, 19, 20, 21 and 22, Concession III Caradoc Township in the municipality of Strathroy-Caradoc, County of Middlesex. The municipal address of the property is 22805 Adelaide Road, Mount Brydges.

Liahn Farms Limited and Thames Crest Farms Limited are proposing to develop a residential plan of subdivision on 14.758 hectares of the 26.334 hectare parcel of land. The remaining 11.576 hectare treed area of the subject property are located adjacent to Lions Park.

M.J. Davenport & Associates Ltd. has been retained to complete a Functional Stormwater Management Report in support of the mixed density residential draft plan of subdivision. The draft plan of subdivision consists of 109 single family residential lots, two medium density townhouse blocks plus the treed lands.

Mount Brydges is located approximately twelve kilometres southeast of Strathroy. The project site is bounded by Adelaide Road, Falconbridge Drive and Rougham Road on the westerly boundary of Mount Brydges.

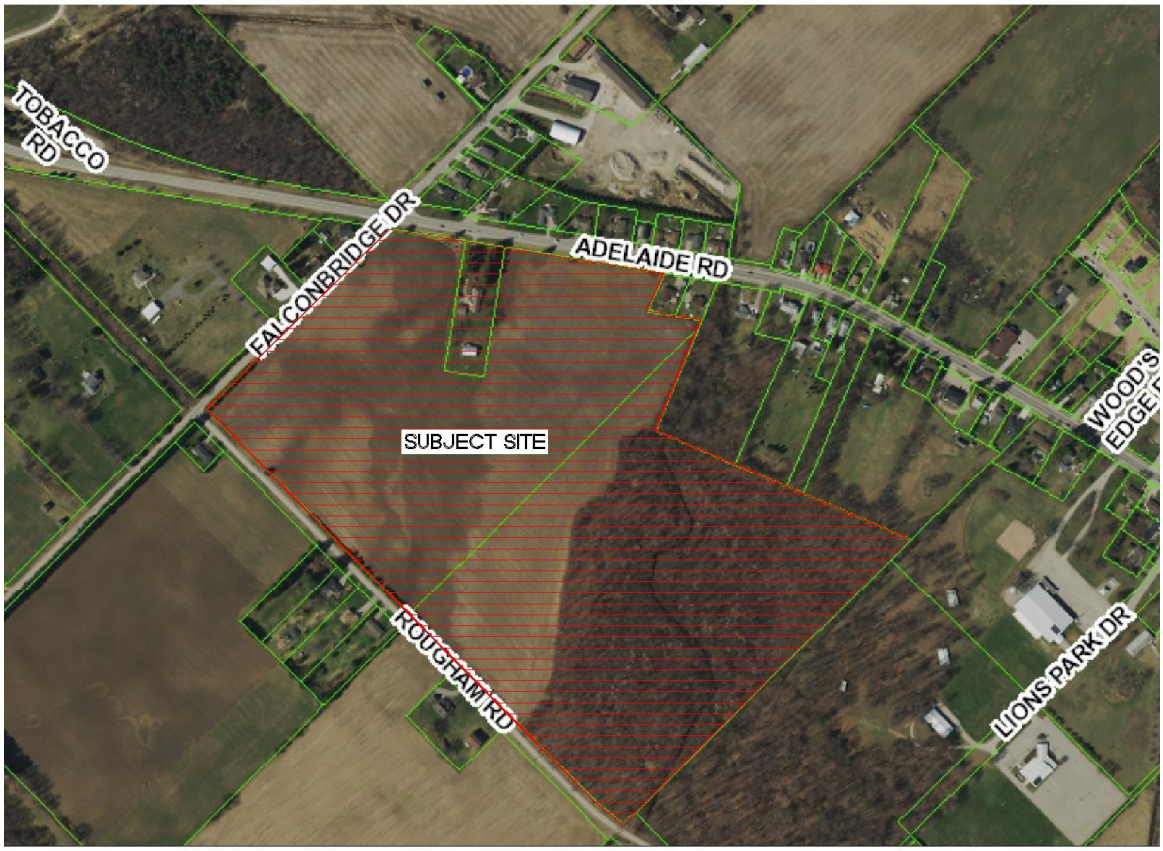
The subject lands are designated settlement area within the Municipality of Strathroy-Caradoc Official Plan and zoned future development within the Comprehensive Zoning Bylaw.

Those lands outside the wooded area have been cultivated. The land slopes from relatively flat to slightly rolling (0%-5%). The upper reaches of the McEvoy municipal drain flows through the treed area.

Developing urban low density and medium density residential subdivisions increases the impervious area on the site. A stormwater management plan must address the potential impact of increased surface water runoff from the project site, provide quantity control and quality control of the runoff plus recommend erosion controls. “Enhanced” water quality treatment (80% TSS removal) will be provided for the areas to be developed. The preferred options to address the stormwater treatment for the majority of the proposed development is an end-of-pipe stormwater management wet pond facility and an inline oil and grit hydrodynamic separator with downstream infiltration gallery treating stormwater runoff directed northerly toward Adelaide Road.

The Location Plan shown in Figure 1 provides an overview of the proposed Adelaide Road Subdivision. The lot layout is shown on Drawing No. 5463-DP Draft Plan of Subdivision in Appendix I.

Figure 1: Location Plan



2.0 PRE-DEVELOPMENT CONDITIONS

The pre-development site has slightly rolling topography with good vegetation cover over the majority of the site. The site topography varies from flat to moderately sloping (0-5%). The majority of the development site ranges from 1%-3% slope.

Ontario Ministry of Agriculture and Food soil mapping for Middlesex County identifies three surficial soils present within the subject site; Tuscola Loam, Waterin Loamy Fine Sand and Plainfield Fine Sand. Tuscola Loam and Waterin Loamy Fine Sand are poorly or imperfectly drained loam type 'C' soils in the Soil Conservation Service (SCS)

hydrologic soil grouping. Plainfield Fine Sand is a rapidly drained fine sand type 'A' soil in the Soil Conservation Service (SCS) hydrologic soil grouping.

The subject site is divided into two (2) internal subwatershed areas and four (4) external subwatershed areas under pre-development conditions based on the natural topography of the land. Stormwater from the external subwatershed areas drains onto or through the subject site. The pre-development subwatershed areas are illustrated in Appendix V on the Pre-Development Subwatershed Areas Drawing No. 5463-SW1 and described below.

Subwatershed Area No. PRE.1

Subwatershed Area No. PRE.1 (8.455 hectares), the westerly half of the site, naturally drains to the Coulter branch of the McEvoy municipal drain.

This subwatershed area is comprised primarily of agricultural land (row crops). The existing residence and associated manicured grass, trees and impervious areas is included within this subwatershed area.

Stormwater runoff from this area drains naturally as sheet flow westerly to the roadside ditch at the intersection of Falconbridge Drive and Rougham Road. Surfacewater runoff flows through a series of culverts under Falconbridge Drive then outlets into the existing Coulter branch of the McEvoy municipal drain on the unopened portion of Rougham Road. An existing agricultural field tile system drains low flow storm events to the Coulter branch of the McEvoy municipal drain. The calculated impervious area percentage of this subwatershed area is 0.8%, allowing the use of the NasHYD command to model the stormwater runoff from this subwatershed area.

Subwatershed Area No. PRE.2

Subwatershed Area No. PRE.2 (7.743 hectares), the easterly half of the site, naturally drains to the main branch of the McEvoy drain.

Subwatershed Area No. PRE.2 is comprised primarily of agricultural land (row crops). This subwatershed area also includes a small portion of the manicured grass, treed and impervious areas of the existing residence plus a small portion of the treed area east of the development.

Stormwater runoff from this area drains as sheet flow easterly into the wooded area and outlets into the main branch of the McEvoy municipal drain under pre-development conditions. The percentage impervious area of this subwatershed area is calculated

as 0.1%, thereby, allowing the use of the NasHYD command to model the stormwater runoff from this subwatershed area.

The subwatershed areas external to the development includes:

a) Subwatershed Area No. EXT.1 - the right-of-way area of Rougham Road, Falconbridge Drive and Adelaide Road that drains to the Coulter branch of the McEvoy drain through the road crossing culverts at Rougham Road and Falconbridge Drive.

b) Subwatershed Area No. EXT.2 - the portion of Adelaide Road right-of-way that drains through the subject site into the main branch of the McEvoy drain.

c) Subwatershed Area No. EXT.3 - the residential lot area of 22755 Adelaide Road that drains to the lot line common with the proposed SWM Block 114.

d) Subwatershed Area No. EXT.4 - the residential lot area of 22755 and 22753 Adelaide Road that drains through the subject site and into the main branch of the McEvoy drain.

e) Subwatershed Area No. EXT.5 – the area of the Enbridge Gas lands on the westerly side of the subject site. The developed Enbridge Gas site drains onto the Subdivision lands and into the Coulter Branch of the McEvoy Drain.

The subwatershed area parameters used in the pre-development Visual Otthymo computer simulation are shown below in Table 1 and Table 2.

Table 1: Pre-Development NasHyd Subwatershed Area Parameters

Sub-watershed	Area (ha)	Landuse	Slope (%)	Length (m)	C	Time to Peak (hr)	CN*	Ia (mm)
PRE.1	8.455	Agricultural/Treed	1.3	430	0.34	0.467	78	7.8
PRE.2	7.743	Agricultural/Treed	0.6	405	0.37	0.549	79	7.9

Table 2: Pre-Development StandHYD Subwatershed Area Parameters

Sub-watershed Area	Area (ha)	Imperviousness (%)		Slope (%)		Length (m)		CN*	Ia (mm)
		Total	Connected	Imp.	Perv.	Imp.	Perv.		
EXT.1	0.937	41	5	2.0	0.7	79.0	300	56	5.0
EXT.2	0.231	43	43	4.0	8.3	39.2	8.5	73	5.0
EXT.3	0.064	36	19	2.0	3.0	20.7	15	73	5.0
EXT.4	0.204	35	20	2.0	2.7	36.9	30	73	5.0
EXT.5	0.168	70	50	0.8	1.0	33.5	10.0	73	5.0

The weighted runoff coefficient, 'C' is based upon "Design Chart 1.07: Runoff Coefficients" of the MTO Drainage Management Manual (MTO, 1997). The 'C' value used to calculate "Time to Peak" considers the land use and topography plus the hydrologic soil classification or soil texture." Figure 4 in Appendix I "Supporting Information" includes the calculation of "time to peak".

Curve Number (CN) is based upon "Design Chart 1.09: Soil Conservation Service Curve Numbers" of the MTO Drainage Management Manual (MTO, 1997). The CN value considers the soil type and the Hydrologic condition. The Curve Number (CN*) is the weighted value for the antecede moisture condition of the soil (AMC II). The weighted Curve Number (CN*) is calculated based on the weighted average of the imperviousness of the subwatershed area. For modelling purposes different CN* values are used due to the existence of different quantities of impervious areas within the subwatershed area. Figure 5 in Appendix I includes the conversion of CN value to CN*.

The Visual OTTHYMO computer program was used to model the surface water runoff from the subject area under existing conditions. Peak flows for varying return periods were computed, and the results are shown in Table 7 on page 16. The detailed Visual OTTHYMO output for the pre-development condition is attached in Appendix II.

3.0 POST DEVELOPMENT CONDITIONS

The development will create 109 single family residential lots and two medium density blocks. The streets will be constructed to an urban standard road cross-section to conform with the Municipality of Strathroy-Caradoc specifications.

The development will divide the pre-development subwatershed area into four post development subwatershed areas. Stormwater runoff will be contained within each lot using drainage swales and general lot grading practices.

The total area and the directly connected impervious areas within each subwatershed area is based on the proposed land use, using guidance from the Strathroy-Caradoc Servicing Standards dated October 2021.

- The total impervious area calculated for the residential lots and the road allowances is 40%.
- The directly connected impervious area the residential lots and the road allowances was 30%.
- The total impervious area calculated for the medium density townhouse blocks was 60%.
- The directly connected impervious area calculated for the medium density townhouse blocks was 50%.
- All parkland blocks are assigned total and directly connected impervious area percentages of 0%.

The permanent pool area of the proposed stormwater management wet pond was considered directly connected impervious area within the calculations.

Four subwatershed areas will exist under the post development condition. These subwatershed areas are summarized as follows:

a) Subwatershed Area No. PR.1 - the subwatershed area that outlets directly into the proposed stormwater management wet pond. The SWM pond outlets into the Coulter branch of the McEvoy drain.

b) Subwatershed Area No. PR.2 - the subwatershed area that will continue to flow easterly into the wooded area and into the main branch of the McEvoy municipal drain within Block 115.

c) Subwatershed Area No. PR.3 - the subwatershed area that directs runoff into the Falconbridge Drive and Rougham Road roadside ditches.

d) Subwatershed Area No. PR.4 – the Subwatershed area that flows northerly onto Adelaide Road which ultimately outlets into the north reach of the main branch of the McEvoy municipal drain.

These subwatershed areas are illustrated on Post Development Subwatershed Areas Drawing No. 5463-SW2 located in Appendix V of this report.

Subwatershed Area No. PR.1

Subwatershed Area No. PR.1 (10.083 hectares) consists of the following:

1. Street road allowances.
2. The area of Lot 1 to Lot 4, Lot 15 to Lot 59 and Lot 65 to Lot 74.
3. The front yards, driveways and half of the rooftop area of Lot 5 to Lot 14, Lot 60, Lot 75 to Lot 79, Lot 109.
4. The rear yard and half of the rooftop area of Lot 61 to Lot 64.
5. The majority of townhouse Block 110.
6. The entire townhouse Block 111.
7. The majority of the Stormwater Management Pond Block 116.
8. Half of the Sanitary Pump Station Block 117.

The total impervious area percentage of this subwatershed area was calculated at 45.1% and the directly connected area percentage at 36.0%. The proposed stormwater management wet pond provides the stormwater quantity and quality control for the major flows and the minor flows. The stormwater management pond will outlet into the existing Coulter branch of the McEvoy municipal drain on the unopened portion of Rougham Road.

The higher impervious area of this developed subwatershed area (45%) allows the use of the StandHYD command in the Visual OTTHYMO model. An enhanced level of quality control must be provided for this subwatershed area.

Subwatershed Area No. PR.2

Subwatershed Area No. PR.2 (2.735 hectares) comprises the following:

1. The remaining half of the rooftop area and grassed rear yards of Lot 92 to Lot 109.
2. The remaining rooftop and grassed rear yard area of townhouse Block 110.
3. The landscaped buffer area along the rear of Lot 92 to Lot 109.
4. The grass landscaped area of Stormwater Management Block 114.
5. A portion of the treed area of Block 115.

6. External subwatershed areas EXT.3 and EXT.4 direct runoff through this subwatershed area that ultimately outlets into the McEvoy drain.

The total impervious area percentage of this subwatershed area was calculated at 18.9%. Stormwater runoff from this subwatershed area drains easterly toward the wooded area of Block 115. A proposed low slope swale in the buffer area between the rear of the lots and the start of the wooded area directs flows into the McEvoy municipal drain within the parkland block.

The lower impervious area of this subwatershed area (19%) resulting from the proposed development allows the use of the NasHYD command in the Visual OTTHYMO model. This subwatershed area includes rooftop and landscaped areas, therefore, the stormwater runoff does not require water quality treatment.

Subwatershed Area No. PR.3

Subwatershed Area No. PR.3 (1.198 hectares) comprises the following:

1. A portion of the Street 'B' road allowance not able to be graded to the stormwater pond due to the elevation difference.
2. The remaining half of the rooftop area and grassed rear yards of Lot 5 to Lot 14, Lot 75 to Lot 79.
3. The remaining area of the stormwater management pond block.
4. Parkland area of Block 111.
5. Road widening strip Block 118.

The total impervious area percentage of this subwatershed area was calculated at 23.9% and the directly connected area percentage at 5.0%. Stormwater runoff from this subwatershed area drains southerly and westerly toward the roadside ditches of Rougham Road and Falconbridge Drive. This subwatershed area outlets into the Coulter Branch of the McEvoy municipal drain.

The higher impervious area of this subwatershed area (24%) resulting from the proposed development allows the use of the StandHYD command in the Visual OTTHYMO model. Only rooftop, landscaped area and a small amount of roadway contributes runoff to this subwatershed area, therefore, the stormwater runoff does not require water quality treatment.

Subwatershed Area No. PR.4

Subwatershed Area No. PR.4 (2.183 hectares) consists of the following:

1. The remaining area of the Street 'A' and Street ‘C’ road allowance.
2. Total area of Lot 80 to Lot 91.
3. The front yards, driveways and half of the rooftop area of Lot 61 to Lot 64, Lot 92 to Lot 109.

The total impervious area percentage of this subwatershed area was calculated at 40.0% and the directly connected area percentage at 30.0%. The proposed oil and grit separator and infiltration gallery provides the stormwater quality and quantity control for the minor flows from this subwatershed area. The minor flows from this area will enter the McEvoy municipal drain on the north side of Adelaide Road via a proposed storm sewer. Major flows will flow toward Adelaide Road and ultimately outlet into the McEvoy municipal drain.

The higher impervious area of this developed subwatershed area (40%) allows the use of the StandHYD command in the Visual OTTHYMO model. An enhanced level of quality control must be provided for this subwatershed area.

All parameters used to model the post development subwatershed areas in the Visual Otthymo computer simulation are shown in Table 3 and Table 4.

Table 3: Post Development NasHYD Subwatershed Area Parameters

Sub-watershed	Area (ha)	Landuse	Slope (%)	Length (m)	C	Time to Peak (hr)	CN*	Ia (mm)
PR.2	2.735	Resid. / Range	0.8	360	0.36	0.476	76	6.2

Table 4: Post Development NasHYD Subwatershed Area Parameters

Sub-watershed Area	Area (ha)	Imperviousness (%)		Slope (%)		Length (m)		CN*	Ia (mm)
		Total	Connected	Imp.	Perv.	Imp.	Perv.		
PR.1	10.083	45	36	1.0	2.0	259.3	40.0	55	5.0
PR.3	1.198	24	5	1.0	2.0	89.4	31.0	56	5.0
PR.4	2.183	40	30	1.0	2.0	120.6	30.0	68	5.0

4.0 STORMWATER MANAGEMENT CONTROLS

4.1 Water Quality Control

Developing an urban residential development naturally increases the impervious area under post development conditions compared to the pre-development condition, plus permits additional pollutants to be conveyed offsite unless the stormwater is controlled. The Ontario Ministry of the Environment's "Stormwater Management Practices Planning and Design Manual, 2003" requires that the impervious areas proposed within the project site that generate runoff containing high levels of total suspended solids be developed with "Enhanced" level protection (80% T.S.S. removal). Portions of those subwatershed areas not being disturbed during construction or containing areas producing runoff with low pollutant loading (rooftop and rear yard areas) are not required to have stormwater quality control.

Primary stormwater quality control will be achieved for this site using a combination of lot level and conveyance controls and two different end-of-pipe stormwater management techniques. Runoff from Subwatershed Area No. PR.1 will receive quality control by means of stormwater detention and an extended drawdown time from the proposed stormwater management wet pond. Stormwater runoff from Subwatershed Area No. PR.4 will enter a storm sewer system designed with an inline oil and grit separator sized to provide primary quality control, with further treatment occurring in the proposed infiltration gallery.

Stormwater runoff generated in Subwatershed Area No. PR.1 will be conveyed to the proposed stormwater management pond through a proposed storm sewer system or as overland flow. The primary water quality control mechanism is sediment settling, with the storage volume available for extended detention within the wet pond meeting or exceeding the MOE quality storage guidelines for an enhanced level of protection prescribed in Table 3.2 of the Ontario Ministry of the Environment's "Stormwater Management Practices Planning and Design Manual, 2003." The stormwater management wet pond is designed to achieve a minimum 24-hour drawdown time for the 25mm quality storm event in addition to extended detention volumetric sizing. The drawdown time calculation can be found in Figure 3 of Appendix I of this report. A sediment forebay for the proposed single inlet to the pond has been designed with consideration to equations 4.5 to 4.7 of Chapter 4 of the MOE SWMPDM to increase the treatment capacity of the pond and facilitate maintenance. The proposed quality design features of the wet pond work in tandem to provide a minimum of enhanced level (80% T.S.S. removal) protection for Subwatershed Area No. PR.1. Table 5 summarizes the proposed wet pond design.

Table 5: Stormwater Management Wet Pond Design Features

Feature	Parameter
Level of Protection	Enhanced – 80% TSS Removal
Contributing Area	10.083 ha
Percent Impervious	45.1%
Storage Volume (MOE SWMPDM Table 3.2)	165.25 m^3/ha for 45.1% impervious 40 m^3/ha for extended detention 125.25m^3/ha for permanent pool
Permanent Pool Design	Volume Required – 1,263 m^3 Volume Proposed – 1,813 m^3
Extended Detention Design	Volume Required – 403m^3 (MOE Table 3.2) Volume Required – 889 m^3 (25mm Storm) Volume Required – 4,461 m^3 (250yr 3hr Chicago Stm.) Volume Proposed – 5,308 m^3 at Elev. = 245.30
Outlet Design	75mm diameter quality orifice at Elev. = 243.60 300mm dia. quantity orifice #1 at Elev. = 243.80 Top of DICB #1 grate Elev. = 245.00 25mm, 4-hour drawdown time = 60.98 hours

Subwatershed Area No. PR.4 contains roadway and driveway impervious area, therefore, requires the stormwater runoff generated must receive quality control prior to the runoff outletting into the McEvoy municipal drain. The runoff will be conveyed through a storm sewer system first to an inline oil and grit separator for primary treatment prior to entering a stormtech chamber infiltration system. Flows that exceed the capacity of the infiltration system will flow within the outlet storm sewer to the main branch of the McEvoy municipal drain.

The hydrodynamic separator will collect runoff from the 2.183 hectare area, with a total impervious percentage of 40% and a runoff coefficient ('C') of approximately 0.49. The oil and grit separator will provide primary treatment of the stormwater. A stormtech chamber infiltration system constructed downstream of the oil and grit separator will provide further stormwater treatment. The treatment train approach proposed for Subwatershed Area PR.4 will provide a minimum of an enhanced level (80% T.S.S.) of quality control. A preliminary stormceptor sizing report and stormtech chamber design information is attached in Appendix I of this report. Table 6 summarizes the proposed infiltration chamber system design.

Table 6: Stormwater Management Infiltration Chamber System Design Features

Feature	Parameter
Level of Protection	Enhanced – 80% TSS Removal (With pre-treatment by Oil and Grit Separator).
Contributing Area	2.183 ha
Percent Impervious	40.0%
Chamber Selected	Stormtech SC-310
Number of Chambers	97
System Layout	7-Rows of 11, 2-Rows of 6, 1-Row of 5, 1-Row of 3
System Footprint	246.55 m^2
Storage Volume (MOE SWMPDM Table 3.2)	26.25 m^3/ha for 40% impervious (Infiltration) Volume Required – 57.3m^3 (MOE Table 3.2) Volume Provided – 94.5 m^3 at Elev. = 245.92
System Storage Depth	0.71 metres
Inlet Design	525mm diameter inlet pipe at Elevation = 245.36
Bottom of System	Bottom of stone at Elevation = 245.21
Outlet Design	525mm diameter outlet pipe at Elevation = 245.92
Approx. Groundwater Elev.	Elevation = 244.60 (Estimated)
Separation to Groundwater	0.61 metres (Estimated)

4.2 Low Impact Development (LID) Controls

The percolation rate of the soils found onsite varies from low (>25mm/hr) in the native till material to average (75-150mm/hr) in the layers of native sand. The viability of proposed infiltration practices is highly dependant on the location and depth of the proposed practice. Monitoring well testing conducted by GHD Limited in December 2017 determined relatively high groundwater table levels of 1.2, 1.3 and 4.4 metres below existing ground at boreholes one, four and seven, respectively. The borehole locations are shown in Drawing No. 5463-SW2 and Figure 1 taken from the GHD Limited geotechnical report.

For infiltration practices, a minimum separation of 1.0 m is recommended from the bottom of practice to the seasonally high groundwater level. The GHD report measured the groundwater elevation at borehole four to be approximately 1.3 metres below existing ground, corresponding to Elevation 244.70. Borehole four is located approximately 100 metres from the location of the proposed infiltration chamber system in a localized low area of the site, where surface ponding occurs. The estimated groundwater level at the proposed infiltration chamber was 1.3 metres below existing ground or Elevation 244.60 metres.

As the groundwater level across the site is generally very shallow, best practices have been used to provide maximum separation from the bottom of the facility to the level of the groundwater; a minimum 0.61 metres separation has been provided. The finished grade across the entire site will be raised to provide gravity sanitary sewer outlet, thereby, surface ponding areas will be removed. Furthermore, the installation of subdrains around the houses and within the road and sewer system will also lower the groundwater level. As a result, we believe the estimated groundwater level at the proposed chamber system is a conservative assumption. The proposed Stormtech chamber system design information is provided in Appendix I. A detailed plan and sections of the stormwater management infiltration system are shown on Block 114 Infiltration Chamber System Drawing No. 5463-20 are included in Appendix V.

Several different lot level low impact development techniques are proposed to promote infiltration and achieve a pre/post development water balance. It is important to note that the low impact development stormwater management planning and design guide accepts the fact that low impact development techniques can work in any soil type, despite low measured surficial groundwater infiltration rates.

Rooftop rainwater runoff from the houses is proposed to be directed onto landscaped areas that have a minimum pervious flow path of 5 metres. Known as a downspout disconnection, the pervious area will be graded between one to five percent and an energy dissipater placed at the downspout to ensure a level spread of flow. Rooftop rainwater is considered clean, therefore, does not require quality control.

Driveway areas will be directed to pervious surfaces where possible to allow sediment filtration from the surfacewater runoff prior to being released into the proposed storm sewer system. Sediment will filter out into the grass prior to entering the sewer system to provide additional stormwater polishing.

Rooftop and rear yard grass runoff from the lots backing onto Block 115 will be directed through vegetated side yard swales and as sheet flow over the proposed vegetated buffer area where it will enter a low slope grass swale incorporating design features of an enhanced grass swale. The proposed swale can be designed with low longitudinal slopes, in the range of 0.50%-4.00%, a trapezoidal shape, 762mm wide bottom section and maximum 3:1 side slopes, to encourage pre-treatment as the stormwater enters the swales as sheet flow. The swale will direct stormwater runoff into the McEvoy municipal drain within Block 115.

4.3 Water Quantity Control

Major and minor surface water runoff flows within Subwatershed Area No. PR.1 will be conveyed into the stormwater management wet pond. Minor rainfall events will flow in the proposed storm sewer system into the SWM pond forebay. Major flows will be conveyed on the road surface to the low point on Street 'C' then in the proposed overland flow route into the stormwater management block located in the southwesterly corner of the subject property. Orifice controls installed in the pond will create temporary storage to provide water quantity control. The proposed orifice controls and the appropriate stormwater management wet pond volumetric sizing will reduce post development peak outflow rates to less than or equal to pre-development peak outflow rates.

The maximum ponding depth in the stormwater management dry pond will be 3.50 metres. This includes the 1.5 metre permanent pool depth in the forebay and in the main cell of the pond. The stormwater management wet pond facility has been designed with maximum 5:1 side slopes for a distance three metres above and below the permanent pool elevation, maximum 3:1 side slopes on the pond berms. The main cell will be constructed with a mildly sloped area where the majority of stormwater detention will occur. Where required, berms specified with minimum 2.0 metre wide top and 3:1 side slopes to match existing grades. The total active storage volume below the emergency overflow weir (Elevation 245.30) in the proposed dry pond will be 5,308 cubic metres.

The GHD Limited geotechnical report identified on site native soils were till with a low permeability of approximately 10^{-4} to 10^{-5} centimetres per second. This material is suitable for the construction of the proposed stormwater management pond berms. The soils in the area of the stormwater pond have a relatively high permeability. If the native soils encountered during excavation of the base of the stormwater pond are found to have high permeability, a geo-synthetic or 600mm thick clay liner shall be installed in the pond bottom and side slopes to maintain the permanent pool.

The stormwater management wet pond facility inlet into the pond forebay will be located in the southeast corner of the pond. The inlet will be constructed as a concrete headwall complete with grating and chute blocks (OPSD 804.040 and 804.050) to ensure slow and level stormwater flow entering the facility. The proposed inlet invert at Elevation 244.10 will be higher than the 25mm quality storm flood elevation to ensure a free-flowing inlet under the majority of storm events.

The proposed wet pond outlet structure will be constructed as a two-stage outlet to mirror pre-development peak flow rates while maintaining post development flows equal to or below pre-development peak flow rates. The primary pond outlet will consist

of a 300mm reverse grade PVC pipe with a 75mm diameter orifice plate installed in a manhole in the southwest berm. The orifice invert will be set at Elevation 243.60 to control the permanent water level. The reverse grade outlet pipe will be installed at a minimum slope of 1.0%, 0.60 metres higher than the bottom elevation of the pond. The 75mm orifice will create an extended detention time in the pond with an approximate drawdown time of 61 hours for the 25mm quality storm event.

The secondary pond outlet is a 600mm by 1,200mm ditch inlet catchbasin with top of grate set at Elevation 245.00. A 300mm diameter orifice plate, set at invert Elevation 243.80 in the ditch inlet catchbasin structure, will provide water quantity control during storm events greater than the 100-year 3-hour Chicago storm event. A 450mm diameter PVC outlet pipe will extend from the ditch inlet catchbasin to the control manhole in the southwest berm of the pond.

A single 450mm diameter concrete pipe, sloped at minimum 0.70% grade, will cross under Falconbridge Drive and terminate in a concrete headwall in the existing Coulter branch of the McEvoy municipal drain in the unopened Rougham Road allowance west of Falconbridge Road. The Coulter branch needs to be cleaned out to ensure a positive outlet and to handle the proposed design flows from the subdivision. The proposed cross-section is shown on Stormwater Pond Drawing No. 5463-19 in Appendix V.

A 10.0 metre wide emergency outflow weir, set at Elevation 245.30 metres (0.30 metres below the top of the berm), will be located at the southwesterly side of the pond. The weir berm shall be reinforced with a permanent turf mat, Nilex P300 or equivalent. The pond berm side slope at the weir will be reinforced with a layer of 150mm rip rap stone, placed on Terrafix 200W filter cloth, to prevent erosion of the berm under an overflow event. The emergency overflow weir will concentrate flows greater than the 250-year storm at one location on the berm and prevent stormwater overtopping the pond berm.

The proposed developed site will increase impervious areas and result in an increase in the rate of surface water runoff leaving the site. Stormwater management facilities are designed to maintain post development flows at pre-development levels to ensure that development does not increase the potential for downstream flooding.

Peak flows listed in this report were calculated using the Visual Otthymo (version 6.2) computer modeling program. Peak flows were calculated for the 25mm 4-hour Chicago storm, as well as the 5, 10, 25, 50, 100 and 250 year 3-hour Chicago design storms. Table 7 below provides a summary of peak flows for all design storms simulated comparing pre-development to the post development uncontrolled condition.

The rainfall parameters used in the Visual Otthymo simulation were taken from the October 2021 Strathroy-Caradoc Servicing Standards document.

Table 7: Pre and Post Development Uncontrolled Peak Flow Summary

Design Storm (yr)	Peak Flows (m^3/s)		
	3 Hour Chicago Storm		
	Pre-Development	Post Development	Difference
25mm	0.086	0.650	0.564
5	0.386	1.378	0.992
10	0.542	1.710	1.168
25	0.771	2.137	1.366
50	0.975	2.591	1.616
100	1.156	2.917	1.761
250	1.446	3.369	1.923

Table 7 indicates that off site flows will increase to a maximum peak flow of 3.369 cubic metres per second during the 250-year, 3 Hour Chicago storm event under post development conditions. Quantity control measures are required to reduce the post development peak flows to pre-development levels. An end-of-pipe stormwater management wet pond in the southwest corner of the development plus a low impact development infiltration chamber system in the northeast corner of the development are designed to reduce post development flows to pre-development levels.

The stage-storage discharge values for the proposed wet pond were calculated using peak flows generated by post development Subwatershed Area PR.1 under the various 3 hour Chicago storm events. The stage-storage discharge values for the proposed stormwater management pond are summarized in
Table 8.

Table 8: Stage-Storage Discharge for Proposed Wet Pond

Elev. (m)	Ponding Depth (m)	Total Discharge (m^3/s)	Active Storage (m^3)	Notes
242.10	0.0	0.0000	0	Bottom of pond main cell
243.60	1.50	0.0000	0	75mm dia. Orifice Top of permanent pool
243.70	1.60	0.0030	202	
243.79	1.69	0.0047	403	Ext. Detention MOE Table 3.2
243.80	1.70	0.0049	422	
243.90	1.80	0.0062	660	
243.99	1.89	0.0072	889	Ext. Detention 25mm Storm
244.00	1.90	0.0073	916	
244.10	2.00	0.0083	1,190	
244.20	2.10	0.0091	1,482	
244.30	2.20	0.0099	1,787	
244.34	2.24	0.0102	1,911	5 Year Storm (3-hour Chicago)
244.40	2.30	0.0106	2,101	
244.48	2.38	0.0111	2,350	10 Year Storm (3-hour Chicago)
244.50	2.40	0.0113	2,423	
244.60	2.50	0.0119	2,754	
244.66	2.56	0.0122	2,948	25 Year Storm (3-hour Chicago)
244.70	2.60	0.0125	3,093	
244.80	2.70	0.0131	3,441	
244.81	2.71	0.0131	3,461	50 Year Storm (3-hour Chicago)
244.90	2.80	0.0136	3,798	
244.93	2.83	0.0138	3,900	100 Year Storm (3-hour Chicago)
245.00	2.90	0.0142	4,162	Secondary outlet T/G of DICB
245.08	2.98	0.0704	4,461	250 Year Storm (3-hour Chicago)
245.10	3.00	0.0844	4,536	
245.20	3.10	0.2123	4,917	
245.30	3.20	0.2412	5,308	Top of Active Storage Start of Emergency Overflow
245.40	3.30	0.7242	5,706	
245.50	3.40	1.5999	6,113	
245.60	3.50	2.7311	6,529	Top of Pond Berm

The supporting calculations for the stage-storage discharge values are included in Appendix I. The peak flows discharging from the full subdivision site for the pre-development and post development controlled condition are summarized in Table 9.

Table 9: Pre and Post Development Controlled Peak Flow Rate Summary for The Full Subdivision Area

Design Storm (yr)	Peak Flows (m^3/s)		
	3 Hour Chicago Storm		
	Pre-Development	Post Development	Difference
25mm	0.086	0.063	-0.023
5	0.386	0.345	-0.041
10	0.542	0.458	-0.084
25	0.771	0.588	-0.183
50	0.975	0.764	-0.211
100	1.156	0.878	-0.278
250	1.446	1.040	-0.406

Table 9 illustrates that off site peak flows will decrease to a maximum peak flow of 1.040 cubic metres per second during the 250-year, 3 Hour Chicago storm event after implementation of the proposed stormwater management controls. It can be noted that with the proposed stormwater controls implemented, the proposed development will result in an overall decrease in runoff peak flow rates under all simulated storm events up to the 250-year event.

Table 10: Pre and Post Development Controlled Peak Flow Rate Summary for Coulter Branch of McEvoy Drain

Design Storm (yr)	Peak Flows (m^3/s)		
	3 Hour Chicago Storm		
	Pre-Development	Post Development	Difference
25mm	0.046	0.035	-0.011
5	0.208	0.079	-0.129
10	0.294	0.100	-0.194
25	0.420	0.130	-0.290
50	0.533	0.178	-0.355
100	0.636	0.206	-0.430
250	0.800	0.249	-0.551

Table 10 illustrates that peak flows directed to the Coulter Branch of the McEvoy municipal drain will decrease to a maximum peak flow of 0.249 cubic metres per second during the 250-year, 3 Hour Chicago storm event after implementation of the proposed stormwater management controls. The post development peak flows directed to the Coulter Branch will be decreased for all storm events simulated.

Figure 1 in Appendix I of this report provides the stormwater quantity storage volumes and resulting maximum flow through the primary and secondary outlets of the proposed wet pond.

5.0 OPERATION AND MAINTENANCE

The developer will be responsible for maintaining the stormwater management (SWM) facilities under the terms of the subdivision agreement until the works have been assumed by the Municipality of Strathroy-Caradoc. Regular inspections shall be completed after every significant storm event during the first two years after construction. After the initial two years of operation, inspections may be reduced to an annual inspection in July or August of each year. Once the contributing drainage area has been fully developed, the pond and oil and grit separator shall be cleaned out to original design elevations and volumes.

An annual maintenance report shall be prepared for the wet pond based upon an annual inspection or several inspections in a year. The annual report shall comment on the following information (MOE Stormwater Management Pond Design Manual, 2003):

1. Observations resulting from the inspection(s):
    - hydraulic operation of the facility (detention time, occurrence of overflows)
    - condition of vegetation in and around the facility
    - occurrence of obstructions at the inlet and the outlet
    - evidence of spills and oil/grease contamination
    - frequency of trash buildup
2. Measured sediment depths.
3. Any maintenance or operation activities that have taken place since the last report.
4. Any recommendations for inspection and maintenance program for the following year.

The proposed stormwater management wet pond facility has been designed to require minimal maintenance. The stormwater management pond has been designed to permit maintenance vehicle access from the east and southeast sides. A four metre wide maintenance path will extend from Street ‘C’ to the forebay berm with another four metre wide path extending from Street ‘C’ to the inlet headwall. A narrower path intended for maintenance pedestrian access will extend along the top of berm on the south side of the pond to the outlet infrastructure. When maintenance is required, the main cell and forebay permanent pool can be drained using a submersible pump

attached to a raft to draw water from the water surface. The discharge hoses must outlet through sediment filter bags, or another method acceptable to the municipality. Any trash or debris buildup noted in the pond shall be immediately cleaned out to prevent blockage of the outlet infrastructure.

The interval between successive sediment cleanouts in the pond can be calculated using a sediment loading rate of 1.25 cubic metres per hectare per year (Interpolating Table 6.3 of the Ontario Ministry of the Environment's "Stormwater Management Practices Planning and Design Manual, 2003" for 45% imperviousness) for Subwatershed Area No. PR.1. A 75% loss in sediment removal efficiency is the determining factor before sediment removal is required. The MOE SWMPDM requires a permanent pool volume of 1,263 cubic metres and an extended detention volume of 403 cubic metres to achieve 80% T.S.S. removal. The current pond design provides 1,813 cubic metres of permanent pool and 403 cubic metres of extended detention. A 5% loss in sediment removal efficiency would correspond to a permanent pool volume of 1,180 cubic metres. Therefore, the pond can accumulate 633 cubic metres of sediment deposition before cleanout is required.

The area contributing sediment load into the stormwater management facility is 10.083 hectares. Assuming a sediment removal rate of 80% results in an estimated sediment deposition within the pond of 10.08 cubic metres per year (1.25 x 10.083 x 0.80), the stormwater management facility must be cleaned out approximately every 62 years (633/10.08) after all construction activity has been completed within the subwatershed area. A more appropriate schedule for maintenance of the stormwater management wet pond would be every 20 to 25 years. The actual cleanout frequency shall be based upon the yearly inspection reports which will include the depth of sediment build up in the pond as these cleanout frequencies are estimates only.

The developer will be required to clean out the entire pond of construction sediment after construction has been completed and the site has been vegetated. A regular cleanout frequency will keep sediment accumulation close to the pond inlet. After the development has been completed, the frequency of cleanout can be adjusted based upon the results of the annual inspections. Sediment removed from the pond must be tested to determine appropriate disposal options.

Prior to being put into service after completion of construction, the oil and grit separator shall be inspected and cleaned out to original design volume. Once in service, for the first year, it shall be inspected every six months to determine the true sediment and oil loading rate. The first-year inspection observations made on the sediment and oil loading can be used to determine the necessary inspection frequency in subsequent years. The oil and grit separator shall be inspected immediately after an oil, fuel or chemical spill. The recommended maintenance schedule specifies annually, however,

results determined from field inspections can be used to develop a tailored maintenance schedule for the oil and grit separator. Maintenance can be performed using a standard vacuum truck by a licensed waste management company. The manufacturer of the installed OGS unit will provide maintenance requirements and recommendations as part of the technical documentation.

The proposed infiltration chamber system has been designed to require minimal maintenance. Pre-treatment provided by the upstream OGS unit will capture most sediment loading directed to the infiltration system. The infiltration system shall be inspected every six months for the first year of operation to determine the true sediment and oil loading rate. Future inspection intervals shall be adjusted based on observations of sediment loading and high-water elevations. Inspection ports in the isolator row and the upstream inlet structure will permit measurement of accumulated sediment levels and the water level in the system. If the measured accumulated sediment level is greater than the recommended level by the manufacturer, a cleanout shall be undertaken. The infiltration chamber system cleanout procedure generally involves using the Jetvac process. A jetvac truck with a culvert cleaning nozzle is used to flush sediment in the isolator row to the isolator row structure. A standard vacuum truck is then used to vacuum the structure sump as required. Depending on the specific infiltration system installed, the cleanout procedure may vary by manufacturer. The cleanout shall be completed according to the manufacturer's instructions.

The maintenance schedule for the infiltration system will likely be in excess of 20 years after construction has been completed in the subwatershed area, provided that the upstream oil and grit separator maintenance schedule is followed. Using a regular cleanout frequency will help keep accumulated sediments closer to the inlet. The cleanout frequency should be reviewed and adjusted, if necessary, based upon the results of the annual inspections.

6.0 EROSION AND SEDIMENTATION CONTROL

Erosion and sedimentation control measures must be installed prior to the commencement of on-site construction. These measures must be maintained throughout the construction period until the site has been stabilized with vegetation to prevent construction sediment from affecting external lands.

A detailed erosion and sediment control plan and the phased order of operations will be developed as part of the detailed subdivision design.

7.0 CONCLUSIONS

In our professional opinion, the proposed stormwater management wet pond and infiltration chamber system will control the increase in post development surface water runoff caused by increased impervious areas at equal to or below pre-development peak flow runoff rates for all storm events up to and including the 250-year storm event.

The extended detention stormwater storage volume proposed in the stormwater management wet pond exceeds the required quality storage volume for an enhanced level of protection prescribed in Table 3.2 of the Ontario Ministry of the Environment Stormwater Management Practices Planning & Design Manual, 2003. The proposed oil and grit separator and downstream infiltration chamber system has been appropriately sized to provide an "Enhanced" level of protection working in a treatment train approach. Therefore, a minimum "Enhanced" level of water quality protection (80% T.S.S.) will be achieved for Subwatershed Areas No. PR.1 and No. PR.4. Subwatershed Area No. PR.2 and Subwatershed Area No. PR.3 consists mostly of rooftop and landscaped rear yard area; therefore, the runoff contains low pollutant loading and does not require quality treatment.

Erosion and sediment control measures will be designed to limit the potential for construction sediment from affecting surrounding lands during the construction period. The erosion and sediment control measures will be developed during the detailed subdivision design phase.

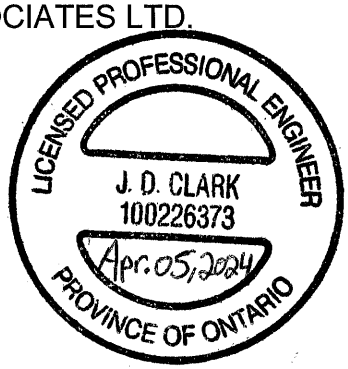
If the stormwater management design is implemented as designed, the proposed re-development of the site can be constructed without negative impacts to adjacent or downstream landowners.

Prepared by:

M.J. DAVENPORT & ASSOCIATES LTD.

Jacob Clark, P. Eng.

April 5, 2024



APPENDIX I

STORMWATER MANAGEMENT SUPPORTING CALCULATIONS

FIGURE 1

Adelaide Road Subdivision, 22805 Adelaide Road, Mount Brydges

STORMWATER MANAGEMENT FACILITY

COMBINED OUTFLOW FROM PROPOSED WET POND

ENTER THE PERMENANT WATER ELEVATION =	243.60	m		Last updated:	April 2, 2024
ENTER THE ORIFICE CONSTANT =	0.62				
ENTER THE SIZE OF THE QUALITY CONTROL ORIFICE =	75	mm			
ENTER THE ELEVATION OF THE QUALITY CONTROL ORIFICE =	243.60	m			
ENTER THE SIZE OF THE ORIFICE IN DICB #1=	300	mm	WIDTH OF DICB#1=	1.20	m
ENTER THE INVERT ELEVATION OF THE ABOVE ORIFICE =	243.80	m	GRATE INVERT OF DICB#1=	245.00	m
ENTER THE SIZE OF THE ORIFICE IN DICB #2=	n/a	mm	WIDTH OF DICB#2=	n/a	m
ENTER THE INVERT ELEVATION OF THE ABOVE ORIFICE =	n/a	m	GRATE INVERT OF DICB#2=	n/a	m
ENTER THE OVERFLOW WEIR WIDTH =	10.00	m			
ENTER THE OVERFLOW WEIR ELEVATION =	245.30	m			

ELEVATION	FLOW OUT QUALITY ORIFICE	QUANTITY CONTROL ORIFICE DICB #1	QUANTITY CONTROL ORIFICE DICB #2	FLOW OUT OVERFLOW WEIR	TOTAL FLOW CAPACITY	SURFACE AREA	INCREMENTAL STORAGE	PERMENANT STORAGE	ACTIVE STORAGE	COMMENTS	3 Hour Chicago	Storm Elevation
(m)	(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m2)	(m3)	(m3)	(m3)			
FOREBAY												
242.10	0.0000	0.0000	0.0000	0.0000	0.0000	96.1	0	0	0	Forebay bottom		
243.00	0.0000	0.0000	0.0000	0.0000	0.0000	245.1	153	153	0			
243.60	0.0000	0.0000	0.0000	0.0000	0.0000	471.3	215	368	0	perm. water level		
POND MAIN CELL (PERMANENT POOL)												
242.10	0.0000	0.0000	0.0000	0.0000	0.0000	657.5	0	0	0	pond bottom		
243.00	0.0000	0.0000	0.0000	0.0000	0.0000	976.1	735	735	0			
243.60	0.0000	0.0000	0.0000	0.0000	0.0000	1390.1	710	1445	0	perm. water level		
243.60	0.0000	0.0000	0.0000	0.0000	0.0000	1928.6	0	**1813**	0	perm. water level		
243.70	0.0030	0.0000	0.0000	0.0000	0.0030	2109.0	202	1813	202			
243.80	0.0049	0.0000	0.0000	0.0000	0.0049	2289.4	220	1813	422	40 cubic metres/ha	403	**243.79**
243.90	0.0062	0.0000	0.0000	0.0000	0.0062	2469.8	238	1813	660			
244.00	0.0073	0.0000	0.0000	0.0000	0.0073	2650.2	256	1813	916	25mm, 4 hour Chicago Storm	889	**243.99**
244.10	0.0083	0.0000	0.0000	0.0000	0.0083	2830.6	274	1813	1190			
244.20	0.0091	0.0000	0.0000	0.0000	0.0091	3011.0	292	1813	1482			
244.30	0.0099	0.0000	0.0000	0.0000	0.0099	3095.9	305	1813	1787			
244.40	0.0106	0.0000	0.0000	0.0000	0.0106	3180.7	314	1813	2101	5 Year Chicago Flood Level	1,911	**244.34**
244.50	0.0113	0.0000	0.0000	0.0000	0.0113	3265.6	322	1813	2423	10 Year Chicago Flood Level	2,350	**244.48**
244.60	0.0119	0.0000	0.0000	0.0000	0.0119	3350.5	331	1813	2754	25 Year Chicago Flood Level	2,948	**244.66**
244.70	0.0125	0.0000	0.0000	0.0000	0.0125	3435.4	339	1813	3093			
244.80	0.0131	0.0000	0.0000	0.0000	0.0131	3520.3	348	1813	3441	50 Year Chicago Flood Level	3,461	**244.81**
244.90	0.0136	0.0000	0.0000	0.0000	0.0136	3605.2	356	1813	3798	100 Year Chicago Flood Level	3,900	**244.93**
245.00	0.0142	0.0000	0.0000	0.0000	0.0142	3690.1	365	1813	4162	250 Year Chicago Flood Level	4,461	**245.08**
245.10	0.0147	0.0697	0.0000	0.0000	0.0844	3775.0	373	1813	4536			
245.20	0.0152	0.1972	0.0000	0.0000	0.2123	3859.9	382	1813	4917			
245.30	0.0156	0.2255	0.0000	0.0000	0.2412	3944.8	390	1813	5308			
245.40	0.0161	0.2338	0.0000	0.4743	0.7242	4028.7	399	1813	5706			
245.50	0.0166	0.2417	0.0000	1.3416	1.5999	4112.6	407	1813	6113			
245.60	0.0170	0.2494	0.0000	2.4648	2.7311	4196.6	415	1813	6529			

The peak flow into the SWM facility caused by 250 Year 3-hour Chicago Storm = 2.336 m3/s

Emergency Overflow Weir capacity calculated using MTO broad-crested weir equation, Q = Cd x b x H1.5, Cd used as 1.5.
The Return Period Flood elevations are based on the required storage for the 3 hour Chicago Storms unless otherwise stated.

FIGURE 2

Adelaide Road Subdivision, 22805 Adelaide Road, Mount Brydges

STORMWATER MANAGEMENT FACILITY

DRAWDOWN TIME FOR EXTENDED DETENTION 40 m3/ha

AREA OF POND SURFACE =	1928.55	m2
AREA/DEPTH CONSTANT =	1804.02	m2/m
ORIFICE SIZE =	75.00	mm
GRAVITY, g =	9.81	
ORIFICE CONSTANT, C =	0.62	

TIME	STARTING HEAD	ENDING HEAD	FLOW	TOTAL FLOW
(sec)	(m)	(m)	(m3/s)	(m3)
4335.60	0.190	0.180	0.0052	22.625
4422.25	0.180	0.170	0.0051	22.445
4517.74	0.170	0.160	0.0049	22.265
4623.49	0.160	0.150	0.0048	22.085
4741.30	0.150	0.140	0.0046	21.905
4873.40	0.140	0.130	0.0045	21.725
5022.67	0.130	0.120	0.0043	21.545
5192.83	0.120	0.110	0.0041	21.365
5388.84	0.110	0.100	0.0039	21.186
5617.46	0.100	0.090	0.0037	21.007
5888.21	0.090	0.080	0.0035	20.828
6214.92	0.080	0.070	0.0033	20.650
3252.83	0.070	0.065	0.0032	10.253
3365.66	0.065	0.060	0.0030	10.209
3493.57	0.060	0.055	0.0029	10.164
3640.09	0.055	0.050	0.0028	10.119
3810.06	0.050	0.045	0.0026	10.075
4010.26	0.045	0.040	0.0025	10.030
4250.56	0.040	0.035	0.0023	9.987
4546.05	0.035	0.030	0.0022	9.943
4921.09	0.030	0.025	0.0020	9.901
5418.45	0.025	0.020	0.0018	9.861
6122.05	0.020	0.015	0.0016	9.826
7228.46	0.015	0.010	0.0014	9.805
7219.47	0.010	0.006	0.0011	7.834
2156.63	0.006	0.005	0.0009	1.940
2383.24	0.005	0.004	0.0008	1.940
2702.58	0.004	0.003	0.0007	1.940
3202.78	0.003	0.002	0.0006	1.943
4170.04	0.002	0.001	0.0005	1.959
9052.22	0.001	0.000	0.0003	2.468
145784.79	seconds			**399.83** m3
40.50	Time in Hours			

Column 1 represents the estimated drawdown time for the volume of water shown in Column 5. The required volume is 403 cubic metres based upon 40 m3/ha.

FIGURE 3

Adelaide Road Subdivision, 22805 Adelaide Road, Mount Brydges

STORMWATER MANAGEMENT FACILITY

DRAWDOWN TIME FOR ACTIVE STORAGE VOLUME OF 889 m3

AREA OF POND SURFACE =	1928.55	m2
AREA/DEPTH CONSTANT =	1804.02	m2/m
ORIFICE SIZE =	75.00	mm
GRAVITY, g =	9.81	
ORIFICE CONSTANT, C =	0.62	

TIME	STARTING HEAD	ENDING HEAD	FLOW	TOTAL FLOW
(sec)	(m)	(m)	(m3/s)	(m3)
6991.02	0.390	0.370	0.0075	52.286
7083.52	0.370	0.350	0.0073	51.565
7186.96	0.350	0.330	0.0071	50.844
7303.10	0.330	0.310	0.0069	50.123
7434.13	0.310	0.290	0.0066	49.402
7582.79	0.290	0.270	0.0064	48.681
7752.57	0.270	0.250	0.0062	47.961
3947.59	0.250	0.240	0.0060	23.707
4000.05	0.240	0.230	0.0059	23.526
4056.65	0.230	0.220	0.0058	23.346
4117.87	0.220	0.210	0.0056	23.166
4184.30	0.210	0.200	0.0055	22.985
4256.60	0.200	0.190	0.0054	22.805
4335.60	0.190	0.180	0.0052	22.625
4422.25	0.180	0.170	0.0051	22.445
4517.74	0.170	0.160	0.0049	22.265
4623.49	0.160	0.150	0.0048	22.085
4741.30	0.150	0.140	0.0046	21.905
4873.40	0.140	0.130	0.0045	21.725
5022.67	0.130	0.120	0.0043	21.545
5192.83	0.120	0.110	0.0041	21.365
5388.84	0.110	0.100	0.0039	21.186
5617.46	0.100	0.090	0.0037	21.007
5888.21	0.090	0.080	0.0035	20.828
6214.92	0.080	0.070	0.0033	20.650
6618.77	0.070	0.060	0.0031	20.473
7134.01	0.060	0.050	0.0028	20.299
7820.80	0.050	0.040	0.0026	20.128
8797.33	0.040	0.030	0.0023	19.968
4921.09	0.030	0.025	0.0020	9.901
5418.45	0.025	0.020	0.0018	9.861
6122.05	0.020	0.015	0.0016	9.826
7228.46	0.015	0.010	0.0014	9.805
28747.27	0.010	0.000	0.0009	24.785
219544.08	seconds			**895.07** m3
60.98	Time in Hours			

Column 1 represents the estimated drawdown time for the volume of water shown in Column 5. The required volume is 889 cubic metres based upon the 25mm storm event.

FIGURE 4 - PRE-DEVELOPMENT SUBWATERSHED AREA HYDROLOGIC PARAMETERS (UNCALIBRATED)

Project Name: Adelaide Road Subdivision, 22805 Adelaide Road, Mount Brydges
Project No. : 17-D-5463
Rain Gauge: London Airport

Subwatershed Area No. And Description		Catchment Area (ha), Land Use, Hydrologic Soil Group, CN Value and Runoff Coefficient													
		Hydrologic Soil Group 'A'							Hydrologic Soil Group 'C'						
Name	Description	Impervious 'Ia' = 2.0 'C' = 0.90 CN = 98	Gravel 'Ia' = 2.0 'C' = 0.80 CN = 76	Grass Yard 'Ia' = 5.0 'C' = 0.15 CN = 39	Woodlots and Forest 'Ia' = 8.0 'C' = 0.12 CN = 50	Pasture and Unimproved Land 'Ia' = 8.0 'C' = 0.17 CN = 58	Crop and Other Improved Land 'Ia' = 8.0 'C' = 0.22 CN = 66	Lakes and Wetland 'Ia' = 8.0 'C' = 0.05 CN = 50	Impervious 'Ia' = 2.0 'C' = 0.90 CN = 98	Gravel 'Ia' = 2.0 'C' = 0.80 CN = 80	Grass Yard 'Ia' = 5.0 'C' = 0.22 CN = 73	Woodlots and Forest 'Ia' = 8.0 'C' = 0.18 CN = 71	Pasture and Unimproved Land 'Ia' = 8.0 'C' = 0.30 CN = 76	Crop and Other Improved Land 'Ia' = 8.0 'C' = 0.45 CN = 82	Lakes and Wetland 'Ia' = 8.0 'C' = 0.05 CN = 50	**Total**
PRE.1	Flows to Coulter Branch				0.082		3.201		0.067		0.374	0.300		4.431		**8.455**
PRE.2	To Main Branch of McEvoy				0.054		2.013		0.008		0.133	0.458		5.077		**7.743**
EXT.1	Road Area to Coulter Branch	0.129		0.226					0.253		0.329					**0.937**
EXT.2	Adelaide Road R.O.W. Area								0.099		0.132					**0.231**
EXT.3	Part of 22755 Adelaide Rd.								0.023		0.041					**0.064**
EXT.4	22755/22753 Adelaide Rd.								0.072		0.132					**0.204**
EXT.5	Enbridge Gas Property								0.118		0.050					**0.168**

Subwatershed Area No. And Description		Catchment Parameters													
Name	Description	Total Impervious Percent (%)	Directly Connected Impervious Percent (%)	Visual Otthymo Command (NasHyd or StandHyd)	Weighted 'CN' (Excludes Imp. Area if StandHyd)	Composite Runoff Coefficient	Length of Catchment (m)	High Elevation Along Longest Flow Path (m)	Low Elevation Along Longest Flow Path (m)	Catchment Slope Along Longest Flow Path (%)	Slope Class (0-2% Flat, 2-6% Rolling, >6% Hilly)	Time of Concentration using Airport Method (min)	Time of Concentration using Bransby-Williams Method (min)	Minimum Time of Concentration (min)	Time to Peak (min)	Time to Peak (hr)
PRE.1		0.8%	0.8%	NasHyd	75.0	0.34	430	250	244.5	1.3	Flat	41.8	18.8	10.0	28.0	0.467
PRE.2		0.1%	0.1%	NasHyd	76.8	0.37	405	248.5	246	0.6	Flat	49.2	20.7	10.0	33.0	0.549
EXT.1		40.8%	5.0%	StandHyd	59.2	0.48	450	247	244	0.7	Flat	39.5	28.0	10.0	18.8	0.313
EXT.2		42.9%	42.9%	StandHyd	73.0	0.51	15	247.5	246.25	8.3	Hilly	2.9	0.6	10.0	6.7	0.112
EXT.3		35.9%	19.4%	StandHyd	73.0	0.46	20	247.15	246.5	3.3	Rolling	5.1	1.2	10.0	6.7	0.112
EXT.4		35.3%	20.0%	StandHyd	73.0	0.46	60	247.35	246	2.2	Rolling	10.1	3.4	10.0	6.7	0.112
EXT.5		70.0%	50.0%	StandHyd	73.0	0.70	38	244.5	244.2	0.8	Flat	5.0	2.7	10.0	6.7	0.112

Notes:
1. Curve Number (CN) is based upon Design Chart 1.09: Soil/Land Use Curve Numbers of the M.T.O. Drainage Management Manual, 1997.
2. Initial Abstraction values taken from the Strathroy-Caradoc Servicing Standards, October 2021.
3. Runoff coefficients taken from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997.
4. The CN values used for each subcatchment are the weighted values calculated based upon the different soils and land use. Excludes impervious area for StandHyd command.
5. Time to Peak Calculated as 0.67 x Time of Concentration
6. Time of Concentration calculated using the Airport Formula where C< 0.40, where C > 0.40, the Bransby Williams Formula was used.
7. Calculated composite runoff coefficients (C) have been adjusted for storm events exceeding the 10-year return period by multiplying by: 1.10 for 25 year, 1.20 for 50 year and 1.25 for 100 year
8. Minimum Time to Concentration used in the Hydrologic Model is 10 minutes (0.167 hr)

FIGURE 5 - PRE-DEVELOPMENT CONVERSION OF CN TO CN* (UNCALIBRATED)

Project Name: Adelaide Road Subdivision, 22805 Adelaide Road, Mount Brydges
Project No. : 17-D-5463
Rain Gauge: London Airport

Subwatershed Area No.	VOH Command	CN (AMC II)	CN (AMC III)	S (mm)	Calculated I_a	P	Q	Composite I_a	S*	CN* (AMC III)	CN* (AMC II)
PRE.1	NasHyd	75.0	88	34.64	5.20	73	44.88	7.8	29.48	90	**78**
PRE.2	NasHyd	76.8	89	31.39	4.71	73	46.78	7.9	25.41	91	**79**
EXT.1	StandHyd	59.2	77	75.87	7.59	73	30.29	5.0	84.68	75	**56**
EXT.2	StandHyd	73.0	87	37.95	5.69	73	43.04	5.0	39.44	87	**73**
EXT.3	StandHyd	73.0	87	37.95	5.69	73	43.04	5.0	39.44	87	**73**
EXT.4	StandHyd	73.0	87	37.95	5.69	73	43.04	5.0	39.44	87	**73**
EXT.5	StandHyd	73.0	87	37.95	5.69	73	43.04	5.0	39.44	87	**73**

Notes:
1. Curve Number (CN) is based upon Design Chart 1.09: Soil/Land Use Curve Numbers of the M.T.O. Drainage Management Manual, 1997.
2. The CN values used for each subcatchment are the weighted values calculated based upon the different soils and land use.
3. Composite Ia refers to the weighted Initial Abstraction. Excludes the impervious area when using StandHyd command.

FIGURE 6 - POST-DEVELOPMENT SUBWATERSHED AREA HYDROLOGIC PARAMETERS (UNCALIBRATED)

Project Name: Adelaide Road Subdivision, 22805 Adelaide Road, Mount Brydges
Project No. : 17-D-5463
Rain Gauge: London Airport

Subwatershed Area No. And Description		Catchment Area (ha), Land Use, Hydrologic Soil Group, CN Value and Runoff Coefficient													
		Hydrologic Soil Group 'A'							Hydrologic Soil Group 'C'						
Name	Description	Impervious 'Ia' = 2.0 'C' = 0.90 CN = 98	Gravel 'Ia' = 2.0 'C' = 0.80 CN = 76	Grass Yard 'Ia' = 5.0 'C' = 0.15 CN = 39	Woodlots and Forest 'Ia' = 8.0 'C' = 0.12 CN = 50	Pasture and Unimproved Land 'Ia' = 8.0 'C' = 0.17 CN = 58	Crop and Other Improved Land 'Ia' = 8.0 'C' = 0.22 CN = 66	Lakes and Wetland 'Ia' = 8.0 'C' = 0.05 CN = 50	Impervious 'Ia' = 2.0 'C' = 0.90 CN = 98	Gravel 'Ia' = 2.0 'C' = 0.80 CN = 80	Grass Yard 'Ia' = 5.0 'C' = 0.22 CN = 73	Woodlots and Forest 'Ia' = 8.0 'C' = 0.18 CN = 71	Pasture and Unimproved Land 'Ia' = 8.0 'C' = 0.30 CN = 76	Crop and Other Improved Land 'Ia' = 8.0 'C' = 0.45 CN = 82	Lakes and Wetland 'Ia' = 8.0 'C' = 0.05 CN = 50	**Total**
PR.1	Area to SWM Pond	1.878		2.297					2.666		3.242					**10.083**
PR.2	Rear Yards to McEvoy Drain	0.151		0.101	0.054	0.215			0.366		0.467	0.458	0.923			**2.735**
PR.3	Uncontrolled Rear Yards	0.144		0.375					0.142		0.537					**1.198**
PR.4	Area to Adelaide Stm sewer	0.066		0.099					0.807		1.211					**2.183**
EXT.1	Road Area to Coulter Branch	0.129		0.226					0.253		0.329					**0.937**
EXT.2	Adelaide Road R.O.W. Area								0.099		0.132					**0.231**
EXT.3	Part of 22755 Adelaide Rd.								0.023		0.041					**0.064**
EXT.4	22755/22753 Adelaide Rd.								0.072		0.132					**0.204**
EXT.5	Enbridge Gas Property								0.118		0.050					**0.168**

Subwatershed Area No. And Description		Catchment Parameters														
Name	Description	Total Impervious Percent (%)	Directly Connected Impervious Percent (%)	Visual Otthymo Command (NasHyd or StandHyd)	Weighted 'CN' (Excludes Imp. Area if StandHyd)	Composite Runoff Coefficient	Length of Catchment (m)	High Elevation Along Longest Flow Path (m)	Low Elevation Along Longest Flow Path (m)	Catchment Slope Along Longest Flow Path (%)	Slope Class (0-2% Flat, 2-6% Rolling, >6% Hilly)	Time of Concentration using Airport Method (min)	Time of Concentration using Bransby-Williams Method (min)	Minimum Time of Concentration (min)	Time to Peak (min)	Time to Peak (hr)
PR.1		45.1%	36.0%	StandHyd	58.9	0.51	100	247	245	2.0	Flat	12.0	3.9	10.0	6.7	0.112
PR.2		18.9%	n/a	NasHyd	75.5	0.36	360	248	245	0.8	Flat	42.7	19.2	10.0	28.6	0.476
PR.3		23.9%	5.0%	StandHyd	59.0	0.36	31	248.6	246.5	6.8	Hilly	6.3	1.2	10.0	6.7	0.112
PR.4		40.0%	30.0%	StandHyd	70.4	0.49	95	249.4	248.5	0.9	Flat	15.8	5.1	10.0	6.7	0.112
EXT.1		40.8%	5.0%	StandHyd	59.2	0.48	450	247	244	0.7	Flat	39.5	28.0	10.0	18.8	0.313
EXT.2		42.9%	42.9%	StandHyd	73.0	0.51	15	247.5	246.25	8.3	Hilly	2.9	0.6	10.0	6.7	0.112
EXT.3		35.9%	19.4%	StandHyd	73.0	0.46	20	247.15	246.5	3.3	Rolling	5.1	1.2	10.0	6.7	0.112
EXT.4		35.3%	20.0%	StandHyd	73.0	0.46	60	247.35	246	2.2	Rolling	10.1	3.4	10.0	6.7	0.112
EXT.5		70.0%	50.0%	StandHyd	73.0	0.70	38	244.5	244.2	0.8	Flat	5.0	2.7	10.0	6.7	0.112

Notes:

1. Curve Number (CN) is based upon Design Chart 1.09: Soil/Land Use Curve Numbers of the M.T.O. Drainage Management Manual, 1997.
2. Initial Abstraction values taken from the Strathroy-Caradoc Servicing Standards, October 2021.
3. Runoff coefficients taken from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997.
4. The CN values used for each subcatchment are the weighted values calculated based upon the different soils and land use. Excludes impervious area for StandHyd command.
5. Time to Peak Calculated as 0.67 x Time of Concentration
6. Time of Concentration calculated using the Airport Formula where C< 0.40, where C > 0.40, the Bransby Williams Formula was used.
7. Calculated composite runoff coefficients (C) have been adjusted for storm events exceeding the 10-year return period by multiplying by: 1.10 for 25 year, 1.20 for 50 year and 1.25 for 100 year
8. Minimum Time to Concentration used in the Hydrologic Model is 10 minutes (0.167 hr)

FIGURE 7 - POST-DEVELOPMENT CONVERSION OF CN TO CN* (UNCALIBRATED)

Project Name: Adelaide Road Subdivision, 22805 Adelaide Road, Mount Brydges
Project No. : 17-D-5463
Rain Gauge: London Airport

Subwatershed Area No.	VOH Command	CN (AMC II)	CN (AMC III)	S (mm)	Calculated I_a	P	Q	Composite I_a	S*	CN* (AMC III)	CN* (AMC II)
PR.1	StandHyd	58.9	76	80.21	8.02	73	29.08	5.0	91.00	74	**55**
PR.2	NasHyd	75.5	88	34.64	5.20	73	44.88	6.2	32.54	89	**76**
PR.3	StandHyd	59.0	77	75.87	7.59	73	30.29	5.0	84.68	75	**56**
PR.4	StandHyd	70.4	85	44.82	6.72	73	39.54	5.0	48.95	84	**68**
EXT.1	StandHyd	59.2	77	75.87	7.59	73	30.29	5.0	84.68	75	**56**
EXT.2	StandHyd	73.0	87	37.95	5.69	73	43.04	5.0	39.44	87	**73**
EXT.3	StandHyd	73.0	87	37.95	5.69	73	43.04	5.0	39.44	87	**73**
EXT.4	StandHyd	73.0	87	37.95	5.69	73	43.04	5.0	39.44	87	**73**
EXT.5	StandHyd	73.0	87	37.95	5.69	73	43.04	5.0	39.44	87	**73**

Notes:
1. Curve Number (CN) is based upon Design Chart 1.09: Soil/Land Use Curve Numbers of the M.T.O. Drainage Management Manual, 1997.
2. The CN values used for each subcatchment are the weighted values calculated based upon the different soils and land use.
3. Composite Ia refers to the weighted Initial Abstraction. Excludes the impervious area when using StandHyd command.

SUPPORTING CALCULATIONS

1. STORMWATER MANAGEMENT POND - ORIFICE OUTLET

The flows through the orifice outlet was calculated using the standard orifice equation with a discharge coefficient of 0.62.

$$Q = CA(2gh)^{0.5}$$

Where Q is the flow (cms), C is the discharge coefficient, A is the area of the orifice (sm), g is gravity constant (9.81 m/s^2), and h is the head over the orifice (m).

2. FOREBAY SIZING CALCULATIONS (WET POND)

Dist. = $(rQ_p/v_s)^{0.5}$
r = 3:1 (approximately based upon length and width at mid depth)
Q_p = 0.0072 cms (peak flow rate from pond during design quality storm)
v_s = 0.0003 m/s (settling velocity for 0.15 mm diameter particles)
Dist = 8.49 metres

or

Dist = 8Q/dv
Q = 1.931 cms (Maximum capacity of upstream 1050mm diameter pipe at 0.50%)
d = 1.5 m (depth of the forebay)
v = 0.5 m/s (velocity of water preferred at forebay berm)
Dist = 20.60m

Minimum Bottom Width = Distance/8
Minimum Bottom Width = **2.57m**

Provided forebay length is about 29.26 metres with a bottom width of 5.23 metres, therefore, the forebay size is sufficient. In addition, the forebay has a length to width ratio greater than 2:1, which provides greater sediment removal and retention value.

Adelaide Road Subdivision, 22805 Adelaide Road, Mount Brydges
Stormtech Chamber System No.1 Design

Stormwater Management Infiltration Chamber System No. 1 Design Features

Feature	Parameter
Level of Protection	Enhanced – 80% TSS Removal (With pre-treatment by Oil and Grit Separator).
Contributing Area	2.183 ha
Percent Impervious	40.0%
Chamber Selected	Stormtech SC-310
Number of Chambers	97
System Layout	7-Rows of 11, 2-Rows of 6, 1-Row of 5, 1-Row of 3
System Footprint	246.55 m^2
Storage Volume	94.5 m^3
System Storage Depth	0.71 metres
Inlet Design	525mm diameter inlet pipe at Elevation = 245.36
Bottom of System	Bottom of stone at Elevation = 245.21
Outlet Design	525mm diameter outlet pipe at Elevation = 245.92
Approx. Groundwater Elev.	Elevation = 244.60 (Estimated)
Separation to Groundwater	0.61 metres (Estimated)

Calculated Maximum Allowable Practice Depth

The maximum depth of the proposed infiltration chamber system in the northeast corner of the site is dependent on the native soil infiltration rate, an infiltration rate factor of safety, porosity of the chosen gravel storage and the desired drawdown time of the practice in-between storm events. The safety correction factor is based on ratio of mean measured infiltration rate at the bottom elevation of the BMP divided by the measured infiltration rate of the least permeable soil horizon within 1.5m taken from Table C2, Appendix C of the LIDSWMPPD.

GHD performed a geotechnical investigation and conducted soil testing on the subject site in December 2017. A series of boreholes were advanced, and samples taken for analysis. Generally, the boreholes taken on site encountered a layer of topsoil underlain by a native sand material. Boreholes 4 and 5 were taken closest to the location of the proposed infiltration system and encountered a layer of topsoil underlain by sand. The proposed depth of the infiltration system would locate it in the layer of sand located in the two boreholes. GHD determined that the hydraulic conductivity of the native sand in the area of the proposed stormwater management pond ranged from approximately 10^{-2} to 10^{-3} cm/sec. Using Table C1 in Appendix C of the LIDSWMPPD to convert hydraulic conductivity to infiltration rate corresponds to measured infiltration rates ranging from 75mm/hr to 150mm/hr. To be conservative when designing the maximum depth of the

infiltration chambers and when using the LID chamber feature in Visual Otthymo to simulate the stormwater runoff quantity reduction, an infiltration rate of 75mm/hr will be used.

The testing conducted by GHD at Boreholes 4 and 5 closest to the location of the proposed infiltration chambers identified two primary soil horizons in varying depths. A surficial layer of topsoil underlain by native sand material were encountered in both boreholes. The topsoil will be removed prior to necessary cut and fill operations. The soakaway pit will be constructed within the native sand soil and from the borehole logs, the native sand extends a minimum of 1.5 metres below the bottom of the proposed infiltration system base stone layer. Therefore, it is expected that the soil horizon in the post-development conditions will be homogeneous for at least 1.5m below the proposed chamber system. From this, the derived ratio of mean measured infiltration rates is 1.0. This indicates that the safety correction factor used in the calculation of maximum depth will be 2.5 from Appendix C of the LIDSWMPPD.

From the LIDSWMPPD guide 2010, page 4-57, the maximum depth for the measured infiltration rate can be calculated using:

$$d_{r\,max} = i/f \times t_s/V_r$$

Where:

- $d_{r\,max}$ = Maximum stone reservoir depth (mm)
- i = Infiltration rate for native soils (mm/hr)
  = 75 mm/hr
- f = Safety correction factor
  = 2.5
- V_r = Void space ratio for aggregate used
  = 0.40 (For 19mm to 50mm clear stone)
- t_s = Time to drain
  = 48 hours (recommended by guide)

$$d_{r\,max} = (75/2.5) \times (48/0.40)$$
$$d_{r\,max} = 3{,}600mm$$

Despite the allowable depth of 3.60m, the proposed infiltration system has a design depth of 0.71 metres. This provides for a greater factor of safety in the design of the facility.

Project: **Adelaide Road Subdivision**

Chamber Model -	SC-310	
Units -	**Metric**	
	20	
Number of chambers -	97	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	245.21	m
Amount of Stone Above Chambers -	152	mm
Amount of Stone Below Chambers -	152	mm

246.55 sq.meters Min. Area - 213.86 sq.meters

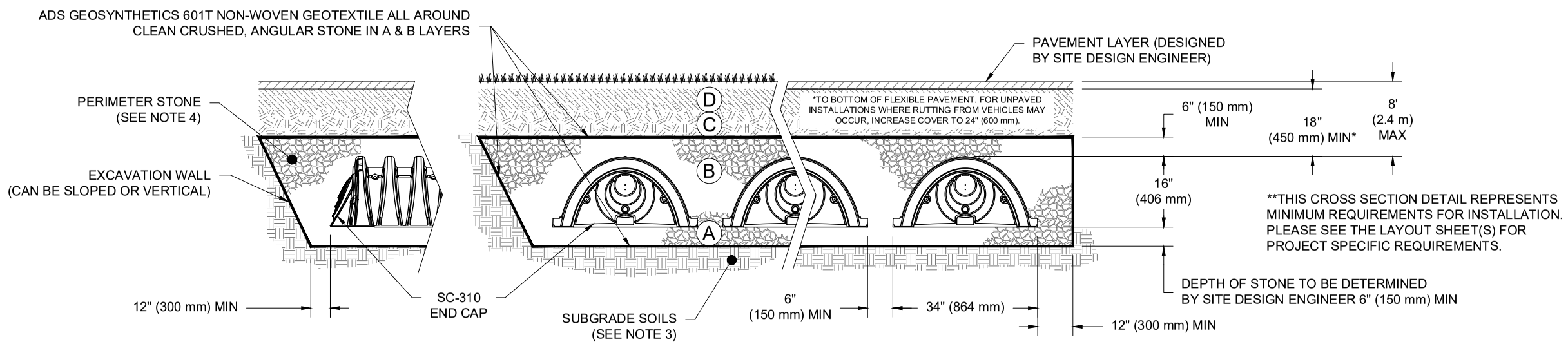
StormTech SC-310 Cumulative Storage Volumes

Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Total Chamber *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Ch & St *(cubic meters)*	Cumulative Chamber *(cubic meters)*	Elevation *(meters)*
711	0.00	0.00	2.51	2.51	94.500	245.92
686	0.00	0.00	2.51	2.51	91.995	245.90
660	0.00	0.00	2.51	2.51	89.489	245.87
635	0.00	0.00	2.51	2.51	86.984	245.85
610	0.00	0.00	2.51	2.51	84.478	245.82
584	0.00	0.00	2.51	2.51	81.973	245.79
559	0.00	0.16	2.44	2.60	79.467	245.77
533	0.00	0.43	2.34	2.76	76.864	245.74
508	0.01	0.73	2.21	2.94	74.104	245.72
483	0.02	1.50	1.91	3.40	71.160	245.69
457	0.02	1.94	1.73	3.67	67.755	245.67
432	0.02	2.27	1.60	3.87	64.089	245.64
406	0.03	2.54	1.49	4.03	60.223	245.62
381	0.03	2.79	1.39	4.18	56.193	245.59
356	0.03	3.01	1.30	4.31	52.013	245.57
330	0.03	3.17	1.24	4.41	47.702	245.54
305	0.03	3.34	1.17	4.51	43.293	245.51
279	0.04	3.50	1.10	4.61	38.783	245.49
254	0.04	3.64	1.05	4.69	34.175	245.46
229	0.04	3.75	1.00	4.76	29.485	245.44
203	0.04	3.86	0.96	4.82	24.728	245.41
178	0.04	3.94	0.93	4.87	19.905	245.39
152	0.00	0.00	2.51	2.51	15.034	245.36
127	0.00	0.00	2.51	2.51	12.528	245.34
102	0.00	0.00	2.51	2.51	10.022	245.31
76	0.00	0.00	2.51	2.51	7.517	245.29
51	0.00	0.00	2.51	2.51	5.011	245.26
25	0.00	0.00	2.51	2.51	2.506	245.24

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

SC-310
STANDARD CROSS SECTION
DATE: 12/21/23 DRAWN: SLS
PROJECT #: CHECKED: SLS

DATE	DRWN	CHKD	DESCRIPTION

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026

Stormceptor®

Rinker MATERIALS™

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

03/11/2024

Province:	Ontario
City:	Mount Brydges
Nearest Rainfall Station:	LONDON CS
Climate Station Id:	6144478
Years of Rainfall Data:	20

Site Name:	Subwatershed PR.4

Drainage Area (ha):	2.183
% Imperviousness:	40.00

Runoff Coefficient 'c': 0.54

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	43.04
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	
Estimated Average Annual Sediment Volume (L/yr):	876

Project Name:	Adelaide Road Subdivision
Project Number:	17-D-5463
Designer Name:	Mike Davenport
Designer Company:	MJ Davenport
Designer Email:	mmdavenport@gmail.com
Designer Phone:	705-745-6676
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	67
EFO6	81
EFO8	88
EFO10	92
EFO12	95

Recommended Stormceptor EFO Model: EFO6

Estimated Net Annual Sediment (TSS) Load Reduction (%): 81

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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

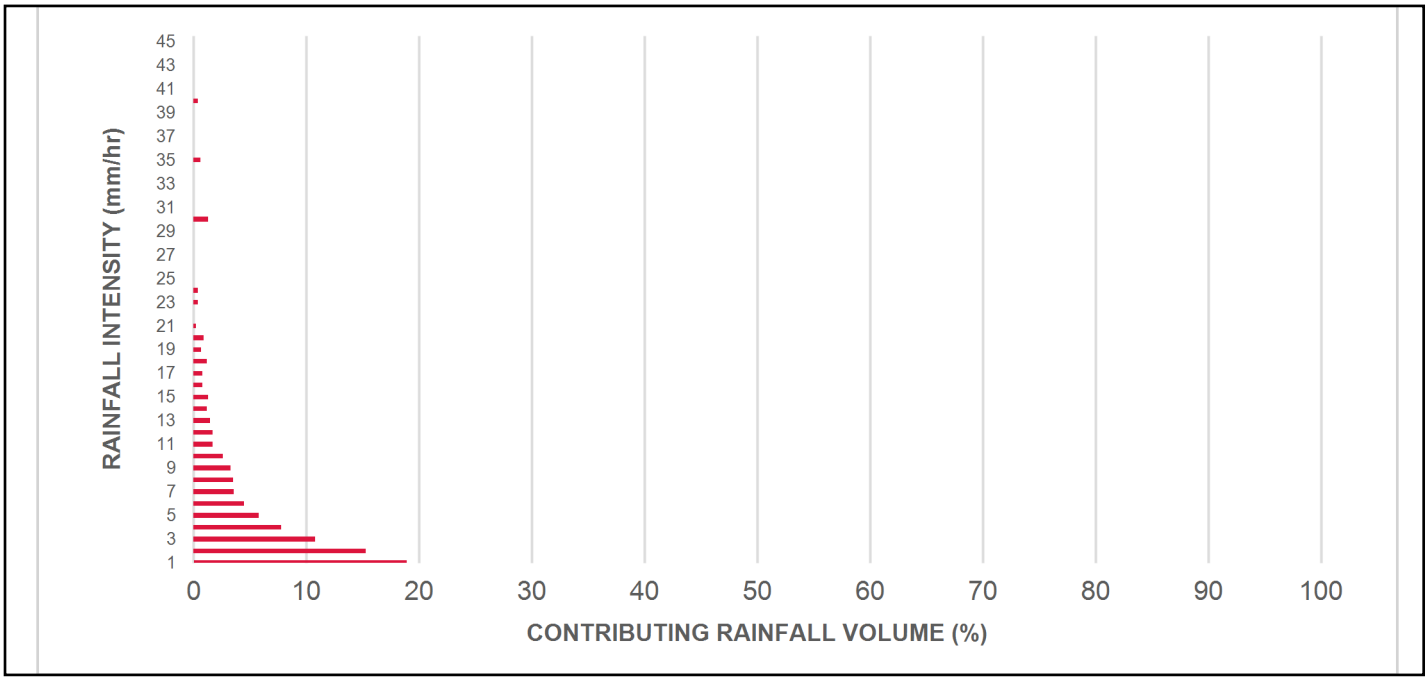
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

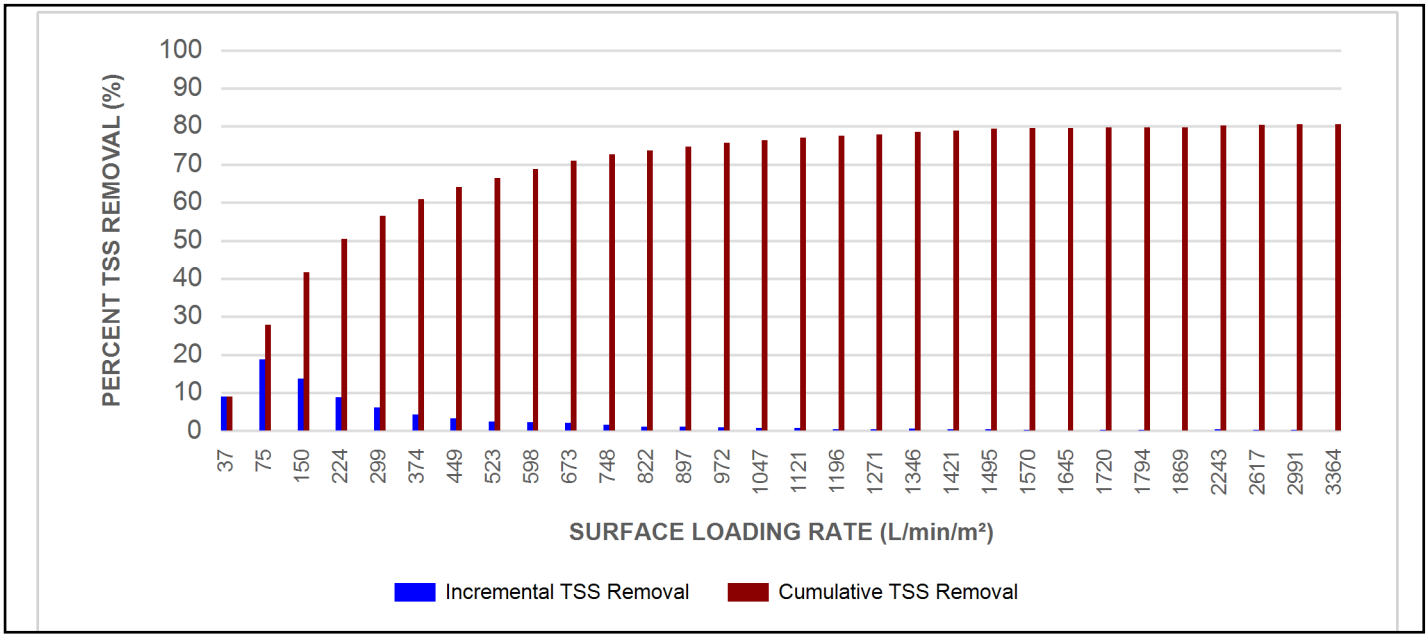
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	9.0	9.0	1.64	98.0	37.0	100	9.0	9.0
1.00	18.9	27.8	3.28	197.0	75.0	100	18.9	27.8
2.00	15.3	43.2	6.55	393.0	150.0	89	13.7	41.6
3.00	10.8	53.9	9.83	590.0	224.0	82	8.9	50.4
4.00	7.8	61.7	13.11	787.0	299.0	78	6.1	56.5
5.00	5.8	67.5	16.39	983.0	374.0	75	4.4	60.9
6.00	4.5	72.0	19.66	1180.0	449.0	72	3.2	64.1
7.00	3.6	75.6	22.94	1376.0	523.0	68	2.4	66.5
8.00	3.5	79.1	26.22	1573.0	598.0	65	2.3	68.8
9.00	3.3	82.4	29.49	1770.0	673.0	64	2.1	70.9
10.00	2.6	85.0	32.77	1966.0	748.0	64	1.7	72.6
11.00	1.7	86.7	36.05	2163.0	822.0	63	1.1	73.7
12.00	1.7	88.4	39.33	2360.0	897.0	62	1.0	74.7
13.00	1.5	89.8	42.60	2556.0	972.0	62	0.9	75.6
14.00	1.2	91.0	45.88	2753.0	1047.0	61	0.7	76.3
15.00	1.3	92.3	49.16	2949.0	1121.0	59	0.7	77.1
16.00	0.8	93.0	52.43	3146.0	1196.0	57	0.4	77.5
17.00	0.8	93.8	55.71	3343.0	1271.0	55	0.4	77.9
18.00	1.2	95.0	58.99	3539.0	1346.0	54	0.6	78.6
19.00	0.7	95.7	62.27	3736.0	1421.0	52	0.4	78.9
20.00	0.9	96.6	65.54	3933.0	1495.0	49	0.5	79.4
21.00	0.2	96.8	68.82	4129.0	1570.0	47	0.1	79.5
22.00	0.0	96.8	72.10	4326.0	1645.0	45	0.0	79.5
23.00	0.4	97.2	75.37	4522.0	1720.0	43	0.2	79.7
24.00	0.4	97.7	78.65	4719.0	1794.0	41	0.2	79.8
25.00	0.0	97.7	81.93	4916.0	1869.0	39	0.0	79.8
30.00	1.3	99.0	98.31	5899.0	2243.0	33	0.4	80.3
35.00	0.6	99.6	114.70	6882.0	2617.0	28	0.2	80.4
40.00	0.4	100.0	131.08	7865.0	2991.0	25	0.1	80.5
45.00	0.0	100.0	147.47	8848.0	3364.0	22	0.0	80.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**81 %**

Climate Station ID: 6144478 *Years of Rainfall Data*: 20

RAINFALL DATA FROM LONDON CS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

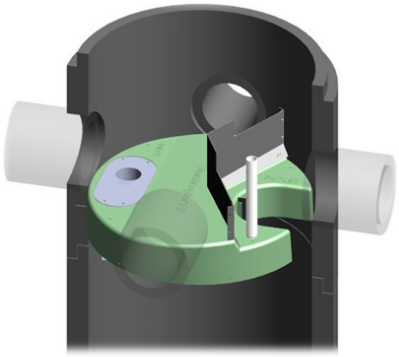
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

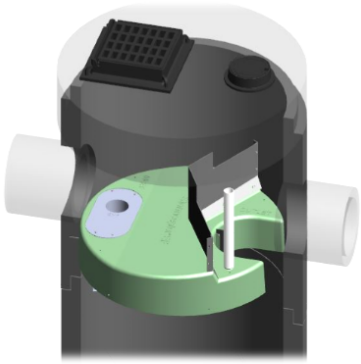
DESIGN FLEXIBILITY

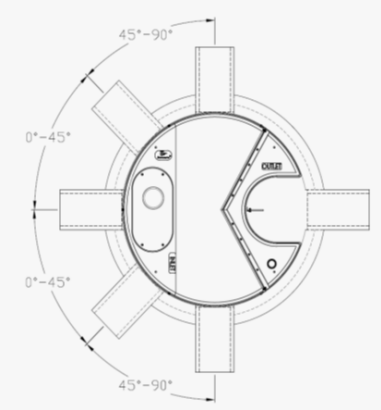
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

OIL CAPTURE AND RETENTION

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







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

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

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

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

3.2 SIZING METHODOLOGY

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

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

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

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

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

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

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

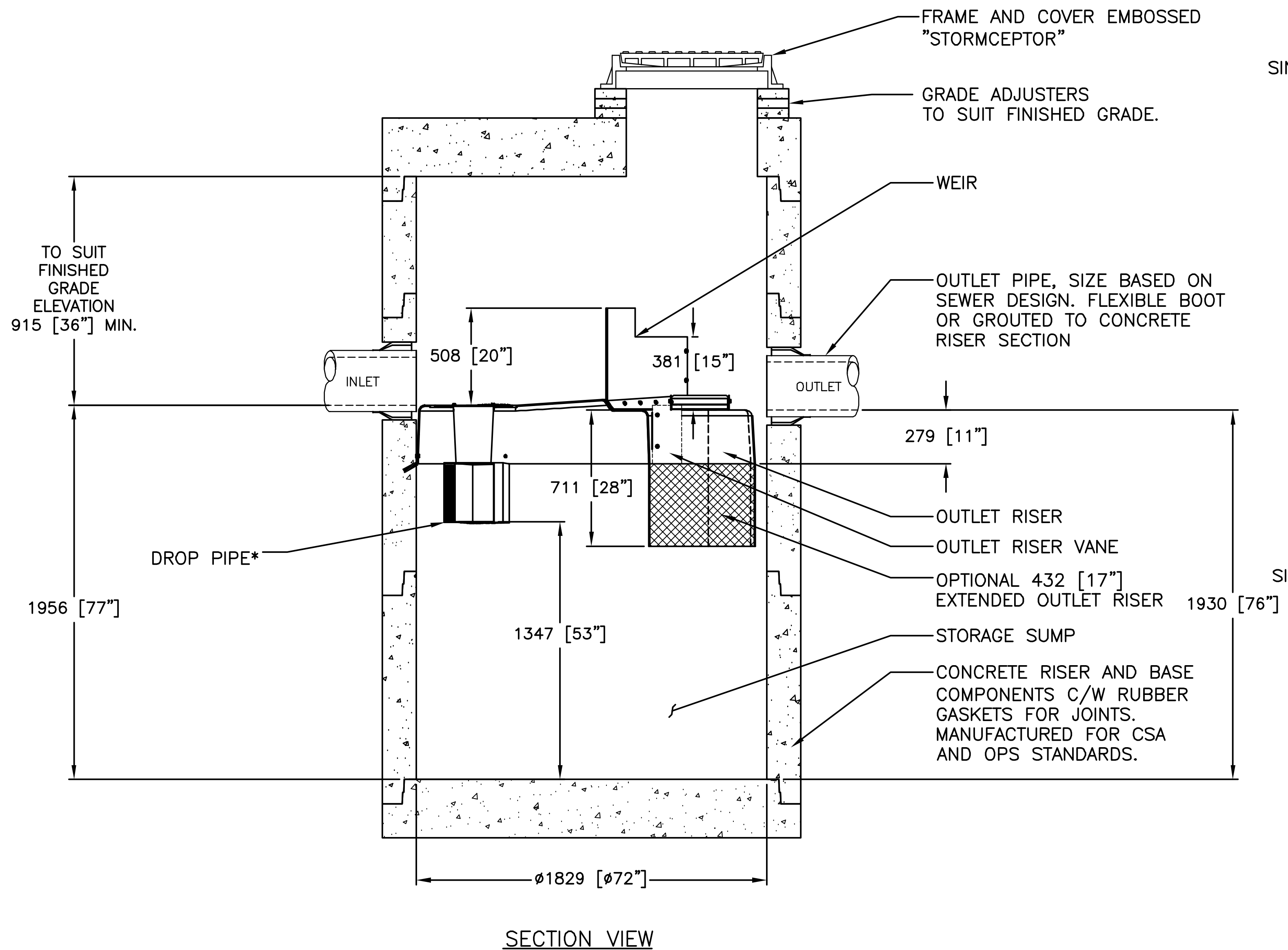
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

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

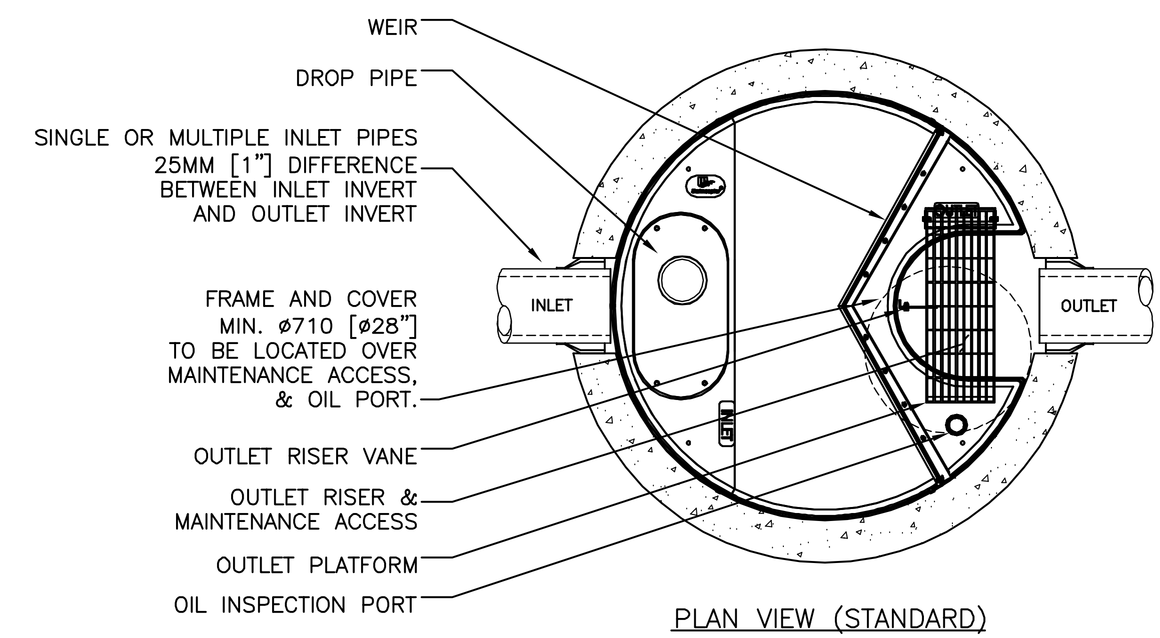
assess whether light liquids captured after a spill are effectively retained at high flow rates.

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

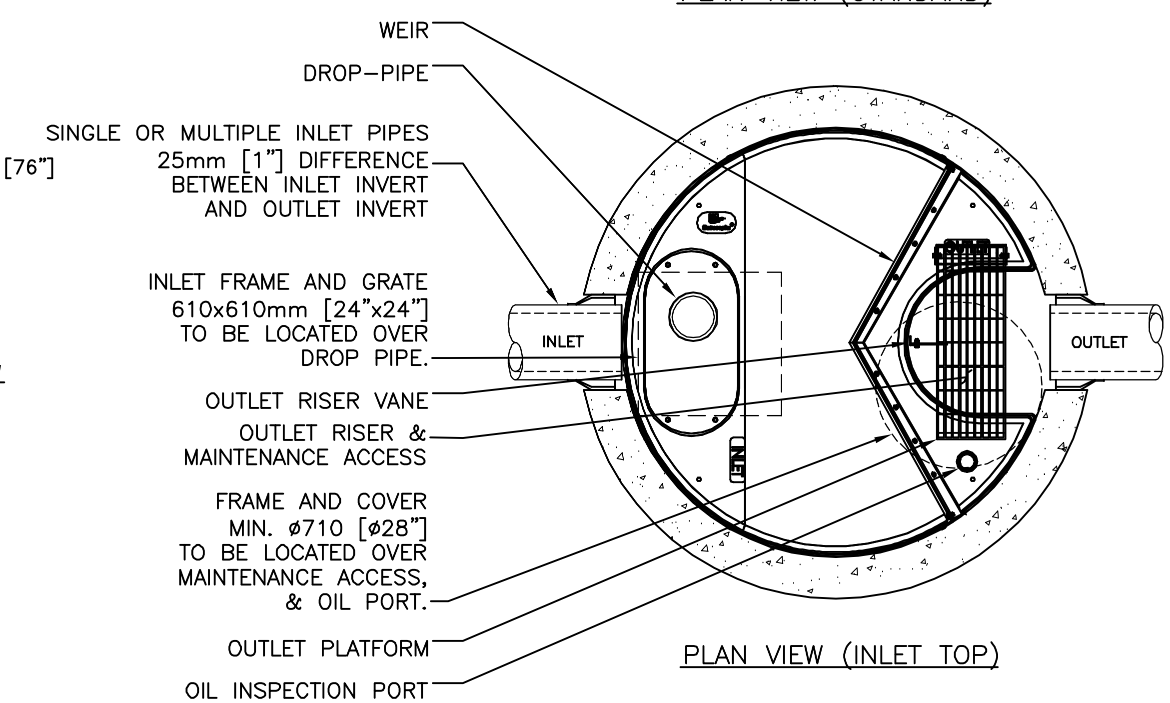
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF6 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO6 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL		EFO6			
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
0	05/26/17	INITIAL RELEASE	JSK
1	6/8/18	OUTLET PLATFORM	JSK
####	####	####	####
####	####	####	####
####	####	####	####

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON L1N 3A9
TF 800-565-4801 CA 416-960-9900 INTL +1-416-960-9900

DATE: 10/13/2017	
DESIGNED: JSK	DRAWN: JSK
CHECKED: BSF	APPROVED: SP
PROJECT No.: EFO6	SEQUENCE No.: *
SHEET: 1 OF 1	

3.3.2 Water Quality Sizing Criteria

The volumetric water quality criteria are presented in Table 3.2. The values are based on a 24 hour drawdown time and a design which conforms to the guidance provided in this manual. Requirements differ with SWMP type to reflect differences in removal efficiencies. Of the specified storage volume for wet facilities, 40 m^3/ha is extended detention, while the remainder represents the permanent pool.

Table 3.2 Water Quality Storage Requirements based on Receiving Waters[1, 2]

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced 80% long-term S.S. removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. removal	Infiltration	20	20	25	30
	Wetlands	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. removal	Infiltration	20	20	20	20
	Wetlands	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

[1]*Table 3.2 does not include every available SWMP type. Any SWMP type that can be demonstrated to the approval agencies to meet the required long-term suspended solids removal for the selected protection levels under the conditions of the site is acceptable for water quality objectives. The sizing for these SWMP types is to be determined based on performance results that have been peer-reviewed. The designer and those who review the design should be fully aware of the assumptions and sampling methodologies used in formulating performance predictions and their implications for the design.*

[2]*Hybrid Wet Pond/Wetland systems have 50-60% of their permanent pool volume in deeper portions of the facility (e.g., forebay, wet pond).*

Design Chart 1.07: Runoff Coefficients

- Urban for 5 to 10-Year Storms

Land Use		Runoff Coefficient	
		Min.	Max.
Pavement	- asphalt or concrete	0.80	0.95
- brick		0.70	0.85
Gravel roads and shoulders		0.40	0.60
Roofs		0.70	0.95
Business	- downtown	0.70	0.95
- neighbourhood		0.50	0.70
- light		0.50	0.80
- heavy		0.60	0.90
Residential	- single family urban	0.30	0.50
- multiple, detached		0.40	0.60
- multiple, attached		0.60	0.75
- suburban		0.25	0.40
Industrial	- light	0.50	0.80
- heavy		0.60	0.90
Apartments		0.50	0.70
Parks, cemeteries		0.10	0.25
Playgrounds (unpaved)		0.20	0.35
Railroad yards		0.20	0.35
Unimproved areas		0.10	0.30
Lawns	- Sandy soil		
- flat, to 2%		0.05	0.10
- average, 2 to 7%		0.10	0.15
- steep, over 7%		0.15	0.20
- Clayey soil			
- flat, to 2%		0.13	0.17
- average, 2 to 7%		0.18	0.22
- steep, over 7%		0.25	0.35

For flat or permeable surfaces, use the lower values. For steeper or more impervious surfaces, use the higher values. For return period of more than 10 years, increase above values as 25-year - add 10%, 50-year - add 20%, 100-year - add 25%.

The coefficients listed above are for unfrozen ground.

Design Chart 1.07: Runoff Coefficients (Continued)

- Rural

Land Use & Topography[3]	Soil Texture		
	Open Sand Loam	Loam or Silt Loam	Clay Loam or Clay
CULTIVATED			
Flat 0 - 5% Slopes	0.22	0.35	0.55
Rolling 5 - 10% Slopes	0.30	0.45	0.60
Hilly 10- 30% Slopes	0.40	0.65	0.70
PASTURE			
Flat 0 - 5% Slopes	0.10	0.28	0.40
Rolling 5 - 10% Slopes	0.15	0.35	0.45
Hilly 10- 30% Slopes	0.22	0.40	0.55
WOODLAND OR CUTOVER			
Flat 0 - 5% Slopes	0.08	0.25	0.35
Rolling 5 - 10% Slopes	0.12	0.30	0.42
Hilly 10- 30% Slopes	0.18	0.35	0.52
BARE ROCK	COVERAGE[3]		
	30%	50%	70%
Flat 0 - 5% Slopes	0.40	0.55	0.75
Rolling 5 - 10% Slopes	0.50	0.65	0.80
Hilly 10- 30% Slopes	0.55	0.70	0.85
LAKES AND WETLANDS	0.05		

[2] Terrain Slopes

[3] Interpolate for other values of % imperviousness

Sources: American Society of Civil Engineers - ASCE (1960)
U.S. Department of Agriculture (1972)

Design Chart 1.08: Hydrologic Soil Groups

- Based on Surficial Geology Maps

Map Ref.No.	Soil Type or Texture	Hydrologic Soil Group (Tentative)
	Ground Moraine	
1a	Usually sandy till, stony, varying depth. (Most widespread type in Shield).	Usually B (shallow); may be A or AB
1b	Clayey till, varying depth.	BC-C
	End or Interlobate Moraine	
2a	Sand & stones, deep. (May be rough topography).	A
2b	Sand & stones capped by till, deep.	A-C depending on type of till.
2c	Sand & stones, deep. (Smoother topography).	A
	Kames & Eskers	
3a	Sand & stones, deep. (May be rough topography).	A
3b	Sand & stones capped by till, deep.	A-C depending on type of till.
3c	Sand & stones, deep. (Smoother topography).	A
	Lacustrine	
4a	Clay & silt, in lowlands.	BC-C
4b	Fine sand, in lowlands.	AB-B
4c	Sand, in lowlands.	AB
4d	Sand (deltas & valley trains).	A-AB
	Outwash	
5	Sand, some gravel, deep.	A
	Aeolian	
6	Very fine sand & silt, shallow. (Loess)	B
	Bedrock	
7	Bare bedrock (normally negligible areas).	Varies according to rock type.

Source: Ministry of Natural Resources - MNR

Design Chart 1.08: Hydrologic Soil Groups (Continued)

- Based on Soil Texture

Sands, Sandy Loams and Gravels	
- overlying sand, gravel or limestone bedrock, very well drained	A
- ditto, imperfectly drained	AB
- shallow, overlying Precambrian bedrock or clay subsoil	B
Medium to Coarse Loams	
- overlying sand, gravel or limestone, well drained	AB
- shallow, overlying Precambrian bedrock or clay subsoil	B
Medium Textured Loams	
- shallow, overlying limestone bedrock	B
- overlying medium textured subsoil	BC
Silt Loams, Some Loams	
- with good internal drainage	BC
- with slow internal drainage and good external drainage	C
Clays, Clay Loams, Silty Clay Loams	
- with good internal drainage	C
- with imperfect or poor external drainage	C
- with slow internal drainage and good external drainage	D

Source: U.S. Department of Agriculture (1972)

Design Chart 1.09: Soil/Land Use Curve Numbers

Land Use	Treatment or Practice	Hydrologic Condition[4]	Hydrologic Soil Group			
			A	B	C	D
Fallow	Straight row	---	77	86	91	94
Row crops	"	Poor	72	81	88	91
	"	Good	67	78	85	89
	Contoured	Poor	70	79	84	88
	"	Good	65	75	82	86
	" and terraced	Poor	66	74	8	82
	" " "	Good	62	71	78	81
Small grain	Straight row	Poor	65	76	84	88
		Good	63	75	83	87
	Contoured	Poor	63	74	82	85
		Good	61	73	81	84
	" and terraced	Poor	61	72	79	82
		Good	59	70	78	81
Close-seeded	Straight row	Poor	66	77	85	89
legumes[2]	" "	Good	58	72	81	85
or	Contoured	Poor	64	75	83	85
rotation	"	Good	55	69	78	83
meadow	" and terraced	Poor	63	73	80	83
	" and terraced	Good	51	67	76	80
Pasture		Poor	68	79	86	89
or range		Fair	49	69	79	84
	Contoured	Good	39	61	74	80
	"	Poor	47	67	81	88
	"	Fair	25	59	75	83
		Good	6	35	70	79
Meadow		Good	30	58	71	78
Woods		Poor	45	66	77	83
		Fair	36	60	73	79
		Good	25	55	70	77
Farmsteads		---	59	74	82	86
		---	72	82	87	89
		---	74	84	90	92

For average anticedent soil moisture condition (AMC II)

[2] Close-drilled or broadcast.

[4] The hydrologic condition of cropland is good if a good crop rotation practice is used; it is poor if one crop is grown continuously.

Source: U.S. Department of Agriculture (1972)

Design Chart 1.09: Soil Conservation Service Curve Numbers (Continued)

Land Use or Surface	Hydrologic Soil Group						
	A	AB	B	BC	C	CD	D
Fallow (special cases only)	77	82	86	89	91	93	94
Crop and other improved land	66** (62)	70** (68)	74	78	82	84	86 AMC I
Pasture & other unimproved land	58* (38)	62* (51)	65	71	76	79	81
Woodlots and forest	50* (30)	54* (44)	58	65	71	74	77
Impervious areas (paved)							98
Bare bedrock draining directly to stream by surface flow							98
Bare bedrock draining indirectly to stream as groundwater (usual case)							70
Lakes and wetlands							50

Notes

(i) All values are based on AMC II except those marked by * (AMC III) or ** (mean of AMC II and AMC III).

(ii) Values in brackets are AMC II and are to be used only for special cases.

(iii) Table is not applicable to frozen soils or to periods in which snowmelt contributes to runoff.

It is strongly recommended that overland flow routes be constructed in Road right of ways (R.O.W.s). The proponent shall avoid overland flow routes from Road R.O.W.s through private lands or from rear yards to R.O.W.'s being directed between buildings. The Municipality may require easements for overland flow routes in this situation.

10.5.3 Design Storms

In the design of site plans or subdivisions, "critical design storms" shall be in accordance with section 10.4.1. Storm events should be modelled using a Modified Chicago Storm Distribution with a 3-hour duration and a Ratio of time to Peak to total duration of 0.33. Rainfall intensity duration frequency (IDF) parameters are summarized below.

Rainfall Parameters for Intensity Duration Frequency Curves

Parameter	25mm	5yr	10yr	25yr	50yr	100yr	250yr
A	538.850	1137.257	1425.011	1835.352	2225.884	2561.151	3048.220
B	6.331	7.184	7.382	7.844	8.620	9.093	10.03
C	0.809	0.830	0.843	0.858	0.871	0.880	0.888

These design storms and IDF parameters are for Stormwater Management only. Storm sewers shall be designed in accordance with Section 3.

10.5.4 Stormwater Management Calculations

SWMHYMO and Visual OTTHYMO are the accepted modelling software to be used for SWM engineering design. Other modelling software will be considered, but approval should be received from the Municipality (at their discretion) prior to commencing detailed design. For small sites (up to 2.0 ha), the Rational Method or Modified Rational Method may be appropriate.

For sites larger than 2.0 Hectare, the rational method or modified rational method will not be approved. Supporting documentation and references should be supplied at the predesign stage for the selected modeling parameters, if not provided within this document. Detailed standard parameters are outlined in Section 10.4.5.

10.5.5 Hydrology Modeling Parameters

For Stormwater Management modeling, the following parameters are required unless otherwise approved:

a) Percent Impervious

Land Use	Total impervious	Directly Connected Impervious
Single Family Residential (Lots smaller than 375m^2)	50%	40%
Single Family Residential (Lots 375m^2 to 550m^2)	40%	30%
Single Family Residential (Lots larger than 550m^2)	35%	25%
Multi-Family Residential	60 - 80%	50 - 60%
Undeveloped Residential	40 – 50%	30 - 40%
Commercial / Industrial	70 - 90%	50 - 80%

b) Infiltration Losses

The SCS curve method or Horton Method are acceptable models for calculating infiltration losses.

c) Initial Abstraction

Land Use	Accepted Value (mm)
Impervious	2
Lawn Area	5
Other Pervious Areas	8

d) Curve Numbers

Curve numbers should be AMC II conditions unless Modified curve numbers are used.

10.5.6 Rational Method Parameters

The following runoff coefficients should be used for all rational method or modified rational method calculations unless otherwise approved:

Single Family Residential (Lots smaller than 375m^2)	0.60
Single Family Residential (Lots 375m^2 to 550m^2)	0.50
Single Family Residential (Lots larger than 550m^2)	0.45
Multi-Family Residential	0.65 – 0.80
Undeveloped Residential	0.50
Commercial	0.70 – 0.85
Industrial	0.70-0.90
Parks, Cemetery, Playgrounds & Farmlands	0.20

10.6 MONITORING AND MAINTENANCE

10.6.1 Construction Phase

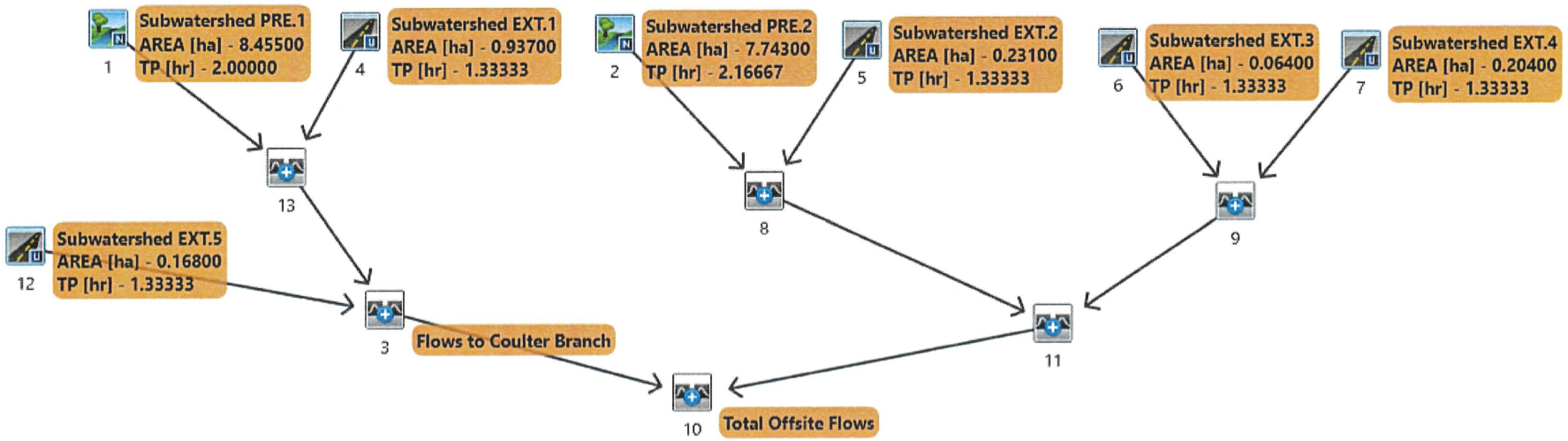
Details and instructions should be included within the Stormwater Management Report and construction drawings to prevent offsite migration of sediments during construction. Details should be provided for all Stormwater inlets and Stormwater flow paths.

APPENDIX II

VISUAL OTTHYMO OUTPUT
PRE-DEVELOPMENT

Pre-Development

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
```



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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc


DATE: 04-02-2024                          TIME: 04:02:25

USER:


COMMENTS: ____________________________________________________________


-------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 1 - 25mm - 4hr Storm Event    **
  ************************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 538.850
| Ptotal= 25.04 mm |                           B=   6.331
--------------------                           C=   0.809
                         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     1.52 |  1.00    13.45 |  2.00     3.80 |  3.00     1.84
                0.17     1.75 |  1.17    56.25 |  2.17     3.20 |  3.17     1.70
                0.33     2.08 |  1.33    17.87 |  2.33     2.78 |  3.33     1.58
                0.50     2.58 |  1.50     9.22 |  2.50     2.45 |  3.50     1.48
                0.67     3.46 |  1.67     6.21 |  2.67     2.20 |  3.67     1.40
                0.83     5.39 |  1.83     4.70 |  2.83     2.00 |  3.83     1.32


-------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=    8.45   Curve Number   (CN)= 78.0
```



```
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.47

        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    1.52 | 1.083   13.45 | 2.083    3.80 |  3.08    1.84
             0.167    1.52 | 1.167   13.45 | 2.167    3.80 |  3.17    1.84
             0.250    1.75 | 1.250   56.25 | 2.250    3.20 |  3.25    1.70
             0.333    1.75 | 1.333   56.25 | 2.333    3.20 |  3.33    1.70
             0.417    2.08 | 1.417   17.87 | 2.417    2.78 |  3.42    1.58
             0.500    2.08 | 1.500   17.87 | 2.500    2.78 |  3.50    1.58
             0.583    2.58 | 1.583    9.22 | 2.583    2.45 |  3.58    1.48
             0.667    2.58 | 1.667    9.22 | 2.667    2.45 |  3.67    1.48
             0.750    3.46 | 1.750    6.21 | 2.750    2.20 |  3.75    1.40
             0.833    3.46 | 1.833    6.21 | 2.833    2.20 |  3.83    1.40
             0.917    5.39 | 1.917    4.70 | 2.917    2.00 |  3.92    1.32
             1.000    5.39 | 2.000    4.70 | 3.000    2.00 |  4.00    1.32

     Unit Hyd Qpeak  (cms)=   0.692

     PEAK FLOW      (cms)=   0.043 (i)
     TIME TO PEAK    (hrs)=   2.000
     RUNOFF VOLUME    (mm)=   3.344
     TOTAL RAINFALL   (mm)=  25.042
     RUNOFF COEFFICIENT   =   0.134

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

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0004)|   Area    (ha)=   0.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  41.00   Dir. Conn.(%)=   5.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.38          0.55
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.00          0.70
     Length            (m)=      79.04        300.00
     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    1.52 | 1.083   13.45 | 2.083    3.80 |  3.08    1.84
             0.167    1.52 | 1.167   13.45 | 2.167    3.80 |  3.17    1.84
             0.250    1.75 | 1.250   56.25 | 2.250    3.20 |  3.25    1.70
             0.333    1.75 | 1.333   56.25 | 2.333    3.20 |  3.33    1.70
             0.417    2.08 | 1.417   17.87 | 2.417    2.78 |  3.42    1.58
             0.500    2.08 | 1.500   17.87 | 2.500    2.78 |  3.50    1.58
             0.583    2.58 | 1.583    9.22 | 2.583    2.45 |  3.58    1.48
             0.667    2.58 | 1.667    9.22 | 2.667    2.45 |  3.67    1.48
             0.750    3.46 | 1.750    6.21 | 2.750    2.20 |  3.75    1.40
             0.833    3.46 | 1.833    6.21 | 2.833    2.20 |  3.83    1.40
             0.917    5.39 | 1.917    4.70 | 2.917    2.00 |  3.92    1.32
             1.000    5.39 | 2.000    4.70 | 3.000    2.00 |  4.00    1.32
```



```
     Max.Eff.Inten.(mm/hr)=      56.25         3.73
                over (min)        5.00       125.00
     Storage Coeff.  (min)=       2.27 (ii)  122.95 (ii)
     Unit Hyd. Tpeak (min)=       5.00       125.00
     Unit Hyd. peak  (cms)=       0.30         0.01
                                                         *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00        0.007 (iii)
     TIME TO PEAK    (hrs)=       1.33         3.67         1.33
     RUNOFF VOLUME    (mm)=      24.04         3.30         4.26
     TOTAL RAINFALL   (mm)=      25.04        25.04        25.04
     RUNOFF COEFFICIENT   =       0.96         0.13         0.17

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  56.0    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  (  0013)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):      8.45   0.043     2.00     3.34
      + ID2= 2 (  0004):      0.94   0.007     1.33     4.26
        ===============================================
        ID = 3 (  0013):      9.39   0.044     2.00     3.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0012)|   Area    (ha)=   0.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  50.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12          0.05
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       0.80          1.00
     Length            (m)=      33.47         10.00
     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    1.52 | 1.083   13.45 | 2.083    3.80 |  3.08    1.84
             0.167    1.52 | 1.167   13.45 | 2.167    3.80 |  3.17    1.84
             0.250    1.75 | 1.250   56.25 | 2.250    3.20 |  3.25    1.70
             0.333    1.75 | 1.333   56.25 | 2.333    3.20 |  3.33    1.70
             0.417    2.08 | 1.417   17.87 | 2.417    2.78 |  3.42    1.58
             0.500    2.08 | 1.500   17.87 | 2.500    2.78 |  3.50    1.58
             0.583    2.58 | 1.583    9.22 | 2.583    2.45 |  3.58    1.48
             0.667    2.58 | 1.667    9.22 | 2.667    2.45 |  3.67    1.48
             0.750    3.46 | 1.750    6.21 | 2.750    2.20 |  3.75    1.40
```



```
             0.833    3.46 | 1.833    6.21 | 2.833    2.20 |  3.83    1.40
             0.917    5.39 | 1.917    4.70 | 2.917    2.00 |  3.92    1.32
             1.000    5.39 | 2.000    4.70 | 3.000    2.00 |  4.00    1.32

     Max.Eff.Inten.(mm/hr)=      56.25         9.59
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.78 (ii)    5.66 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.15
                                                         *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00        0.014 (iii)
     TIME TO PEAK    (hrs)=       1.33         1.42         1.33
     RUNOFF VOLUME    (mm)=      24.04         3.43        13.71
     TOTAL RAINFALL   (mm)=      25.04        25.04        25.04
     RUNOFF COEFFICIENT   =       0.96         0.14         0.55

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  56.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0012):      0.17   0.014     1.33    13.71
      + ID2= 2 (  0013):      9.39   0.044     2.00     3.44
        ===============================================
        ID = 3 (  0003):      9.56   0.046     2.00     3.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   7.74   Curve Number   (CN)= 79.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

        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    1.52 | 1.083   13.45 | 2.083    3.80 |  3.08    1.84
             0.167    1.52 | 1.167   13.45 | 2.167    3.80 |  3.17    1.84
             0.250    1.75 | 1.250   56.25 | 2.250    3.20 |  3.25    1.70
             0.333    1.75 | 1.333   56.25 | 2.333    3.20 |  3.33    1.70
             0.417    2.08 | 1.417   17.87 | 2.417    2.78 |  3.42    1.58
             0.500    2.08 | 1.500   17.87 | 2.500    2.78 |  3.50    1.58
             0.583    2.58 | 1.583    9.22 | 2.583    2.45 |  3.58    1.48
             0.667    2.58 | 1.667    9.22 | 2.667    2.45 |  3.67    1.48
             0.750    3.46 | 1.750    6.21 | 2.750    2.20 |  3.75    1.40
             0.833    3.46 | 1.833    6.21 | 2.833    2.20 |  3.83    1.40
             0.917    5.39 | 1.917    4.70 | 2.917    2.00 |  3.92    1.32
             1.000    5.39 | 2.000    4.70 | 3.000    2.00 |  4.00    1.32

     Unit Hyd Qpeak  (cms)=   0.539
```

PEAK FLOW (cms)= 0.038 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 3.471
TOTAL RAINFALL (mm)= 25.042
RUNOFF COEFFICIENT = 0.139

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

CALIB
STANDHYD (0005)
ID= 1 DT= 5.0 min

Area (ha)= 0.23
Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.10	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	4.00	8.30
Length (m)=	39.24	8.50
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

			TOTALS
Max.Eff.Inten.(mm/hr)=	56.25	5.44	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.21 (ii)	3.77 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.33	0.25	
PEAK FLOW (cms)=	0.02	0.00	0.018 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	24.04	3.52	12.34
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.96	0.14	0.49

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0008)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	7.74	0.038	2.17	3.47
+ ID2= 2 (0005):	0.23	0.018	1.33	12.34
ID = 3 (0008):	7.97	0.039	2.17	3.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0006)
ID= 1 DT= 5.0 min

Area (ha)= 0.06
Total Imp(%)= 36.00 Dir. Conn.(%)= 19.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.02	0.04
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	3.00
Length (m)=	20.66	15.00
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

			TOTALS
Max.Eff.Inten.(mm/hr)=	56.25	9.70	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.01 (ii)	9.84 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.11	
PEAK FLOW (cms)=	0.00	0.00	0.002 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	24.04	4.67	8.27
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.96	0.19	0.33

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0007)
ID= 1 DT= 5.0 min

Area (ha)= 0.20
Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.07	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.70
Length (m)=	36.88	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

			TOTALS
Max.Eff.Inten.(mm/hr)=	56.25	7.27	
over (min)	5.00	20.00	
Storage Coeff. (min)=	1.44 (ii)	16.92 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.33	0.06	
PEAK FLOW (cms)=	0.01	0.00	0.007 (iii)
TIME TO PEAK (hrs)=	1.33	1.67	1.33
RUNOFF VOLUME (mm)=	24.04	4.52	8.37
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.96	0.18	0.33

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0009)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0006):	0.06	0.002	1.33	8.27
+ ID2= 2 (0007):	0.20	0.007	1.33	8.37

ID = 3 (0009):	0.27	0.009	1.33	8.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0008):	7.97	0.039	2.17	3.73
+ ID2= 2 (0009):	0.27	0.009	1.33	8.35
ID = 3 (0011):	8.24	0.041	2.17	3.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0011):	8.24	0.041	2.17	3.88
+ ID2= 2 (0003):	9.56	0.046	2.00	3.62
ID = 3 (0010):	17.80	0.086	2.08	3.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
Output filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024 TIME: 04:02:25

USER:

COMMENTS: _____

****
** SIMULATION : 2 - 5yr - 3hr Chicago **
****

| CHICAGO STORM | Ptotal= 44.34 mm |

IDF curve parameters: A=1137.257
B= 7.184
C= 0.830
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.65	0.83	107.33	1.67	6.92	2.50	3.52
0.17	4.60	1.00	34.77	1.83	5.77	2.67	3.21
0.33	6.26	1.17	17.56	2.00	4.96	2.83	2.96
0.50	10.01	1.33	11.61	2.17	4.36		
0.67	25.98	1.50	8.67	2.33	3.89		

CALIB NASHYD (0001)	ID= 1 DT= 5.0 min	Area (ha)= 8.45 Ia (mm)= 7.80	Curve Number (CN)= 78.0 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.47

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

Unit Hyd Qpeak (cms)= 0.692

PEAK FLOW (cms)= 0.200 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 12.340
TOTAL RAINFALL (mm)= 44.338
RUNOFF COEFFICIENT = 0.278

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

CALIB STANDHYD (0004)	ID= 1 DT= 5.0 min	Area (ha)= 0.94 Total Imp(%)= 41.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.38	0.55
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	0.70
Length (m)=	79.04	300.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	12.99	
over (min)	5.00	80.00	
Storage Coeff. (min)=	1.75 (ii)	75.04 (ii)	
Unit Hyd. Tpeak (min)=	5.00	80.00	
Unit Hyd. peak (cms)=	0.32	0.01	

PEAK FLOW (cms)=	0.01	0.01	0.014 (iii)
TIME TO PEAK (hrs)=	1.00	2.42	1.00
RUNOFF VOLUME (mm)=	43.34	10.29	11.90
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.98	0.23	0.27

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0013)	1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):		8.45	0.200	1.58	12.34
+ ID2= 2 (0004):		0.94	0.014	1.00	11.90
ID = 3 (0013):		9.39	0.205	1.58	12.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0012)	ID= 1 DT= 5.0 min	Area (ha)= 0.17 Total Imp(%)= 70.00 Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.12	0.05
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	0.80	1.00
Length (m)=	33.47	10.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	35.62	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.38 (ii)	4.37 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.33	0.23	

PEAK FLOW (cms)=	0.03	0.01	0.030 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	43.34	10.61	26.96
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.98	0.24	0.61

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0003)	1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):		0.17	0.030	1.00	26.96
+ ID2= 2 (0013):		9.39	0.205	1.58	12.30
ID = 3 (0003):		9.56	0.208	1.58	12.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0002)	ID= 1 DT= 5.0 min	Area (ha)= 7.74 Ia (mm)= 7.90 U.H. Tp(hrs)= 0.55	Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

Unit Hyd Qpeak (cms)= 0.539

PEAK FLOW (cms)= 0.171 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 12.771
TOTAL RAINFALL (mm)= 44.338
RUNOFF COEFFICIENT = 0.288

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

CALIB STANDHYD (0005)	Area (ha)= 0.23

Pre-Development - 5-Year Storm

|ID= 1 DT= 5.0 min | Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	4.00	8.30
Length	(m)=	39.24	8.50
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

				TOTALS
Max.Eff.Inten.(mm/hr)=		107.33	22.91	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.93 (ii)	2.91 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.28	
PEAK FLOW	(cms)=	0.03	0.01	0.039 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	43.34	11.61	25.25
TOTAL RAINFALL	(mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT	=	0.98	0.26	0.57

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0008)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0002):		7.74	0.171	1.67	12.77
+ ID2= 2 (0005):		0.23	0.039	1.00	25.25
ID = 3 (0008):		7.97	0.175	1.67	13.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0006)	Area (ha)= 0.06				
ID= 1 DT= 5.0 min	Total Imp(%)= 36.00	Dir. Conn.(%)= 19.00			

Pre-Development - 5-Year Storm

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.02	0.04
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	3.00
Length	(m)=	20.66	15.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

				TOTALS
Max.Eff.Inten.(mm/hr)=		107.33	37.36	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.78 (ii)	5.93 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.15	
PEAK FLOW	(cms)=	0.00	0.00	0.006 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	43.34	14.23	19.69
TOTAL RAINFALL	(mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT	=	0.98	0.32	0.44

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0007)	Area (ha)= 0.20				
ID= 1 DT= 5.0 min	Total Imp(%)= 35.00	Dir. Conn.(%)= 20.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

Pre-Development - 5-Year Storm

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

				TOTALS
Max.Eff.Inten.(mm/hr)=		107.33	35.33	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.11 (ii)	9.34 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.12	
PEAK FLOW	(cms)=	0.01	0.01	0.018 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	43.34	13.91	19.77
TOTAL RAINFALL	(mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT	=	0.98	0.31	0.45

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0009)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):		0.06	0.006	1.00	19.69
+ ID2= 2 (0007):		0.20	0.018	1.00	19.77
ID = 3 (0009):		0.27	0.025	1.00	19.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):		7.97	0.175	1.67	13.13
+ ID2= 2 (0009):		0.27	0.025	1.00	19.75
ID = 3 (0011):		8.24	0.179	1.67	13.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)

Pre-Development - 5-Year Storm

ID1= 1 (0011):		8.24	0.179	1.67	13.35
+ ID2= 2 (0003):		9.56	0.208	1.58	12.55
ID = 3 (0010):		17.80	0.386	1.67	12.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:02:25

USER:


COMMENTS: _____________________________________________________
```

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  **********************************************
  ** SIMULATION : 3 - 10yr - 3hr Chicago      **
  **********************************************

-------------------
| CHICAGO STORM   |    IDF curve parameters: A=1425.011
| Ptotal= 51.86 mm |                          B=   7.382
-------------------                          C=   0.843
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    4.05 |  0.83  128.36 |  1.67    7.83 |  2.50    3.89
                0.17    5.13 |  1.00   41.12 |  1.83    6.49 |  2.67    3.55
                0.33    7.06 |  1.17   20.44 |  2.00    5.55 |  2.83    3.26
                0.50   11.46 |  1.33   13.35 |  2.17    4.86 |
                0.67   30.55 |  1.50    9.87 |  2.33    4.32 |


-------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD   (  0001)|   Area    (ha)=   8.45   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.80   # of Linear Res.(N)= 3.00
```



```
-------------------   U.H. Tp(hrs)=   0.47

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

                                ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
                0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
                0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
                0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
                0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
                0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
                0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
                0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
                0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Unit Hyd Qpeak  (cms)=   0.692

    PEAK FLOW       (cms)=   0.282 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  16.776
    TOTAL RAINFALL   (mm)=  51.857
    RUNOFF COEFFICIENT   =   0.323

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

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0004)|   Area    (ha)=   0.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  41.00   Dir. Conn.(%)=   5.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.38        0.55
    Dep. Storage     (mm)=       1.00        5.00
    Average Slope     (%)=       2.00        0.70
    Length            (m)=      79.04      300.00
    Mannings n           =      0.013       0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
                0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
                0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
                0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
                0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
                0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
                0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
                0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
                0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Max.Eff.Inten.(mm/hr)=     128.36       17.61
              over (min)        5.00       70.00
    Storage Coeff.  (min)=       1.63 (ii)   66.52 (ii)
    Unit Hyd. Tpeak (min)=       5.00       70.00
    Unit Hyd. peak  (cms)=       0.32        0.02
                                                        *TOTALS*
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```
    PEAK FLOW       (cms)=       0.02        0.01          0.017 (iii)
    TIME TO PEAK    (hrs)=       1.00        2.25           1.00
    RUNOFF VOLUME    (mm)=      50.86       13.76          15.58
    TOTAL RAINFALL   (mm)=      51.86       51.86          51.86
    RUNOFF COEFFICIENT   =       0.98        0.27           0.30

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  56.0    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  (  0013)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     8.45   0.282     1.58    16.78
     + ID2= 2 (  0004):     0.94   0.017     1.00    15.58
       ==========================================================
       ID = 3 (  0013):     9.39   0.291     1.58    16.66

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0012)|   Area    (ha)=   0.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  50.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.12        0.05
    Dep. Storage     (mm)=       1.00        5.00
    Average Slope     (%)=       0.80        1.00
    Length            (m)=      33.47       10.00
    Mannings n           =      0.013       0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
                0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
                0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
                0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
                0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
                0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
                0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
                0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
                0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Max.Eff.Inten.(mm/hr)=     128.36       49.86
              over (min)        5.00        5.00
    Storage Coeff.  (min)=       1.28 (ii)    4.07 (ii)
    Unit Hyd. Tpeak (min)=       5.00        5.00
    Unit Hyd. peak  (cms)=       0.33        0.24
                                                        *TOTALS*
```



```
    PEAK FLOW       (cms)=       0.03        0.01          0.037 (iii)
    TIME TO PEAK    (hrs)=       1.00        1.00           1.00
    RUNOFF VOLUME    (mm)=      50.86       14.16          32.50
    TOTAL RAINFALL   (mm)=      51.86       51.86          51.86
    RUNOFF COEFFICIENT   =       0.98        0.27           0.63

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  56.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     0.17   0.037     1.00    32.50
     + ID2= 2 (  0013):     9.39   0.291     1.58    16.66
       ==========================================================
       ID = 3 (  0003):     9.56   0.294     1.58    16.93

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD   (  0002)|   Area    (ha)=   7.74   Curve Number   (CN)= 79.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.55

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

                                ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
                0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
                0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
                0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
                0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
                0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
                0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
                0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
                0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Unit Hyd Qpeak  (cms)=   0.539

    PEAK FLOW       (cms)=   0.240 (i)
    TIME TO PEAK    (hrs)=   1.667
    RUNOFF VOLUME    (mm)=  17.333
    TOTAL RAINFALL   (mm)=  51.857
    RUNOFF COEFFICIENT   =   0.334

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

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0005)|   Area    (ha)=   0.23
```

Pre-Development - 10-Year Storm

|ID= 1 DT= 5.0 min | Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	4.00	8.30
Length	(m)=	39.24	8.50
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.05	0.833	30.55	1.583	9.87	2.33	4.86
0.167	4.05	0.917	128.36	1.667	9.87	2.42	4.32
0.250	5.13	1.000	128.36	1.750	7.83	2.50	4.32
0.333	5.13	1.083	41.12	1.833	7.83	2.58	3.89
0.417	7.06	1.167	41.12	1.917	6.49	2.67	3.89
0.500	7.06	1.250	20.44	2.000	6.49	2.75	3.55
0.583	11.46	1.333	20.44	2.083	5.55	2.83	3.55
0.667	11.46	1.417	13.35	2.167	5.55	2.92	3.26
0.750	30.55	1.500	13.35	2.250	4.86	3.00	3.26

				TOTALS
Max.Eff.Inten.(mm/hr)=		128.36	32.70	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.87 (ii)	2.71 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.29	
PEAK FLOW	(cms)=	0.04	0.01	0.050 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	50.86	15.59	30.75
TOTAL RAINFALL	(mm)=	51.86	51.86	51.86
RUNOFF COEFFICIENT	=	0.98	0.30	0.59

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0008)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0002):	7.74	0.240	1.67	17.33
	+ ID2= 2 (0005):	0.23	0.050	1.00	30.75
	ID = 3 (0008):	7.97	0.244	1.67	17.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0006)			
ID= 1 DT= 5.0 min	Area (ha)=	0.06	
	Total Imp(%)=	36.00	Dir. Conn.(%)= 19.00

Pre-Development - 10-Year Storm

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.02	0.04
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	3.00
Length	(m)=	20.66	15.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.05	0.833	30.55	1.583	9.87	2.33	4.86
0.167	4.05	0.917	128.36	1.667	9.87	2.42	4.32
0.250	5.13	1.000	128.36	1.750	7.83	2.50	4.32
0.333	5.13	1.083	41.12	1.833	7.83	2.58	3.89
0.417	7.06	1.167	41.12	1.917	6.49	2.67	3.89
0.500	7.06	1.250	20.44	2.000	6.49	2.75	3.55
0.583	11.46	1.333	20.44	2.083	5.55	2.83	3.55
0.667	11.46	1.417	13.35	2.167	5.55	2.92	3.26
0.750	30.55	1.500	13.35	2.250	4.86	3.00	3.26

				TOTALS
Max.Eff.Inten.(mm/hr)=		128.36	52.07	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.73 (ii)	5.23 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.16	
PEAK FLOW	(cms)=	0.00	0.01	0.008 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	50.86	18.79	24.82
TOTAL RAINFALL	(mm)=	51.86	51.86	51.86
RUNOFF COEFFICIENT	=	0.98	0.36	0.48

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0007)			
ID= 1 DT= 5.0 min	Area (ha)=	0.20	
	Total Imp(%)=	35.00	Dir. Conn.(%)= 20.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

Pre-Development - 10-Year Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.05	0.833	30.55	1.583	9.87	2.33	4.86
0.167	4.05	0.917	128.36	1.667	9.87	2.42	4.32
0.250	5.13	1.000	128.36	1.750	7.83	2.50	4.32
0.333	5.13	1.083	41.12	1.833	7.83	2.58	3.89
0.417	7.06	1.167	41.12	1.917	6.49	2.67	3.89
0.500	7.06	1.250	20.44	2.000	6.49	2.75	3.55
0.583	11.46	1.333	20.44	2.083	5.55	2.83	3.55
0.667	11.46	1.417	13.35	2.167	5.55	2.92	3.26
0.750	30.55	1.500	13.35	2.250	4.86	3.00	3.26

				TOTALS
Max.Eff.Inten.(mm/hr)=		128.36	49.36	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.03 (ii)	8.23 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.13	
PEAK FLOW	(cms)=	0.01	0.01	0.024 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	50.86	18.40	24.87
TOTAL RAINFALL	(mm)=	51.86	51.86	51.86
RUNOFF COEFFICIENT	=	0.98	0.35	0.48

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0009)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0006):	0.06	0.008	1.00	24.82
	+ ID2= 2 (0007):	0.20	0.024	1.00	24.87
	ID = 3 (0009):	0.27	0.032	1.00	24.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0008):	7.97	0.244	1.67	17.72
	+ ID2= 2 (0009):	0.27	0.032	1.00	24.86
	ID = 3 (0011):	8.24	0.250	1.67	17.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)

Pre-Development - 10-Year Storm

	ID1= 1 (0011):	8.24	0.250	1.67	17.95
	+ ID2= 2 (0003):	9.56	0.294	1.58	16.93
	ID = 3 (0010):	17.80	0.542	1.58	17.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:02:23

USER:


COMMENTS: _____________________________________________________
```

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  ************************************************
  ** SIMULATION : 4 - 25yr - 3hr Chicago        **
  ************************************************

-------------------
| CHICAGO STORM   |    IDF curve parameters: A=1835.352
| Ptotal= 61.62 mm |                          B=   7.844
-------------------                          C=   0.858
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    4.54 |  0.83  154.86 |  1.67    9.01 |  2.50    4.36
                0.17    5.80 |  1.00   49.76 |  1.83    7.41 |  2.67    3.95
                0.33    8.09 |  1.17   24.35 |  2.00    6.30 |  2.83    3.62
                0.50   13.39 |  1.33   15.69 |  2.17    5.48 |
                0.67   36.78 |  1.50   11.46 |  2.33    4.85 |

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD   (  0001)|   Area    (ha)=   8.45   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.80   # of Linear Res.(N)= 3.00
```



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-------------------   U.H. Tp(hrs)=   0.47

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
               0.167    4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
               0.250    5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
               0.333    5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
               0.417    8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
               0.500    8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
               0.583   13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
               0.667   13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
               0.750   36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Unit Hyd Qpeak  (cms)=   0.692

    PEAK FLOW       (cms)=   0.401 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  23.085
    TOTAL RAINFALL   (mm)=  61.618
    RUNOFF COEFFICIENT   =   0.375

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

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0004)|   Area    (ha)=   0.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  41.00   Dir. Conn.(%)=   5.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.38         0.55
    Dep. Storage     (mm)=      1.00         5.00
    Average Slope     (%)=      2.00         0.70
    Length            (m)=     79.04       300.00
    Mannings n           =     0.013        0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
               0.167    4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
               0.250    5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
               0.333    5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
               0.417    8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
               0.500    8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
               0.583   13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
               0.667   13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
               0.750   36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Max.Eff.Inten.(mm/hr)=     154.86        24.32
              over (min)        5.00        60.00
    Storage Coeff.  (min)=       1.51 (ii)   58.54 (ii)
    Unit Hyd. Tpeak (min)=       5.00        60.00
    Unit Hyd. peak  (cms)=       0.33         0.02
                                                      *TOTALS*
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    PEAK FLOW       (cms)=       0.02         0.02          0.022 (iii)
    TIME TO PEAK    (hrs)=       1.00         2.00           2.00
    RUNOFF VOLUME    (mm)=      60.62        18.76          20.82
    TOTAL RAINFALL   (mm)=      61.62        61.62          61.62
    RUNOFF COEFFICIENT   =       0.98         0.30           0.34

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  56.0    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  (  0013)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     8.45   0.401     1.58    23.08
     + ID2= 2 (  0004):     0.94   0.022     2.00    20.82
       ================================================
       ID = 3 (  0013):     9.39   0.416     1.58    22.86

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0012)|   Area    (ha)=   0.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  50.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.12         0.05
    Dep. Storage     (mm)=      1.00         5.00
    Average Slope     (%)=      0.80         1.00
    Length            (m)=     33.47        10.00
    Mannings n           =     0.013        0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
               0.167    4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
               0.250    5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
               0.333    5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
               0.417    8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
               0.500    8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
               0.583   13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
               0.667   13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
               0.750   36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Max.Eff.Inten.(mm/hr)=     154.86        70.60
              over (min)        5.00         5.00
    Storage Coeff.  (min)=       1.19 (ii)    3.78 (ii)
    Unit Hyd. Tpeak (min)=       5.00         5.00
    Unit Hyd. peak  (cms)=       0.33         0.25
                                                      *TOTALS*
```



```
    PEAK FLOW       (cms)=       0.04         0.01          0.047 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00           1.00
    RUNOFF VOLUME    (mm)=      60.62        19.26          39.93
    TOTAL RAINFALL   (mm)=      61.62        61.62          61.62
    RUNOFF COEFFICIENT   =       0.98         0.31           0.65

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  56.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0003)|
|  1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     0.17   0.047     1.00    39.93
     + ID2= 2 (  0013):     9.39   0.416     1.58    22.86
       ================================================
       ID = 3 (  0003):     9.56   0.420     1.58    23.16

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD   (  0002)|   Area    (ha)=   7.74   Curve Number   (CN)= 79.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.55

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
               0.167    4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
               0.250    5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
               0.333    5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
               0.417    8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
               0.500    8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
               0.583   13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
               0.667   13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
               0.750   36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Unit Hyd Qpeak  (cms)=   0.539

    PEAK FLOW       (cms)=   0.340 (i)
    TIME TO PEAK    (hrs)=   1.667
    RUNOFF VOLUME    (mm)=  23.801
    TOTAL RAINFALL   (mm)=  61.618
    RUNOFF COEFFICIENT   =   0.386

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

-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0005)|   Area    (ha)=   0.23
```

Pre-Development - 25-Year Storm

|ID= 1 DT= 5.0 min | Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	4.00	8.30
Length	(m)=	39.24	8.50
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

				TOTALS
Max.Eff.Inten.(mm/hr)=		154.86	46.96	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.81 (ii)	2.52 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.29	
PEAK FLOW	(cms)=	0.04	0.02	0.063 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	60.62	21.29	38.20
TOTAL RAINFALL	(mm)=	61.62	61.62	61.62
RUNOFF COEFFICIENT	=	0.98	0.35	0.62

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0008)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0002):	7.74	0.340	1.67	23.80
	+ ID2= 2 (0005):	0.23	0.063	1.00	38.20
	ID = 3 (0008):	7.97	0.345	1.67	24.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0006)	Area (ha)= 0.06				
ID= 1 DT= 5.0 min	Total Imp(%)= 36.00	Dir. Conn.(%)= 19.00			

Pre-Development - 25-Year Storm

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.02	0.04
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	3.00
Length	(m)=	20.66	15.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

				TOTALS
Max.Eff.Inten.(mm/hr)=		154.86	73.08	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.68 (ii)	5.41 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.16	
PEAK FLOW	(cms)=	0.01	0.01	0.011 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	60.62	25.21	31.91
TOTAL RAINFALL	(mm)=	61.62	61.62	61.62
RUNOFF COEFFICIENT	=	0.98	0.41	0.52

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0007)	Area (ha)= 0.20				
ID= 1 DT= 5.0 min	Total Imp(%)= 35.00	Dir. Conn.(%)= 20.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

Pre-Development - 25-Year Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

				TOTALS
Max.Eff.Inten.(mm/hr)=		154.86	69.45	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.96 (ii)	7.24 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.14	
PEAK FLOW	(cms)=	0.02	0.02	0.032 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	60.62	24.74	31.90
TOTAL RAINFALL	(mm)=	61.62	61.62	61.62
RUNOFF COEFFICIENT	=	0.98	0.40	0.52

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0009)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0006):	0.06	0.011	1.00	31.91
	+ ID2= 2 (0007):	0.20	0.032	1.00	31.90
	ID = 3 (0009):	0.27	0.043	1.00	31.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0008):	7.97	0.345	1.67	24.22
	+ ID2= 2 (0009):	0.27	0.043	1.00	31.90
	ID = 3 (0011):	8.24	0.352	1.67	24.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)

Pre-Development - 25-Year Storm

	ID1= 1 (0011):	8.24	0.352	1.67	24.47
	+ ID2= 2 (0003):	9.56	0.420	1.58	23.16
	ID = 3 (0010):	17.80	0.771	1.58	23.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:02:24

USER:


COMMENTS: _____________________________________________________
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**** SIMULATION : 5 - 50yr - 3hr Chicago ****

CHICAGO STORM	Ptotal= 69.56 mm

IDF curve parameters: A=2225.884
B= 8.620
C= 0.871
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 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	4.91	0.83	174.32	1.67	10.02	2.50	4.70
0.17	6.34	1.00	57.54	1.83	8.18	2.67	4.25
0.33	8.96	1.17	27.95	2.00	6.90	2.83	3.88
0.50	15.11	1.33	17.79	2.17	5.97		
0.67	42.43	1.50	12.87	2.33	5.26		

CALIB NASHYD (0001) ID= 1 DT= 5.0 min	Area (ha)= 8.45 Ia (mm)= 7.80	Curve Number (CN)= 78.0 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.47

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

Unit Hyd Qpeak (cms)= 0.692

PEAK FLOW (cms)= 0.506 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 28.593
TOTAL RAINFALL (mm)= 69.563
RUNOFF COEFFICIENT = 0.411

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

CALIB STANDHYD (0004) ID= 1 DT= 5.0 min	Area (ha)= 0.94 Total Imp(%)= 41.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.38	0.55
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	0.70
Length (m)=	79.04	300.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

Max.Eff.Inten.(mm/hr)=	174.32	34.60	
over (min)	5.00	55.00	
Storage Coeff. (min)=	1.44 (ii)	50.97 (ii)	
Unit Hyd. Tpeak (min)=	5.00	55.00	
Unit Hyd. peak (cms)=	0.33	0.02	
			TOTALS

PEAK FLOW (cms)=	0.02	0.03	0.030 (iii)
TIME TO PEAK (hrs)=	1.00	1.92	1.92
RUNOFF VOLUME (mm)=	68.56	23.20	25.43
TOTAL RAINFALL (mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT =	0.99	0.33	0.37

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0013) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	8.45	0.506	1.50	28.59
+ ID2= 2 (0004):	0.94	0.030	1.92	25.43
ID = 3 (0013):	9.39	0.528	1.58	28.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0012) ID= 1 DT= 5.0 min	Area (ha)= 0.17 Total Imp(%)= 70.00 Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.12	0.05
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	0.80	1.00
Length (m)=	33.47	10.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

Max.Eff.Inten.(mm/hr)=	174.32	88.22	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.13 (ii)	3.60 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.25	
			TOTALS

PEAK FLOW (cms)=	0.04	0.01	0.054 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	68.56	23.78	46.16
TOTAL RAINFALL (mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT =	0.99	0.34	0.66

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0003) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	0.17	0.054	1.00	46.16
+ ID2= 2 (0013):	9.39	0.528	1.58	28.28
ID = 3 (0003):	9.56	0.533	1.50	28.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0002) ID= 1 DT= 5.0 min	Area (ha)= 7.74 Ia (mm)= 7.90	Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.55	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

Unit Hyd Qpeak (cms)= 0.539

PEAK FLOW (cms)= 0.428 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 29.433
TOTAL RAINFALL (mm)= 69.563
RUNOFF COEFFICIENT = 0.423

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

CALIB STANDHYD (0005)	Area (ha)= 0.23

Pre-Development - 50-Year Storm

|ID= 1 DT= 5.0 min | Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	4.00	8.30
Length	(m)=	39.24	8.50
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

				TOTALS
Max.Eff.Inten.(mm/hr)=		174.32	59.03	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.77 (ii)	2.40 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.30	
PEAK FLOW	(cms)=	0.05	0.03	0.073 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	68.56	26.30	44.47
TOTAL RAINFALL	(mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT	=	0.99	0.38	0.64

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0008)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0002):		7.74	0.428	1.67	29.43
+ ID2= 2 (0005):		0.23	0.073	1.00	44.47
ID = 3 (0008):		7.97	0.434	1.67	29.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0006)	Area (ha)= 0.06				
ID= 1 DT= 5.0 min	Total Imp(%)= 36.00	Dir. Conn.(%)= 19.00			

Pre-Development - 50-Year Storm

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.02	0.04
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	3.00
Length	(m)=	20.66	15.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

				TOTALS
Max.Eff.Inten.(mm/hr)=		174.32	90.56	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.65 (ii)	5.16 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.16	
PEAK FLOW	(cms)=	0.01	0.01	0.013 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	68.56	30.78	37.93
TOTAL RAINFALL	(mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT	=	0.99	0.44	0.55

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0007)	Area (ha)= 0.20				
ID= 1 DT= 5.0 min	Total Imp(%)= 35.00	Dir. Conn.(%)= 20.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

Pre-Development - 50-Year Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

				TOTALS
Max.Eff.Inten.(mm/hr)=		174.32	86.20	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.91 (ii)	6.67 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.14	
PEAK FLOW	(cms)=	0.02	0.02	0.039 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	68.56	30.25	37.90
TOTAL RAINFALL	(mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT	=	0.99	0.43	0.54

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0009)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):		0.06	0.013	1.00	37.93
+ ID2= 2 (0007):		0.20	0.039	1.00	37.90
ID = 3 (0009):		0.27	0.052	1.00	37.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):		7.97	0.434	1.67	29.87
+ ID2= 2 (0009):		0.27	0.052	1.00	37.91
ID = 3 (0011):		8.24	0.442	1.67	30.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)

Pre-Development - 50-Year Storm

ID1= 1 (0011):		8.24	0.442	1.67	30.13
+ ID2= 2 (0003):		9.56	0.533	1.50	28.59
ID = 3 (0010):		17.80	0.975	1.58	29.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:02:24

USER:


COMMENTS: _____________________________________________________
```

```
  ************************************************
  ** SIMULATION : 6 - 100yr - 3hr Chicago       **
  ************************************************

-------------------
| CHICAGO STORM   |    IDF curve parameters: A=2561.151
| Ptotal= 76.19 mm |                          B=   9.093
-------------------                          C=   0.880
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	5.20	0.83	191.10	1.67	10.83	2.50	4.98
0.17	6.77	1.00	63.94	1.83	8.79	2.67	4.49
0.33	9.66	1.17	30.88	2.00	7.39	2.83	4.09
0.50	16.51	1.33	19.50	2.17	6.36		
0.67	47.05	1.50	14.00	2.33	5.59		

```
-------------------
| CALIB             |
| NASHYD   (  0001)|   Area    (ha)=   8.45   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.80   # of Linear Res.(N)= 3.00
                                                        Page 1
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```
-------------------   U.H. Tp(hrs)=   0.47

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

```
    Unit Hyd Qpeak  (cms)=   0.692

    PEAK FLOW       (cms)=   0.601 (i)
    TIME TO PEAK    (hrs)=   1.500
    RUNOFF VOLUME    (mm)=  33.396
    TOTAL RAINFALL   (mm)=  76.186
    RUNOFF COEFFICIENT   =   0.438

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

-------------------
| CALIB             |
| STANDHYD (  0004)|   Area    (ha)=   0.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  41.00   Dir. Conn.(%)=   5.00
-------------------

                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.38         0.55
    Dep. Storage     (mm)=      1.00         5.00
    Average Slope     (%)=      2.00         0.70
    Length            (m)=     79.04       300.00
    Mannings n           =     0.013        0.250

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

```
    Max.Eff.Inten.(mm/hr)=     191.10       40.71
              over (min)          5.00       50.00
    Storage Coeff.  (min)=       1.39 (ii)  47.80 (ii)
    Unit Hyd. Tpeak (min)=       5.00       50.00
    Unit Hyd. peak  (cms)=       0.33        0.02
                                                    *TOTALS*
                                          Page 2
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```
    PEAK FLOW       (cms)=       0.02         0.04          0.038 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.83           1.83
    RUNOFF VOLUME    (mm)=      75.19        27.11          29.48
    TOTAL RAINFALL   (mm)=      76.19        76.19          76.19
    RUNOFF COEFFICIENT   =       0.99         0.36           0.39

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  56.0    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  (  0013)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     8.45   0.601     1.50     33.40
     + ID2= 2 (  0004):     0.94   0.038     1.83     29.48
       ==========================================================
       ID = 3 (  0013):     9.39   0.629     1.58     33.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------
| CALIB             |
| STANDHYD (  0012)|   Area    (ha)=   0.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  50.00
-------------------

                       IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.12         0.05
    Dep. Storage     (mm)=      1.00         5.00
    Average Slope     (%)=      0.80         1.00
    Length            (m)=     33.47        10.00
    Mannings n           =     0.013        0.250

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

```
    Max.Eff.Inten.(mm/hr)=     191.10       104.26
              over (min)          5.00         5.00
    Storage Coeff.  (min)=       1.09 (ii)    3.47 (ii)
    Unit Hyd. Tpeak (min)=       5.00         5.00
    Unit Hyd. peak  (cms)=       0.34         0.26
                                                    *TOTALS*
                                          Page 3
```



```
    PEAK FLOW       (cms)=       0.04         0.02          0.060 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00           1.00
    RUNOFF VOLUME    (mm)=      75.19        27.76          51.47
    TOTAL RAINFALL   (mm)=      76.19        76.19          76.19
    RUNOFF COEFFICIENT   =       0.99         0.36           0.68

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  56.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     0.17   0.060     1.00     51.47
     + ID2= 2 (  0013):     9.39   0.629     1.58     33.01
       ==========================================================
       ID = 3 (  0003):     9.56   0.636     1.50     33.33

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------
| CALIB             |
| NASHYD   (  0002)|   Area    (ha)=   7.74   Curve Number   (CN)= 79.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.55

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

```
    Unit Hyd Qpeak  (cms)=   0.539

    PEAK FLOW       (cms)=   0.505 (i)
    TIME TO PEAK    (hrs)=   1.667
    RUNOFF VOLUME    (mm)=  34.334
    TOTAL RAINFALL   (mm)=  76.186
    RUNOFF COEFFICIENT   =   0.451

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

-------------------
| CALIB             |
| STANDHYD (  0005)|   Area    (ha)=   0.23
                                          Page 4
```

Pre-Development - 100-Year Storm

|ID= 1 DT= 5.0 min | Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	4.00	8.30
Length	(m)=	39.24	8.50
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

				TOTALS
Max.Eff.Inten.(mm/hr)=		191.10	69.97	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.74 (ii)	2.31 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.30	
PEAK FLOW	(cms)=	0.05	0.03	0.083 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	75.19	30.69	49.82
TOTAL RAINFALL	(mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT	=	0.99	0.40	0.65

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0008)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0002):		7.74	0.505	1.67	34.33
+ ID2= 2 (0005):		0.23	0.083	1.00	49.82
ID = 3 (0008):		7.97	0.512	1.67	34.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0006)	Area (ha)= 0.06				
ID= 1 DT= 5.0 min	Total Imp(%)= 36.00	Dir. Conn.(%)= 19.00			

Pre-Development - 100-Year Storm

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.02	0.04
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	3.00
Length	(m)=	20.66	15.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

				TOTALS
Max.Eff.Inten.(mm/hr)=		191.10	106.25	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.62 (ii)	4.97 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.22	
PEAK FLOW	(cms)=	0.01	0.01	0.018 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	75.19	35.63	43.10
TOTAL RAINFALL	(mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT	=	0.99	0.47	0.57

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0007)	Area (ha)= 0.20				
ID= 1 DT= 5.0 min	Total Imp(%)= 35.00	Dir. Conn.(%)= 20.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

Pre-Development - 100-Year Storm

0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

				TOTALS
Max.Eff.Inten.(mm/hr)=		191.10	101.25	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.88 (ii)	6.28 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.15	
PEAK FLOW	(cms)=	0.02	0.03	0.045 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	75.19	35.04	43.06
TOTAL RAINFALL	(mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT	=	0.99	0.46	0.57

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0009)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):		0.06	0.018	1.00	43.10
+ ID2= 2 (0007):		0.20	0.045	1.00	43.06
ID = 3 (0009):		0.27	0.063	1.00	43.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):		7.97	0.512	1.67	34.78
+ ID2= 2 (0009):		0.27	0.063	1.00	43.07
ID = 3 (0011):		8.24	0.521	1.58	35.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)

Pre-Development - 100-Year Storm

ID1= 1 (0011):		8.24	0.521	1.58	35.05
+ ID2= 2 (0003):		9.56	0.636	1.50	33.33
ID = 3 (0010):		17.80	1.156	1.58	34.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
         V  V   I      SS   U   U  A   A  L
          VV    I    SSSSS  UUUU  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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50

DATE: 04-02-2024                          TIME: 04:02:24

USER:


COMMENTS: _____________________________________________________
```

```
  ************************************************
  ** SIMULATION : 7 - 250yr - 3hr Chicago       **
  ************************************************

-------------------
| CHICAGO STORM   |    IDF curve parameters: A=3048.220
| Ptotal= 86.57 mm |                          B=  10.030
-------------------                          C=   0.888
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.00    5.83 |  0.83  212.89 |  1.67   12.40 |  2.50    5.57
                 0.17    7.65 |  1.00   74.20 |  1.83   10.01 |  2.67    5.00
                 0.33   11.03 |  1.17   35.98 |  2.00    8.37 |  2.83    4.54
                 0.50   19.09 |  1.33   22.61 |  2.17    7.17 |
                 0.67   54.67 |  1.50   16.13 |  2.33    6.27 |

-------------------
| CALIB             |
| NASHYD   (  0001)|   Area    (ha)=   8.45   Curve Number   (CN)= 78.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.80   # of Linear Res.(N)= 3.00
                                                          Page 1
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```
-------------------   U.H. Tp(hrs)=   0.47

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

                                ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    5.83 | 0.833   54.67 | 1.583   16.13 |  2.33    7.17
                0.167    5.83 | 0.917  212.89 | 1.667   16.13 |  2.42    6.27
                0.250    7.65 | 1.000  212.89 | 1.750   12.40 |  2.50    6.27
                0.333    7.65 | 1.083   74.20 | 1.833   12.40 |  2.58    5.57
                0.417   11.03 | 1.167   74.20 | 1.917   10.01 |  2.67    5.57
                0.500   11.03 | 1.250   35.98 | 2.000   10.01 |  2.75    5.00
                0.583   19.09 | 1.333   35.98 | 2.083    8.37 |  2.83    5.00
                0.667   19.09 | 1.417   22.61 | 2.167    8.37 |  2.92    4.54
                0.750   54.67 | 1.500   22.61 | 2.250    7.17 |  3.00    4.54

    Unit Hyd Qpeak  (cms)=   0.692

    PEAK FLOW       (cms)=   0.749 (i)
    TIME TO PEAK    (hrs)=   1.500
    RUNOFF VOLUME    (mm)=  41.248
    TOTAL RAINFALL   (mm)=  86.569
    RUNOFF COEFFICIENT   =   0.476

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

-------------------
| CALIB             |
| STANDHYD (  0004)|   Area    (ha)=   0.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  41.00   Dir. Conn.(%)=   5.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.38         0.55
    Dep. Storage     (mm)=      1.00         5.00
    Average Slope     (%)=      2.00         0.70
    Length            (m)=     79.04       300.00
    Mannings n           =     0.013        0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    5.83 | 0.833   54.67 | 1.583   16.13 |  2.33    7.17
                0.167    5.83 | 0.917  212.89 | 1.667   16.13 |  2.42    6.27
                0.250    7.65 | 1.000  212.89 | 1.750   12.40 |  2.50    6.27
                0.333    7.65 | 1.083   74.20 | 1.833   12.40 |  2.58    5.57
                0.417   11.03 | 1.167   74.20 | 1.917   10.01 |  2.67    5.57
                0.500   11.03 | 1.250   35.98 | 2.000   10.01 |  2.75    5.00
                0.583   19.09 | 1.333   35.98 | 2.083    8.37 |  2.83    5.00
                0.667   19.09 | 1.417   22.61 | 2.167    8.37 |  2.92    4.54
                0.750   54.67 | 1.500   22.61 | 2.250    7.17 |  3.00    4.54

    Max.Eff.Inten.(mm/hr)=     212.89       59.19
              over (min)          5.00       45.00
    Storage Coeff.  (min)=       1.33 (ii)  41.29 (ii)
    Unit Hyd. Tpeak (min)=       5.00       45.00
    Unit Hyd. peak  (cms)=       0.33        0.03
                                                        *TOTALS*
                                                          Page 2
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```
    PEAK FLOW       (cms)=       0.03         0.05          0.052 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.75           1.67
    RUNOFF VOLUME    (mm)=      85.57        33.59          36.16
    TOTAL RAINFALL   (mm)=      86.57        86.57          86.57
    RUNOFF COEFFICIENT   =       0.99         0.39           0.42

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  56.0    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  (  0013)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     8.45   0.749     1.50    41.25
     + ID2= 2 (  0004):     0.94   0.052     1.67    36.16
       ================================================
       ID = 3 (  0013):     9.39   0.792     1.58    40.74

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------
| CALIB             |
| STANDHYD (  0012)|   Area    (ha)=   0.17
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  50.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.12         0.05
    Dep. Storage     (mm)=      1.00         5.00
    Average Slope     (%)=      0.80         1.00
    Length            (m)=     33.47        10.00
    Mannings n           =     0.013        0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    5.83 | 0.833   54.67 | 1.583   16.13 |  2.33    7.17
                0.167    5.83 | 0.917  212.89 | 1.667   16.13 |  2.42    6.27
                0.250    7.65 | 1.000  212.89 | 1.750   12.40 |  2.50    6.27
                0.333    7.65 | 1.083   74.20 | 1.833   12.40 |  2.58    5.57
                0.417   11.03 | 1.167   74.20 | 1.917   10.01 |  2.67    5.57
                0.500   11.03 | 1.250   35.98 | 2.000   10.01 |  2.75    5.00
                0.583   19.09 | 1.333   35.98 | 2.083    8.37 |  2.83    5.00
                0.667   19.09 | 1.417   22.61 | 2.167    8.37 |  2.92    4.54
                0.750   54.67 | 1.500   22.61 | 2.250    7.17 |  3.00    4.54

    Max.Eff.Inten.(mm/hr)=     212.89       128.14
              over (min)          5.00         5.00
    Storage Coeff.  (min)=       1.05 (ii)    3.33 (ii)
    Unit Hyd. Tpeak (min)=       5.00         5.00
    Unit Hyd. peak  (cms)=       0.34         0.26
                                                        *TOTALS*
                                                          Page 3
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```
    PEAK FLOW       (cms)=       0.05         0.02          0.069 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00           1.00
    RUNOFF VOLUME    (mm)=      85.57        34.35          59.95
    TOTAL RAINFALL   (mm)=      86.57        86.57          86.57
    RUNOFF COEFFICIENT   =       0.99         0.40           0.69

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  56.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):     0.17   0.069     1.00    59.95
     + ID2= 2 (  0013):     9.39   0.792     1.58    40.74
       ================================================
       ID = 3 (  0003):     9.56   0.800     1.50    41.08

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------
| CALIB             |
| NASHYD   (  0002)|   Area    (ha)=   7.74   Curve Number   (CN)= 79.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.55

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

                                ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    5.83 | 0.833   54.67 | 1.583   16.13 |  2.33    7.17
                0.167    5.83 | 0.917  212.89 | 1.667   16.13 |  2.42    6.27
                0.250    7.65 | 1.000  212.89 | 1.750   12.40 |  2.50    6.27
                0.333    7.65 | 1.083   74.20 | 1.833   12.40 |  2.58    5.57
                0.417   11.03 | 1.167   74.20 | 1.917   10.01 |  2.67    5.57
                0.500   11.03 | 1.250   35.98 | 2.000   10.01 |  2.75    5.00
                0.583   19.09 | 1.333   35.98 | 2.083    8.37 |  2.83    5.00
                0.667   19.09 | 1.417   22.61 | 2.167    8.37 |  2.92    4.54
                0.750   54.67 | 1.500   22.61 | 2.250    7.17 |  3.00    4.54

    Unit Hyd Qpeak  (cms)=   0.539

    PEAK FLOW       (cms)=   0.628 (i)
    TIME TO PEAK    (hrs)=   1.667
    RUNOFF VOLUME    (mm)=  42.333
    TOTAL RAINFALL   (mm)=  86.569
    RUNOFF COEFFICIENT   =   0.489

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

-------------------
| CALIB             |
| STANDHYD (  0005)|   Area    (ha)=   0.23
                                                          Page 4
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Pre-Development - 250-Year Storm

|ID= 1 DT= 5.0 min | Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	4.00	8.30
Length	(m)=	39.24	8.50
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

Max.Eff.Inten.(mm/hr)=		212.89	86.19	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.71 (ii)	2.22 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.30	
				TOTALS
PEAK FLOW	(cms)=	0.06	0.04	0.095 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	85.57	37.91	58.40
TOTAL RAINFALL	(mm)=	86.57	86.57	86.57
RUNOFF COEFFICIENT	=	0.99	0.44	0.67

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0008)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0002):		7.74	0.628	1.67	42.33
+ ID2= 2 (0005):		0.23	0.095	1.00	58.40
ID = 3 (0008):		7.97	0.636	1.67	42.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0006)	Area (ha)= 0.06				
ID= 1 DT= 5.0 min	Total Imp(%)= 36.00	Dir. Conn.(%)= 19.00			

Pre-Development - 250-Year Storm

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.02	0.04
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	3.00
Length	(m)=	20.66	15.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

Max.Eff.Inten.(mm/hr)=		212.89	129.17	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.60 (ii)	4.76 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.22	
				TOTALS
PEAK FLOW	(cms)=	0.01	0.01	0.021 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	85.57	43.52	51.46
TOTAL RAINFALL	(mm)=	86.57	86.57	86.57
RUNOFF COEFFICIENT	=	0.99	0.50	0.59

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0007)	Area (ha)= 0.20				
ID= 1 DT= 5.0 min	Total Imp(%)= 35.00	Dir. Conn.(%)= 20.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

Pre-Development - 250-Year Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

Max.Eff.Inten.(mm/hr)=		212.89	123.28	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.84 (ii)	5.83 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.15	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.04	0.054 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	85.57	42.86	51.38
TOTAL RAINFALL	(mm)=	86.57	86.57	86.57
RUNOFF COEFFICIENT	=	0.99	0.50	0.59

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0009)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):		0.06	0.021	1.00	51.46
+ ID2= 2 (0007):		0.20	0.054	1.00	51.38
ID = 3 (0009):		0.27	0.075	1.00	51.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):		7.97	0.636	1.67	42.80
+ ID2= 2 (0009):		0.27	0.075	1.00	51.40
ID = 3 (0011):		8.24	0.648	1.58	43.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)

Pre-Development - 250-Year Storm

ID1= 1 (0011):		8.24	0.648	1.58	43.08
+ ID2= 2 (0003):		9.56	0.800	1.50	41.08
ID = 3 (0010):		17.80	1.446	1.58	42.00

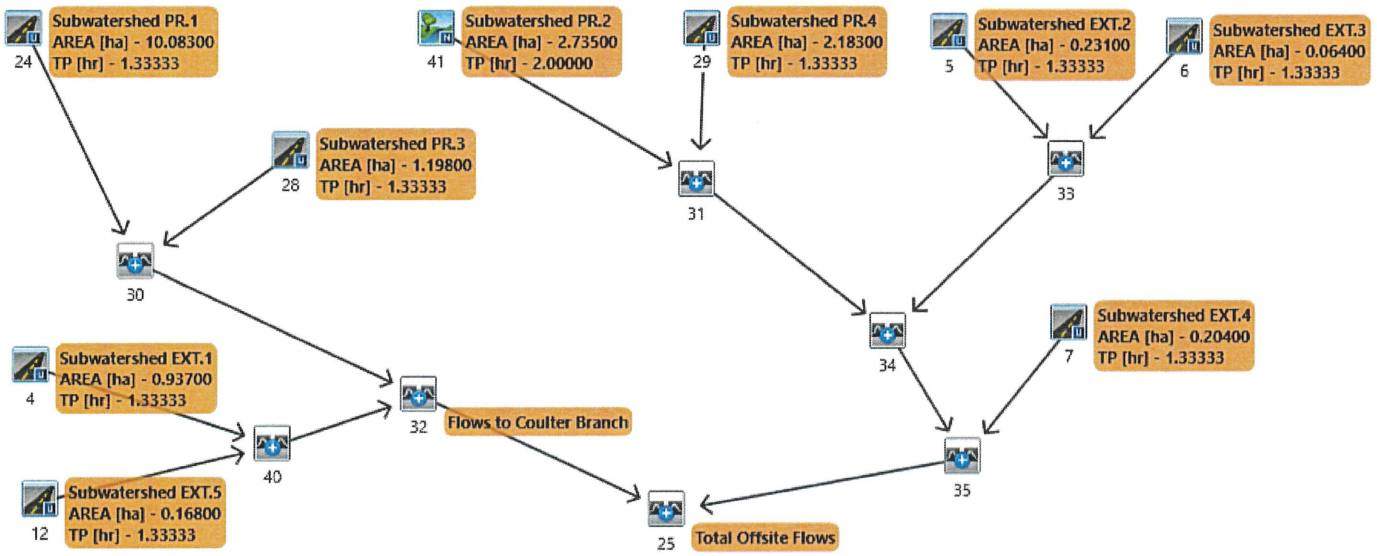
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

APPENDIX III

VISUAL OTTHYMO OUTPUT
POST DEVELOPMENT: UNCONTROLLED

Post Development Uncontrolled

Schematic



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

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:05:42

USER:


COMMENTS: _____________________________________________________
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****
** SIMULATION : 1 - 25mm - 4hr Storm Event   **
****

| CHICAGO STORM | Ptotal= 25.04 mm |

IDF curve parameters: A= 538.850
B= 6.331
C= 0.809
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	1.52	1.00	13.45	2.00	3.80	3.00	1.84
0.17	1.75	1.17	56.25	2.17	3.20	3.17	1.70
0.33	2.08	1.33	17.87	2.33	2.78	3.33	1.58
0.50	2.58	1.50	9.22	2.50	2.45	3.50	1.48
0.67	3.46	1.67	6.21	2.67	2.20	3.67	1.40
0.83	5.39	1.83	4.70	2.83	2.00	3.83	1.32

CALIB	NASHYD (0041)	Area (ha)= 2.73	Curve Number (CN)= 76.0

ID= 1 DT= 5.0 min	Ia (mm)= 6.20 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.48

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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Unit Hyd Qpeak (cms)= 0.219

PEAK FLOW (cms)= 0.016 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 3.584
TOTAL RAINFALL (mm)= 25.042
RUNOFF COEFFICIENT = 0.143

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

CALIB	STANDHYD (0029)	ID= 1 DT= 5.0 min	Area (ha)= 2.18	Total Imp(%)= 40.00	Dir. Conn.(%)= 30.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.87	1.31
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	120.64	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	5.18	
over (min)	5.00	25.00	
Storage Coeff. (min)=	3.60 (ii)	23.00 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.26	0.05	
			TOTALS
PEAK FLOW (cms)=	0.10	0.01	0.099 (iii)
TIME TO PEAK (hrs)=	1.33	1.75	1.33
RUNOFF VOLUME (mm)=	23.04	3.50	9.35
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.92	0.14	0.37

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 68.0 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 (0031)	1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0029):		2.18	0.099	1.33	9.35
+ ID2= 2 (0041):		2.73	0.016	2.00	3.58
ID = 3 (0031):		4.92	0.101	1.33	6.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	STANDHYD (0005)	ID= 1 DT= 5.0 min	Area (ha)= 0.23	Total Imp(%)= 43.00	Dir. Conn.(%)= 43.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.10	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	4.00	8.30
Length (m)=	39.24	8.50
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	5.44	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.21 (ii)	3.77 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.33	0.25	
			TOTALS
PEAK FLOW (cms)=	0.02	0.00	0.018 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	24.04	3.52	12.34
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.96	0.14	0.49

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0006)	ID= 1 DT= 5.0 min	Area (ha)= 0.06	Total Imp(%)= 36.00	Dir. Conn.(%)= 19.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.02	0.04
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	3.00
Length (m)=	20.66	15.00
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	9.70	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.01 (ii)	9.84 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.11	
			TOTALS
PEAK FLOW (cms)=	0.00	0.00	0.002 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	24.04	4.67	8.27

TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.96	0.19	0.33

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0033)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	0.23	0.018	1.33	12.34
+ ID2= 2 (0006):	0.06	0.002	1.33	8.27
ID = 3 (0033):	0.30	0.020	1.33	11.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0031):	4.92	0.101	1.33	6.15
+ ID2= 2 (0033):	0.30	0.020	1.33	11.46
ID = 3 (0034):	5.21	0.121	1.33	6.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0007) | Area (ha)= 0.20
ID= 1 DT= 5.0 min | Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.07	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.70
Length (m)=	36.88	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	7.27	
over (min)	5.00	20.00	
Storage Coeff. (min)=	1.44 (ii)	16.92 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.33	0.06	
			TOTALS
PEAK FLOW (cms)=	0.01	0.00	0.007 (iii)
TIME TO PEAK (hrs)=	1.33	1.67	1.33
RUNOFF VOLUME (mm)=	24.04	4.52	8.37
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.96	0.18	0.33

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	5.21	0.121	1.33	6.45
+ ID2= 2 (0007):	0.20	0.007	1.33	8.37
ID = 3 (0035):	5.42	0.127	1.33	6.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028) | Area (ha)= 1.20
ID= 1 DT= 5.0 min | Total Imp(%)= 24.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.29	0.91
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	89.37	31.00
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	3.44	
over (min)	5.00	30.00	
Storage Coeff. (min)=	3.01 (ii)	26.32 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.28	0.04	
			TOTALS
PEAK FLOW (cms)=	0.01	0.00	0.010 (iii)
TIME TO PEAK (hrs)=	1.33	1.83	1.33
RUNOFF VOLUME (mm)=	23.04	2.45	3.47
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.92	0.10	0.14

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0024) | Area (ha)= 10.08
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 36.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	5.55
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	259.27	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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	2.36	
over (min)	5.00	40.00	
Storage Coeff. (min)=	5.70 (ii)	37.30 (ii)	
Unit Hyd. Tpeak (min)=	5.00	40.00	
Unit Hyd. peak (cms)=	0.20	0.03	
			TOTALS
PEAK FLOW (cms)=	0.49	0.02	0.491 (iii)
TIME TO PEAK (hrs)=	1.33	2.08	1.33
RUNOFF VOLUME (mm)=	23.04	2.16	9.67
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.92	0.09	0.39

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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 (0030)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0024):	10.08	0.491	1.33	9.67
+ ID2= 2 (0028):	1.20	0.010	1.33	3.47
ID = 3 (0030):	11.28	0.501	1.33	9.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0012) | Area (ha)= 0.17
ID= 1 DT= 5.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.12	0.05
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	0.80	1.00
Length (m)=	33.47	10.00
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	9.59		
over (min)	5.00	10.00		
Storage Coeff. (min)=	1.78 (ii)	5.66 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.32	0.15		
			TOTALS	
PEAK FLOW (cms)=	0.01	0.00	0.014 (iii)	
TIME TO PEAK (hrs)=	1.33	1.42	1.33	
RUNOFF VOLUME (mm)=	24.04	3.43	13.71	
TOTAL RAINFALL (mm)=	25.04	25.04	25.04	
RUNOFF COEFFICIENT =	0.96	0.14	0.55	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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)= 0.94
ID= 1 DT= 5.0 min	Total Imp(%)= 41.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.38	0.55
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	0.70
Length (m)=	79.04	300.00
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	3.73		
over (min)	5.00	125.00		
Storage Coeff. (min)=	2.27 (ii)	122.95 (ii)		
Unit Hyd. Tpeak (min)=	5.00	125.00		
Unit Hyd. peak (cms)=	0.30	0.01		
			TOTALS	
PEAK FLOW (cms)=	0.01	0.00	0.007 (iii)	
TIME TO PEAK (hrs)=	1.33	3.67	1.33	
RUNOFF VOLUME (mm)=	24.04	3.30	4.26	
TOTAL RAINFALL (mm)=	25.04	25.04	25.04	
RUNOFF COEFFICIENT =	0.96	0.13	0.17	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	0.17	0.014	1.33	13.71
+ ID2= 2 (0004):	0.94	0.007	1.33	4.26
ID = 3 (0040):	1.11	0.021	1.33	5.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0032) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	11.28	0.501	1.33	9.02
+ ID2= 2 (0040):	1.11	0.021	1.33	5.69
ID = 3 (0032):	12.39	0.522	1.33	8.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025) | 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0032):	12.39	0.522	1.33	8.72
+ ID2= 2 (0035):	5.42	0.127	1.33	6.52
ID = 3 (0025):	17.80	0.650	1.33	8.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
Output filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024 TIME: 04:05:41

USER:

COMMENTS: _____

****
** SIMULATION : 2 - 5yr - 3hr Chicago **
****

| CHICAGO STORM | IDF curve parameters: A=1137.257
| Ptotal= 44.34 mm | B= 7.184
C= 0.830

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.65	0.83	107.33	1.67	6.92	2.50	3.52
0.17	4.60	1.00	34.77	1.83	5.77	2.67	3.21
0.33	6.26	1.17	17.56	2.00	4.96	2.83	2.96
0.50	10.01	1.33	11.61	2.17	4.36		
0.67	25.98	1.50	8.67	2.33	3.89		

CALIB					
NASHYD (0041)	Area	(ha)=	2.73	Curve Number	(CN)= 76.0
ID= 1 DT= 5.0 min	Ia	(mm)=	6.20	# of Linear Res.(N)=	3.00

U.H. Tp(hrs)= 0.48

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

Unit Hyd Qpeak (cms)= 0.219

PEAK FLOW (cms)= 0.064 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 12.289
TOTAL RAINFALL (mm)= 44.338
RUNOFF COEFFICIENT = 0.277

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

CALIB					
STANDHYD (0029)	Area	(ha)=	2.18		
ID= 1 DT= 5.0 min	Total Imp(%)=	40.00	Dir. Conn.(%)=	30.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.87	1.31
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	120.64	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	22.00	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.78 (ii)	13.66 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.28	0.08	

			TOTALS
PEAK FLOW (cms)=	0.19	0.05	0.213 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.00
RUNOFF VOLUME (mm)=	42.34	11.26	20.58
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.95	0.25	0.46

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 68.0 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 (0031)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0029):		2.18	0.213	1.00	20.58
+ ID2= 2 (0041):		2.73	0.064	1.58	12.29
ID = 3 (0031):		4.92	0.222	1.00	15.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0005)	Area	(ha)=	0.23		
ID= 1 DT= 5.0 min	Total Imp(%)=	43.00	Dir. Conn.(%)=	43.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.10	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	4.00	8.30
Length (m)=	39.24	8.50
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	22.91	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.93 (ii)	2.91 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.28	
PEAK FLOW (cms)=	0.03	0.01	0.039 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00

			TOTALS
RUNOFF VOLUME (mm)=	43.34	11.61	25.25
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.98	0.26	0.57

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0006)	Area	(ha)=	0.06		
ID= 1 DT= 5.0 min	Total Imp(%)=	36.00	Dir. Conn.(%)=	19.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.02	0.04
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	3.00
Length (m)=	20.66	15.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	37.36	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.78 (ii)	5.93 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.15	
PEAK FLOW (cms)=	0.00	0.00	0.006 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.00
RUNOFF VOLUME (mm)=	43.34	14.23	19.69
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.98	0.32	0.44

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0033)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0005):		0.23	0.039	1.00	25.25
+ ID2= 2 (0006):		0.06	0.006	1.00	19.69
ID = 3 (0033):		0.30	0.046	1.00	24.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0031):		4.92	0.222	1.00	15.97
+ ID2= 2 (0033):		0.30	0.046	1.00	24.04
ID = 3 (0034):		5.21	0.268	1.00	16.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0007)	Area	(ha)=	0.20	
ID= 1 DT= 5.0 min	Total Imp(%)=	35.00	Dir. Conn.(%)=	20.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

Max.Eff.Inten.(mm/hr)=		107.33	35.33	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.11 (ii)	9.34 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.12	
			TOTALS	
PEAK FLOW	(cms)=	0.01	0.01	0.018 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	43.34	13.91	19.77
TOTAL RAINFALL	(mm)=	44.34	44.34	44.34

RUNOFF COEFFICIENT =	0.98	0.31	0.45

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0034):		5.21	0.268	1.00	16.42
+ ID2= 2 (0007):		0.20	0.018	1.00	19.77
ID = 3 (0035):		5.42	0.286	1.00	16.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0028)	Area	(ha)=	1.20	
ID= 1 DT= 5.0 min	Total Imp(%)=	24.00	Dir. Conn.(%)=	5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.29	0.91
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	89.37	31.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

Max.Eff.Inten.(mm/hr)=		107.33	16.58	
over (min)		5.00	15.00	
Storage Coeff. (min)=		2.32 (ii)	14.75 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.30	0.08	
			TOTALS	
PEAK FLOW	(cms)=	0.02	0.03	0.032 (iii)
TIME TO PEAK	(hrs)=	1.00	1.17	1.17
RUNOFF VOLUME	(mm)=	42.34	8.14	9.84
TOTAL RAINFALL	(mm)=	44.34	44.34	44.34

RUNOFF COEFFICIENT =	0.95	0.18	0.22

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0024)	Area	(ha)=	10.08	
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00	Dir. Conn.(%)=	36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.54	5.55
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	259.27	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	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

Max.Eff.Inten.(mm/hr)=		107.33	12.75	
over (min)		5.00	25.00	
Storage Coeff. (min)=		4.40 (ii)	20.49 (ii)	
Unit Hyd. Tpeak (min)=		5.00	25.00	
Unit Hyd. peak (cms)=		0.23	0.05	
			TOTALS	
PEAK FLOW	(cms)=	1.00	0.11	1.018 (iii)
TIME TO PEAK	(hrs)=	1.00	1.33	1.00
RUNOFF VOLUME	(mm)=	42.34	7.33	19.93
TOTAL RAINFALL	(mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT	=	0.95	0.17	0.45

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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 (0030)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0024):		10.08	1.018	1.00	19.93
+ ID2= 2 (0028):		1.20	0.032	1.17	9.84
ID = 3 (0030):		11.28	1.047	1.00	18.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0012)	Area	(ha)=	0.17	
ID= 1 DT= 5.0 min	Total Imp(%)=	70.00	Dir. Conn.(%)=	50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.05
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.80	1.00
Length	(m)=	33.47	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

Max.Eff.Inten.(mm/hr)=		107.33	35.62	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.38 (ii)	4.37 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.33	0.23	
			TOTALS	
PEAK FLOW	(cms)=	0.03	0.01	0.030 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	43.34	10.61	26.96
TOTAL RAINFALL	(mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT	=	0.98	0.24	0.61

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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)=	0.94	

Post-Development - Uncontrolled - 5-Year Storm

|ID= 1 DT= 5.0 min | Total Imp(%)= 41.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.38	0.55
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	0.70
Length (m)=	79.04	300.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	12.99	
over (min)	5.00	80.00	
Storage Coeff. (min)=	1.75 (ii)	75.04 (ii)	
Unit Hyd. Tpeak (min)=	5.00	80.00	
Unit Hyd. peak (cms)=	0.32	0.01	
PEAK FLOW (cms)=	0.01	0.01	0.014 (iii)
TIME TO PEAK (hrs)=	1.00	2.42	1.00
RUNOFF VOLUME (mm)=	43.34	10.29	11.90
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.98	0.23	0.27

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0012):		0.17	0.030	1.00	26.96
+	ID2= 2 (0004):		0.94	0.014	1.00	11.90
	ID = 3 (0040):		1.11	0.045	1.00	14.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0032)|

Post-Development - Uncontrolled - 5-Year Storm

1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0030):	11.28	1.047	1.00	18.86
+	ID2= 2 (0040):	1.11	0.045	1.00	14.19
	ID = 3 (0032):	12.39	1.091	1.00	18.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0032):		12.39	1.091	1.00	18.44
+	ID2= 2 (0035):		5.42	0.286	1.00	16.55
	ID = 3 (0025):		17.80	1.378	1.00	17.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:05:41

USER:


COMMENTS: _____________________________________________________
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  **********************************************
  ** SIMULATION : 3 - 10yr - 3hr Chicago      **
  **********************************************

-------------------
| CHICAGO STORM   |    IDF curve parameters: A=1425.011
| Ptotal= 51.86 mm |                          B=   7.382
-------------------                          C=   0.843
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    4.05 |  0.83  128.36 |  1.67    7.83 |  2.50    3.89
                0.17    5.13 |  1.00   41.12 |  1.83    6.49 |  2.67    3.55
                0.33    7.06 |  1.17   20.44 |  2.00    5.55 |  2.83    3.26
                0.50   11.46 |  1.33   13.35 |  2.17    4.86 |
                0.67   30.55 |  1.50    9.87 |  2.33    4.32 |


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-------------------
| CALIB             |
| NASHYD   (  0041)|   Area     (ha)=   2.73   Curve Number   (CN)= 76.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.20   # of Linear Res.(N)= 3.00
                                  Page 1
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-------------------   U.H. Tp(hrs)=   0.48

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
               0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
               0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
               0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
               0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
               0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
               0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
               0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
               0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Unit Hyd Qpeak  (cms)=   0.219

    PEAK FLOW       (cms)=   0.090 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  16.560
    TOTAL RAINFALL   (mm)=  51.857
    RUNOFF COEFFICIENT   =   0.319

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

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-------------------
| CALIB             |
| STANDHYD (  0029)|   Area     (ha)=   2.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.87         1.31
    Dep. Storage     (mm)=       2.00         5.00
    Average Slope     (%)=       1.00         2.00
    Length            (m)=     120.64        30.00
    Mannings n           =      0.013        0.250

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
               0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
               0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
               0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
               0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
               0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
               0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
               0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
               0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Max.Eff.Inten.(mm/hr)=     128.36        37.03
              over (min)        5.00        15.00
    Storage Coeff.  (min)=       2.59 (ii)   11.42 (ii)
    Unit Hyd. Tpeak (min)=       5.00        15.00
    Unit Hyd. peak  (cms)=       0.29         0.09
                                                    *TOTALS*
                                  Page 2
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    PEAK FLOW       (cms)=       0.23         0.08          0.265 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17           1.00
    RUNOFF VOLUME    (mm)=      49.86        15.08          25.51
    TOTAL RAINFALL   (mm)=      51.86        51.86          51.86
    RUNOFF COEFFICIENT   =       0.96         0.29           0.49

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  68.0    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  (  0031)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):     2.18   0.265     1.00    25.51
     + ID2= 2 (  0041):     2.73   0.090     1.58    16.56
       ================================================
       ID = 3 (  0031):     4.92   0.279     1.00    20.53

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0005)|   Area     (ha)=   0.23
|ID= 1 DT= 5.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  43.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.10         0.13
    Dep. Storage     (mm)=       1.00         5.00
    Average Slope     (%)=       4.00         8.30
    Length            (m)=      39.24         8.50
    Mannings n           =      0.013        0.250

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
               0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
               0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
               0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
               0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
               0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
               0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
               0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
               0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Max.Eff.Inten.(mm/hr)=     128.36        32.70
              over (min)        5.00         5.00
    Storage Coeff.  (min)=       0.87 (ii)    2.71 (ii)
    Unit Hyd. Tpeak (min)=       5.00         5.00
    Unit Hyd. peak  (cms)=       0.34         0.29
                                                    *TOTALS*
    PEAK FLOW       (cms)=       0.04         0.01          0.050 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00           1.00
                                  Page 3
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    RUNOFF VOLUME    (mm)=      50.86        15.59          30.75
    TOTAL RAINFALL   (mm)=      51.86        51.86          51.86
    RUNOFF COEFFICIENT   =       0.98         0.30           0.59

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  73.0    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 (  0006)|   Area     (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  19.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.02         0.04
    Dep. Storage     (mm)=       1.00         5.00
    Average Slope     (%)=       2.00         3.00
    Length            (m)=      20.66        15.00
    Mannings n           =      0.013        0.250

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
               0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
               0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
               0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
               0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
               0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
               0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
               0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
               0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Max.Eff.Inten.(mm/hr)=     128.36        52.07
              over (min)        5.00        10.00
    Storage Coeff.  (min)=       0.73 (ii)    5.23 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.34         0.16
                                                    *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.01          0.008 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.08           1.00
    RUNOFF VOLUME    (mm)=      50.86        18.79          24.82
    TOTAL RAINFALL   (mm)=      51.86        51.86          51.86
    RUNOFF COEFFICIENT   =       0.98         0.36           0.48

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  73.0    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.

                                  Page 4
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ADD HYD (0033)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0005):	0.23	0.050	1.00	30.75
	+ ID2= 2 (0006):	0.06	0.008	1.00	24.82
	ID = 3 (0033):	0.30	0.058	1.00	29.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0031):	4.92	0.279	1.00	20.53
	+ ID2= 2 (0033):	0.30	0.058	1.00	29.47
	ID = 3 (0034):	5.21	0.337	1.00	21.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0007) | Area (ha)= 0.20
ID= 1 DT= 5.0 min | Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.07	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.70
Length (m)=	36.88	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.05	0.833	30.55	1.583	9.87	2.33	4.86
0.167	4.05	0.917	128.36	1.667	9.87	2.42	4.32
0.250	5.13	1.000	128.36	1.750	7.83	2.50	4.32
0.333	5.13	1.083	41.12	1.833	7.83	2.58	3.89
0.417	7.06	1.167	41.12	1.917	6.49	2.67	3.89
0.500	7.06	1.250	20.44	2.000	6.49	2.75	3.55
0.583	11.46	1.333	20.44	2.083	5.55	2.83	3.55
0.667	11.46	1.417	13.35	2.167	5.55	2.92	3.26
0.750	30.55	1.500	13.35	2.250	4.86	3.00	3.26

			TOTALS
Max.Eff.Inten.(mm/hr)=	128.36	49.36	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.03 (ii)	8.23 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.13	
PEAK FLOW (cms)=	0.01	0.01	0.024 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	50.86	18.40	24.87
TOTAL RAINFALL (mm)=	51.86	51.86	51.86

RUNOFF COEFFICIENT = 0.98 0.35 0.48

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0034):	5.21	0.337	1.00	21.04
	+ ID2= 2 (0007):	0.20	0.024	1.00	24.87
	ID = 3 (0035):	5.42	0.361	1.00	21.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028) | Area (ha)= 1.20
ID= 1 DT= 5.0 min | Total Imp(%)= 24.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.29	0.91
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	89.37	31.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.05	0.833	30.55	1.583	9.87	2.33	4.86
0.167	4.05	0.917	128.36	1.667	9.87	2.42	4.32
0.250	5.13	1.000	128.36	1.750	7.83	2.50	4.32
0.333	5.13	1.083	41.12	1.833	7.83	2.58	3.89
0.417	7.06	1.167	41.12	1.917	6.49	2.67	3.89
0.500	7.06	1.250	20.44	2.000	6.49	2.75	3.55
0.583	11.46	1.333	20.44	2.083	5.55	2.83	3.55
0.667	11.46	1.417	13.35	2.167	5.55	2.92	3.26
0.750	30.55	1.500	13.35	2.250	4.86	3.00	3.26

			TOTALS
Max.Eff.Inten.(mm/hr)=	128.36	23.52	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.16 (ii)	12.97 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.31	0.08	
PEAK FLOW (cms)=	0.02	0.04	0.047 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.17
RUNOFF VOLUME (mm)=	49.86	11.04	12.97
TOTAL RAINFALL (mm)=	51.86	51.86	51.86

RUNOFF COEFFICIENT = 0.96 0.21 0.25

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0024) | Area (ha)= 10.08
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 36.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	5.55
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	259.27	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	4.05	0.833	30.55	1.583	9.87	2.33	4.86
0.167	4.05	0.917	128.36	1.667	9.87	2.42	4.32
0.250	5.13	1.000	128.36	1.750	7.83	2.50	4.32
0.333	5.13	1.083	41.12	1.833	7.83	2.58	3.89
0.417	7.06	1.167	41.12	1.917	6.49	2.67	3.89
0.500	7.06	1.250	20.44	2.000	6.49	2.75	3.55
0.583	11.46	1.333	20.44	2.083	5.55	2.83	3.55
0.667	11.46	1.417	13.35	2.167	5.55	2.92	3.26
0.750	30.55	1.500	13.35	2.250	4.86	3.00	3.26

			TOTALS
Max.Eff.Inten.(mm/hr)=	128.36	19.63	
over (min)	5.00	20.00	
Storage Coeff. (min)=	4.09 (ii)	17.63 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.24	0.06	
PEAK FLOW (cms)=	1.21	0.17	1.256 (iii)
TIME TO PEAK (hrs)=	1.00	1.25	1.00
RUNOFF VOLUME (mm)=	49.86	10.00	24.35
TOTAL RAINFALL (mm)=	51.86	51.86	51.86
RUNOFF COEFFICIENT =	0.96	0.19	0.47

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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 (0030)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0024):	10.08	1.256	1.00	24.35
	+ ID2= 2 (0028):	1.20	0.047	1.17	12.97
	ID = 3 (0030):	11.28	1.294	1.00	23.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0012) | Area (ha)= 0.17
ID= 1 DT= 5.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.12	0.05
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	0.80	1.00
Length (m)=	33.47	10.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.05	0.833	30.55	1.583	9.87	2.33	4.86
0.167	4.05	0.917	128.36	1.667	9.87	2.42	4.32
0.250	5.13	1.000	128.36	1.750	7.83	2.50	4.32
0.333	5.13	1.083	41.12	1.833	7.83	2.58	3.89
0.417	7.06	1.167	41.12	1.917	6.49	2.67	3.89
0.500	7.06	1.250	20.44	2.000	6.49	2.75	3.55
0.583	11.46	1.333	20.44	2.083	5.55	2.83	3.55
0.667	11.46	1.417	13.35	2.167	5.55	2.92	3.26
0.750	30.55	1.500	13.35	2.250	4.86	3.00	3.26

			TOTALS
Max.Eff.Inten.(mm/hr)=	128.36	49.86	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.28 (ii)	4.07 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.33	0.24	
PEAK FLOW (cms)=	0.03	0.01	0.037 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	50.86	14.16	32.50
TOTAL RAINFALL (mm)=	51.86	51.86	51.86
RUNOFF COEFFICIENT =	0.98	0.27	0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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)= 0.94

|ID= 1 DT= 5.0 min | Total Imp(%)= 41.00 Dir. Conn.(%)= 5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.38	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	0.70
Length	(m)=	79.04	300.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.05	0.833	30.55	1.583	9.87	2.33	4.86
0.167	4.05	0.917	128.36	1.667	9.87	2.42	4.32
0.250	5.13	1.000	128.36	1.750	7.83	2.50	4.32
0.333	5.13	1.083	41.12	1.833	7.83	2.58	3.89
0.417	7.06	1.167	41.12	1.917	6.49	2.67	3.89
0.500	7.06	1.250	20.44	2.000	6.49	2.75	3.55
0.583	11.46	1.333	20.44	2.083	5.55	2.83	3.55
0.667	11.46	1.417	13.35	2.167	5.55	2.92	3.26
0.750	30.55	1.500	13.35	2.250	4.86	3.00	3.26

Max.Eff.Inten.(mm/hr)=		128.36	17.61	
over (min)		5.00	70.00	
Storage Coeff. (min)=		1.63 (ii)	66.52 (ii)	
Unit Hyd. Tpeak (min)=		5.00	70.00	
Unit Hyd. peak (cms)=		0.32	0.02	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.01	0.017 (iii)
TIME TO PEAK	(hrs)=	1.00	2.25	1.00
RUNOFF VOLUME	(mm)=	50.86	13.76	15.58
TOTAL RAINFALL	(mm)=	51.86	51.86	51.86
RUNOFF COEFFICIENT	=	0.98	0.27	0.30

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0012):		0.17	0.037	1.00	32.50
+	ID2= 2 (0004):		0.94	0.017	1.00	15.58
	ID = 3 (0040):		1.11	0.055	1.00	18.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0032)|

1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0030):	11.28	1.294	1.00	23.14
+	ID2= 2 (0040):	1.11	0.055	1.00	18.15
	ID = 3 (0032):	12.39	1.349	1.00	22.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0032):		12.39	1.349	1.00	22.70
+	ID2= 2 (0035):		5.42	0.361	1.00	21.18
	ID = 3 (0025):		17.80	1.710	1.00	22.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:05:43

USER:


COMMENTS: _____________________________________________________
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  ************************************************
  ** SIMULATION : 4 - 25yr - 3hr Chicago        **
  ************************************************

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| CHICAGO STORM    |    IDF curve parameters: A=1835.352
| Ptotal= 61.62 mm |                          B=   7.844
-------------------                          C=   0.858
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33

                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.00    4.54 |  0.83  154.86 |  1.67    9.01 |  2.50    4.36
                  0.17    5.80 |  1.00   49.76 |  1.83    7.41 |  2.67    3.95
                  0.33    8.09 |  1.17   24.35 |  2.00    6.30 |  2.83    3.62
                  0.50   13.39 |  1.33   15.69 |  2.17    5.48 |
                  0.67   36.78 |  1.50   11.46 |  2.33    4.85 |

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| CALIB             |
| NASHYD   (  0041)|   Area    (ha)=   2.73   Curve Number   (CN)= 76.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.20   # of Linear Res.(N)= 3.00
                                  Page 1
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--------------------   U.H. Tp(hrs)=   0.48

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.083    4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
                  0.167    4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
                  0.250    5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
                  0.333    5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
                  0.417    8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
                  0.500    8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
                  0.583   13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
                  0.667   13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
                  0.750   36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Unit Hyd Qpeak  (cms)=   0.219

    PEAK FLOW       (cms)=   0.126 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  22.642
    TOTAL RAINFALL   (mm)=  61.618
    RUNOFF COEFFICIENT   =   0.367

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

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-------------------
| CALIB             |
| STANDHYD (  0029)|   Area    (ha)=   2.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
-------------------

                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.87         1.31
    Dep. Storage     (mm)=       2.00         5.00
    Average Slope     (%)=       1.00         2.00
    Length            (m)=     120.64        30.00
    Mannings n           =      0.013        0.250

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.083    4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
                  0.167    4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
                  0.250    5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
                  0.333    5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
                  0.417    8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
                  0.500    8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
                  0.583   13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
                  0.667   13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
                  0.750   36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Max.Eff.Inten.(mm/hr)=     154.86        52.89
              over (min)        5.00        15.00
    Storage Coeff.  (min)=      2.40 (ii)   10.06 (ii)
    Unit Hyd. Tpeak (min)=      5.00        15.00
    Unit Hyd. peak  (cms)=      0.30         0.10
                                                    *TOTALS*
                                  Page 2
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    PEAK FLOW       (cms)=       0.28         0.12          0.334 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17           1.00
    RUNOFF VOLUME    (mm)=      59.62        20.57          32.28
    TOTAL RAINFALL   (mm)=      61.62        61.62          61.62
    RUNOFF COEFFICIENT   =       0.97         0.33           0.52

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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  (  0031)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):     2.18   0.334     1.00    32.28
     + ID2= 2 (  0041):     2.73   0.126     1.58    22.64
       ==========================================================
       ID = 3 (  0031):     4.92   0.355     1.00    26.92

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0005)|   Area    (ha)=   0.23
|ID= 1 DT= 5.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  43.00
-------------------

                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.10         0.13
    Dep. Storage     (mm)=       1.00         5.00
    Average Slope     (%)=       4.00         8.30
    Length            (m)=      39.24         8.50
    Mannings n           =      0.013        0.250

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.083    4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
                  0.167    4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
                  0.250    5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
                  0.333    5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
                  0.417    8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
                  0.500    8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
                  0.583   13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
                  0.667   13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
                  0.750   36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Max.Eff.Inten.(mm/hr)=     154.86        46.96
              over (min)        5.00         5.00
    Storage Coeff.  (min)=      0.81 (ii)    2.52 (ii)
    Unit Hyd. Tpeak (min)=      5.00         5.00
    Unit Hyd. peak  (cms)=      0.34         0.29
                                                    *TOTALS*
    PEAK FLOW       (cms)=       0.04         0.02          0.063 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00           1.00
                                  Page 3
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    RUNOFF VOLUME    (mm)=      60.62        21.29          38.20
    TOTAL RAINFALL   (mm)=      61.62        61.62          61.62
    RUNOFF COEFFICIENT   =       0.98         0.35           0.62

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  73.0    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 (  0006)|   Area    (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  19.00
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                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.02         0.04
    Dep. Storage     (mm)=       1.00         5.00
    Average Slope     (%)=       2.00         3.00
    Length            (m)=      20.66        15.00
    Mannings n           =      0.013        0.250

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.083    4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
                  0.167    4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
                  0.250    5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
                  0.333    5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
                  0.417    8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
                  0.500    8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
                  0.583   13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
                  0.667   13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
                  0.750   36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Max.Eff.Inten.(mm/hr)=     154.86        73.08
              over (min)        5.00        10.00
    Storage Coeff.  (min)=      0.68 (ii)    5.41 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.34         0.16
                                                    *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.01          0.011 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.08           1.00
    RUNOFF VOLUME    (mm)=      60.62        25.21          31.91
    TOTAL RAINFALL   (mm)=      61.62        61.62          61.62
    RUNOFF COEFFICIENT   =       0.98         0.41           0.52

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  73.0    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 (0033)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	0.23	0.063	1.00	38.20
+ ID2= 2 (0006):	0.06	0.011	1.00	31.91
ID = 3 (0033):	0.30	0.074	1.00	36.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0031):	4.92	0.355	1.00	26.92
+ ID2= 2 (0033):	0.30	0.074	1.00	36.83
ID = 3 (0034):	5.21	0.429	1.00	27.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0007) | Area (ha)= 0.20
ID= 1 DT= 5.0 min | Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.07	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.70
Length (m)=	36.88	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

			TOTALS
Max.Eff.Inten.(mm/hr)=	154.86	69.45	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.96 (ii)	7.24 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.14	
PEAK FLOW (cms)=	0.02	0.02	0.032 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.00
RUNOFF VOLUME (mm)=	60.62	24.74	31.90
TOTAL RAINFALL (mm)=	61.62	61.62	61.62

RUNOFF COEFFICIENT = 0.98 0.40 0.52

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	5.21	0.429	1.00	27.48
+ ID2= 2 (0007):	0.20	0.032	1.00	31.90
ID = 3 (0035):	5.42	0.461	1.00	27.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028) | Area (ha)= 1.20
ID= 1 DT= 5.0 min | Total Imp(%)= 24.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.29	0.91
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	89.37	31.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

			TOTALS
Max.Eff.Inten.(mm/hr)=	154.86	40.49	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.00 (ii)	10.70 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.31	0.09	
PEAK FLOW (cms)=	0.03	0.06	0.072 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.17
RUNOFF VOLUME (mm)=	59.62	15.28	17.49
TOTAL RAINFALL (mm)=	61.62	61.62	61.62

RUNOFF COEFFICIENT = 0.97 0.25 0.28

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0024) | Area (ha)= 10.08
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 36.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	5.55
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	259.27	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	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

			TOTALS
Max.Eff.Inten.(mm/hr)=	154.86	28.42	
over (min)	5.00	20.00	
Storage Coeff. (min)=	3.80 (ii)	15.47 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.25	0.07	
PEAK FLOW (cms)=	1.47	0.26	1.554 (iii)
TIME TO PEAK (hrs)=	1.00	1.25	1.00
RUNOFF VOLUME (mm)=	59.62	13.93	30.38
TOTAL RAINFALL (mm)=	61.62	61.62	61.62
RUNOFF COEFFICIENT =	0.97	0.23	0.49

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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 (0030)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0024):	10.08	1.554	1.00	30.38
+ ID2= 2 (0028):	1.20	0.072	1.17	17.49
ID = 3 (0030):	11.28	1.607	1.00	29.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0012) | Area (ha)= 0.17
ID= 1 DT= 5.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.12	0.05
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	0.80	1.00
Length (m)=	33.47	10.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

			TOTALS
Max.Eff.Inten.(mm/hr)=	154.86	70.60	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.19 (ii)	3.78 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.33	0.25	
PEAK FLOW (cms)=	0.04	0.01	0.047 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	60.62	19.26	39.93
TOTAL RAINFALL (mm)=	61.62	61.62	61.62
RUNOFF COEFFICIENT =	0.98	0.31	0.65

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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)= 0.94

|ID= 1 DT= 5.0 min | Total Imp(%)= 41.00 Dir. Conn.(%)= 5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.38	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	0.70
Length	(m)=	79.04	300.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

Max.Eff.Inten.(mm/hr)=		154.86	24.32	
over (min)		5.00	60.00	
Storage Coeff. (min)=		1.51 (ii)	58.54 (ii)	
Unit Hyd. Tpeak (min)=		5.00	60.00	
Unit Hyd. peak (cms)=		0.33	0.02	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.02	0.022 (iii)
TIME TO PEAK	(hrs)=	1.00	2.00	2.00
RUNOFF VOLUME	(mm)=	60.62	18.76	20.82
TOTAL RAINFALL	(mm)=	61.62	61.62	61.62
RUNOFF COEFFICIENT	=	0.98	0.30	0.34

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0012):		0.17	0.047	1.00	39.93
	+ ID2= 2 (0004):		0.94	0.022	2.00	20.82
	ID = 3 (0040):		1.11	0.068	1.00	23.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0032)|

1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0030):	11.28	1.607	1.00	29.01
	+ ID2= 2 (0040):	1.11	0.068	1.00	23.73
	ID = 3 (0032):	12.39	1.676	1.00	28.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0032):		12.39	1.676	1.00	28.54
	+ ID2= 2 (0035):		5.42	0.461	1.00	27.65
	ID = 3 (0025):		17.80	2.137	1.00	28.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:05:42

USER:


COMMENTS: _____________________________________________________
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  ************************************************
  ** SIMULATION : 5 - 50yr - 3hr Chicago        **
  ************************************************

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| CHICAGO STORM   |    IDF curve parameters: A=2225.884
| Ptotal= 69.56 mm |                          B=   8.620
-------------------                          C=   0.871
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    4.91 |  0.83  174.32 |  1.67  10.02 |  2.50    4.70
                0.17    6.34 |  1.00   57.54 |  1.83   8.18 |  2.67    4.25
                0.33    8.96 |  1.17   27.95 |  2.00   6.90 |  2.83    3.88
                0.50   15.11 |  1.33   17.79 |  2.17   5.97 |
                0.67   42.43 |  1.50   12.87 |  2.33   5.26 |


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| CALIB             |
| NASHYD   (  0041)|   Area    (ha)=   2.73   Curve Number   (CN)= 76.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.20   # of Linear Res.(N)= 3.00
                                  Page 1
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--------------------   U.H. Tp(hrs)=   0.48

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   4.91 | 0.833   42.43 | 1.583   12.87 |  2.33    5.97
                0.167   4.91 | 0.917  174.32 | 1.667   12.87 |  2.42    5.26
                0.250   6.34 | 1.000  174.32 | 1.750   10.02 |  2.50    5.26
                0.333   6.34 | 1.083   57.54 | 1.833   10.02 |  2.58    4.70
                0.417   8.96 | 1.167   57.54 | 1.917    8.18 |  2.67    4.70
                0.500   8.96 | 1.250   27.95 | 2.000    8.18 |  2.75    4.25
                0.583  15.11 | 1.333   27.95 | 2.083    6.90 |  2.83    4.25
                0.667  15.11 | 1.417   17.79 | 2.167    6.90 |  2.92    3.88
                0.750  42.43 | 1.500   17.79 | 2.250    5.97 |  3.00    3.88

    Unit Hyd Qpeak  (cms)=   0.219

    PEAK FLOW       (cms)=   0.158 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  27.962
    TOTAL RAINFALL   (mm)=  69.563
    RUNOFF COEFFICIENT   =   0.402

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

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| CALIB             |
| STANDHYD (  0029)|   Area    (ha)=   2.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
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                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.87         1.31
    Dep. Storage     (mm)=       2.00         5.00
    Average Slope     (%)=       1.00         2.00
    Length            (m)=     120.64        30.00
    Mannings n            =      0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   4.91 | 0.833   42.43 | 1.583   12.87 |  2.33    5.97
                0.167   4.91 | 0.917  174.32 | 1.667   12.87 |  2.42    5.26
                0.250   6.34 | 1.000  174.32 | 1.750   10.02 |  2.50    5.26
                0.333   6.34 | 1.083   57.54 | 1.833   10.02 |  2.58    4.70
                0.417   8.96 | 1.167   57.54 | 1.917    8.18 |  2.67    4.70
                0.500   8.96 | 1.250   27.95 | 2.000    8.18 |  2.75    4.25
                0.583  15.11 | 1.333   27.95 | 2.083    6.90 |  2.83    4.25
                0.667  15.11 | 1.417   17.79 | 2.167    6.90 |  2.92    3.88
                0.750  42.43 | 1.500   17.79 | 2.250    5.97 |  3.00    3.88

    Max.Eff.Inten.(mm/hr)=     174.32         66.33
              over (min)        5.00         10.00
    Storage Coeff.  (min)=      2.29 (ii)     9.29 (ii)
    Unit Hyd. Tpeak (min)=      5.00         10.00
    Unit Hyd. peak  (cms)=      0.30          0.12
                                                      *TOTALS*
                                  Page 2
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    PEAK FLOW       (cms)=       0.31          0.16          0.435 (iii)
    TIME TO PEAK    (hrs)=       1.00          1.08           1.00
    RUNOFF VOLUME    (mm)=      67.56         25.40          38.05
    TOTAL RAINFALL   (mm)=      69.56         69.56          69.56
    RUNOFF COEFFICIENT   =       0.97          0.37           0.55

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  68.0    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  (  0031)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0029):    2.18   0.435     1.00    38.05
      + ID2= 2 (  0041):    2.73   0.158     1.58    27.96
        ==========================================================
        ID = 3 (  0031):    4.92   0.463     1.00    32.44

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| CALIB             |
| STANDHYD (  0005)|   Area    (ha)=   0.23
|ID= 1 DT= 5.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  43.00
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                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.10         0.13
    Dep. Storage     (mm)=       1.00         5.00
    Average Slope     (%)=       4.00         8.30
    Length            (m)=      39.24         8.50
    Mannings n            =      0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   4.91 | 0.833   42.43 | 1.583   12.87 |  2.33    5.97
                0.167   4.91 | 0.917  174.32 | 1.667   12.87 |  2.42    5.26
                0.250   6.34 | 1.000  174.32 | 1.750   10.02 |  2.50    5.26
                0.333   6.34 | 1.083   57.54 | 1.833   10.02 |  2.58    4.70
                0.417   8.96 | 1.167   57.54 | 1.917    8.18 |  2.67    4.70
                0.500   8.96 | 1.250   27.95 | 2.000    8.18 |  2.75    4.25
                0.583  15.11 | 1.333   27.95 | 2.083    6.90 |  2.83    4.25
                0.667  15.11 | 1.417   17.79 | 2.167    6.90 |  2.92    3.88
                0.750  42.43 | 1.500   17.79 | 2.250    5.97 |  3.00    3.88

    Max.Eff.Inten.(mm/hr)=     174.32         59.03
              over (min)        5.00          5.00
    Storage Coeff.  (min)=      0.77 (ii)     2.40 (ii)
    Unit Hyd. Tpeak (min)=      5.00          5.00
    Unit Hyd. peak  (cms)=      0.34          0.30
                                                      *TOTALS*
    PEAK FLOW       (cms)=       0.05          0.03           0.073 (iii)
    TIME TO PEAK    (hrs)=       1.00          1.00           1.00
                                  Page 3
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    RUNOFF VOLUME    (mm)=      68.56         26.30          44.47
    TOTAL RAINFALL   (mm)=      69.56         69.56          69.56
    RUNOFF COEFFICIENT   =       0.99          0.38           0.64

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  73.0    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 (  0006)|   Area    (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  19.00
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                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.02         0.04
    Dep. Storage     (mm)=       1.00         5.00
    Average Slope     (%)=       2.00         3.00
    Length            (m)=      20.66        15.00
    Mannings n            =      0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   4.91 | 0.833   42.43 | 1.583   12.87 |  2.33    5.97
                0.167   4.91 | 0.917  174.32 | 1.667   12.87 |  2.42    5.26
                0.250   6.34 | 1.000  174.32 | 1.750   10.02 |  2.50    5.26
                0.333   6.34 | 1.083   57.54 | 1.833   10.02 |  2.58    4.70
                0.417   8.96 | 1.167   57.54 | 1.917    8.18 |  2.67    4.70
                0.500   8.96 | 1.250   27.95 | 2.000    8.18 |  2.75    4.25
                0.583  15.11 | 1.333   27.95 | 2.083    6.90 |  2.83    4.25
                0.667  15.11 | 1.417   17.79 | 2.167    6.90 |  2.92    3.88
                0.750  42.43 | 1.500   17.79 | 2.250    5.97 |  3.00    3.88

    Max.Eff.Inten.(mm/hr)=     174.32         90.56
              over (min)        5.00         10.00
    Storage Coeff.  (min)=      0.65 (ii)     5.16 (ii)
    Unit Hyd. Tpeak (min)=      5.00         10.00
    Unit Hyd. peak  (cms)=      0.34          0.16
                                                      *TOTALS*
    PEAK FLOW       (cms)=       0.01          0.01           0.013 (iii)
    TIME TO PEAK    (hrs)=       1.00          1.08           1.00
    RUNOFF VOLUME    (mm)=      68.56         30.78          37.93
    TOTAL RAINFALL   (mm)=      69.56         69.56          69.56
    RUNOFF COEFFICIENT   =       0.99          0.44           0.55

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  73.0    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 (0033)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	0.23	0.073	1.00	44.47
+ ID2= 2 (0006):	0.06	0.013	1.00	37.93
ID = 3 (0033):	0.30	0.086	1.00	43.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0031):	4.92	0.463	1.00	32.44
+ ID2= 2 (0033):	0.30	0.086	1.00	43.05
ID = 3 (0034):	5.21	0.549	1.00	33.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0007) | Area (ha)= 0.20
ID= 1 DT= 5.0 min | Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.07	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.70
Length (m)=	36.88	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

			TOTALS
Max.Eff.Inten.(mm/hr)=	174.32	86.20	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.91 (ii)	6.67 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.14	
PEAK FLOW (cms)=	0.02	0.02	0.039 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.00
RUNOFF VOLUME (mm)=	68.56	30.25	37.90
TOTAL RAINFALL (mm)=	69.56	69.56	69.56

RUNOFF COEFFICIENT = 0.99 0.43 0.54

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	5.21	0.549	1.00	33.04
+ ID2= 2 (0007):	0.20	0.039	1.00	37.90
ID = 3 (0035):	5.42	0.588	1.00	33.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028) | Area (ha)= 1.20
ID= 1 DT= 5.0 min | Total Imp(%)= 24.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.29	0.91
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	89.37	31.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

			TOTALS
Max.Eff.Inten.(mm/hr)=	174.32	51.25	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.91 (ii)	9.83 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.31	0.11	
PEAK FLOW (cms)=	0.03	0.09	0.097 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.08
RUNOFF VOLUME (mm)=	67.56	19.09	21.50
TOTAL RAINFALL (mm)=	69.56	69.56	69.56

RUNOFF COEFFICIENT = 0.97 0.27 0.31

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0024) | Area (ha)= 10.08
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 36.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	5.55
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	259.27	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	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

			TOTALS
Max.Eff.Inten.(mm/hr)=	174.32	43.11	
over (min)	5.00	15.00	
Storage Coeff. (min)=	3.62 (ii)	13.50 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.25	0.08	
PEAK FLOW (cms)=	1.67	0.37	1.833 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.00
RUNOFF VOLUME (mm)=	67.56	17.47	35.50
TOTAL RAINFALL (mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT =	0.97	0.25	0.51

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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 (0030)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0024):	10.08	1.833	1.00	35.50
+ ID2= 2 (0028):	1.20	0.097	1.08	21.50
ID = 3 (0030):	11.28	1.924	1.00	34.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0012) | Area (ha)= 0.17
ID= 1 DT= 5.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.12	0.05
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	0.80	1.00
Length (m)=	33.47	10.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

			TOTALS
Max.Eff.Inten.(mm/hr)=	174.32	88.22	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.13 (ii)	3.60 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.25	
PEAK FLOW (cms)=	0.04	0.01	0.054 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	68.56	23.78	46.16
TOTAL RAINFALL (mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT =	0.99	0.34	0.66

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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)= 0.94

|ID= 1 DT= 5.0 min | Total Imp(%)= 41.00 Dir. Conn.(%)= 5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.38	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	0.70
Length	(m)=	79.04	300.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

				TOTALS
Max.Eff.Inten.(mm/hr)=		174.32	34.60	
over (min)		5.00	55.00	
Storage Coeff. (min)=		1.44 (ii)	50.97 (ii)	
Unit Hyd. Tpeak (min)=		5.00	55.00	
Unit Hyd. peak (cms)=		0.33	0.02	
PEAK FLOW	(cms)=	0.02	0.03	0.030 (iii)
TIME TO PEAK	(hrs)=	1.00	1.92	1.92
RUNOFF VOLUME	(mm)=	68.56	23.20	25.43
TOTAL RAINFALL	(mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT	=	0.99	0.33	0.37

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0012):		0.17	0.054	1.00	46.16
+	ID2= 2 (0004):		0.94	0.030	1.92	25.43
	ID = 3 (0040):		1.11	0.079	1.00	28.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0032)|

1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0030):	11.28	1.924	1.00	34.01
+	ID2= 2 (0040):	1.11	0.079	1.00	28.58
	ID = 3 (0032):	12.39	2.003	1.00	33.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0032):		12.39	2.003	1.00	33.53
+	ID2= 2 (0035):		5.42	0.588	1.00	33.22
	ID = 3 (0025):		17.80	2.591	1.00	33.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:05:40

USER:


COMMENTS: _____________________________________________________
```

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  **************************************************
  ** SIMULATION : 6 - 100yr - 3hr Chicago       **
  **************************************************

-------------------
| CHICAGO STORM    |    IDF curve parameters: A=2561.151
| Ptotal= 76.19 mm |                          B=   9.093
-------------------                          C=   0.880
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    5.20 |  0.83  191.10 |  1.67  10.83 |  2.50    4.98
                0.17    6.77 |  1.00   63.94 |  1.83   8.79 |  2.67    4.49
                0.33    9.66 |  1.17   30.88 |  2.00   7.39 |  2.83    4.09
                0.50   16.51 |  1.33   19.50 |  2.17   6.36 |
                0.67   47.05 |  1.50   14.00 |  2.33   5.59 |

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-------------------
| CALIB             |
| NASHYD   (  0041)|   Area    (ha)=   2.73   Curve Number   (CN)= 76.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.20   # of Linear Res.(N)= 3.00
                                  Page 1
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-------------------   U.H. Tp(hrs)=   0.48

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.20 | 0.833   47.05 | 1.583   14.00 |  2.33    6.36
                0.167   5.20 | 0.917  191.10 | 1.667   14.00 |  2.42    5.59
                0.250   6.77 | 1.000  191.10 | 1.750   10.83 |  2.50    5.59
                0.333   6.77 | 1.083   63.94 | 1.833   10.83 |  2.58    4.98
                0.417   9.66 | 1.167   63.94 | 1.917    8.79 |  2.67    4.98
                0.500   9.66 | 1.250   30.88 | 2.000    8.79 |  2.75    4.49
                0.583  16.51 | 1.333   30.88 | 2.083    7.39 |  2.83    4.49
                0.667  16.51 | 1.417   19.50 | 2.167    7.39 |  2.92    4.09
                0.750  47.05 | 1.500   19.50 | 2.250    6.36 |  3.00    4.09

    Unit Hyd Qpeak  (cms)=   0.219

    PEAK FLOW       (cms)=   0.187 (i)
    TIME TO PEAK    (hrs)=   1.500
    RUNOFF VOLUME    (mm)=  32.608
    TOTAL RAINFALL   (mm)=  76.186
    RUNOFF COEFFICIENT   =   0.428

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

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-------------------
| CALIB             |
| STANDHYD (  0029)|   Area    (ha)=   2.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
-------------------

                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.87         1.31
    Dep. Storage     (mm)=       2.00         5.00
    Average Slope     (%)=       1.00         2.00
    Length            (m)=     120.64        30.00
    Mannings n           =      0.013        0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.20 | 0.833   47.05 | 1.583   14.00 |  2.33    6.36
                0.167   5.20 | 0.917  191.10 | 1.667   14.00 |  2.42    5.59
                0.250   6.77 | 1.000  191.10 | 1.750   10.83 |  2.50    5.59
                0.333   6.77 | 1.083   63.94 | 1.833   10.83 |  2.58    4.98
                0.417   9.66 | 1.167   63.94 | 1.917    8.79 |  2.67    4.98
                0.500   9.66 | 1.250   30.88 | 2.000    8.79 |  2.75    4.49
                0.583  16.51 | 1.333   30.88 | 2.083    7.39 |  2.83    4.49
                0.667  16.51 | 1.417   19.50 | 2.167    7.39 |  2.92    4.09
                0.750  47.05 | 1.500   19.50 | 2.250    6.36 |  3.00    4.09

    Max.Eff.Inten.(mm/hr)=     191.10        78.54
              over (min)        5.00        10.00
    Storage Coeff.  (min)=      2.21 (ii)    8.75 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.30         0.12
                                                      *TOTALS*
                                  Page 2
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    PEAK FLOW       (cms)=       0.34         0.20          0.494 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.08          1.00
    RUNOFF VOLUME    (mm)=      74.19        29.65         43.01
    TOTAL RAINFALL   (mm)=      76.19        76.19         76.19
    RUNOFF COEFFICIENT   =       0.97         0.39          0.56

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  68.0    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  (  0031)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):     2.18   0.494     1.00    43.01
     + ID2= 2 (  0041):     2.73   0.187     1.50    32.61
       ================================================
       ID = 3 (  0031):     4.92   0.528     1.00    37.23

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0005)|   Area    (ha)=   0.23
|ID= 1 DT= 5.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  43.00
-------------------

                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.10         0.13
    Dep. Storage     (mm)=       1.00         5.00
    Average Slope     (%)=       4.00         8.30
    Length            (m)=      39.24         8.50
    Mannings n           =      0.013        0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.20 | 0.833   47.05 | 1.583   14.00 |  2.33    6.36
                0.167   5.20 | 0.917  191.10 | 1.667   14.00 |  2.42    5.59
                0.250   6.77 | 1.000  191.10 | 1.750   10.83 |  2.50    5.59
                0.333   6.77 | 1.083   63.94 | 1.833   10.83 |  2.58    4.98
                0.417   9.66 | 1.167   63.94 | 1.917    8.79 |  2.67    4.98
                0.500   9.66 | 1.250   30.88 | 2.000    8.79 |  2.75    4.49
                0.583  16.51 | 1.333   30.88 | 2.083    7.39 |  2.83    4.49
                0.667  16.51 | 1.417   19.50 | 2.167    7.39 |  2.92    4.09
                0.750  47.05 | 1.500   19.50 | 2.250    6.36 |  3.00    4.09

    Max.Eff.Inten.(mm/hr)=     191.10        69.97
              over (min)        5.00         5.00
    Storage Coeff.  (min)=      0.74 (ii)    2.31 (ii)
    Unit Hyd. Tpeak (min)=      5.00         5.00
    Unit Hyd. peak  (cms)=      0.34         0.30
                                                      *TOTALS*
    PEAK FLOW       (cms)=       0.05         0.03          0.083 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00          1.00
                                  Page 3
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    RUNOFF VOLUME    (mm)=      75.19        30.69         49.82
    TOTAL RAINFALL   (mm)=      76.19        76.19         76.19
    RUNOFF COEFFICIENT   =       0.99         0.40          0.65

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  73.0    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 (  0006)|   Area    (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  19.00
-------------------

                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.02         0.04
    Dep. Storage     (mm)=       1.00         5.00
    Average Slope     (%)=       2.00         3.00
    Length            (m)=      20.66        15.00
    Mannings n           =      0.013        0.250

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

                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.20 | 0.833   47.05 | 1.583   14.00 |  2.33    6.36
                0.167   5.20 | 0.917  191.10 | 1.667   14.00 |  2.42    5.59
                0.250   6.77 | 1.000  191.10 | 1.750   10.83 |  2.50    5.59
                0.333   6.77 | 1.083   63.94 | 1.833   10.83 |  2.58    4.98
                0.417   9.66 | 1.167   63.94 | 1.917    8.79 |  2.67    4.98
                0.500   9.66 | 1.250   30.88 | 2.000    8.79 |  2.75    4.49
                0.583  16.51 | 1.333   30.88 | 2.083    7.39 |  2.83    4.49
                0.667  16.51 | 1.417   19.50 | 2.167    7.39 |  2.92    4.09
                0.750  47.05 | 1.500   19.50 | 2.250    6.36 |  3.00    4.09

    Max.Eff.Inten.(mm/hr)=     191.10       106.25
              over (min)        5.00         5.00
    Storage Coeff.  (min)=      0.62 (ii)    4.97 (ii)
    Unit Hyd. Tpeak (min)=      5.00         5.00
    Unit Hyd. peak  (cms)=      0.34         0.22
                                                      *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.01          0.018 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00          1.00
    RUNOFF VOLUME    (mm)=      75.19        35.63         43.10
    TOTAL RAINFALL   (mm)=      76.19        76.19         76.19
    RUNOFF COEFFICIENT   =       0.99         0.47          0.57

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  73.0    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.

                                  Page 4
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ADD HYD (0033)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	0.23	0.083	1.00	49.82
+ ID2= 2 (0006):	0.06	0.018	1.00	43.10
ID = 3 (0033):	0.30	0.101	1.00	48.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0031):	4.92	0.528	1.00	37.23
+ ID2= 2 (0033):	0.30	0.101	1.00	48.36
ID = 3 (0034):	5.21	0.628	1.00	37.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0007) | Area (ha)= 0.20
ID= 1 DT= 5.0 min | Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.07	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.70
Length (m)=	36.88	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

			TOTALS
Max.Eff.Inten.(mm/hr)=	191.10	101.25	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.88 (ii)	6.28 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.15	
PEAK FLOW (cms)=	0.02	0.03	0.045 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.00
RUNOFF VOLUME (mm)=	75.19	35.04	43.06
TOTAL RAINFALL (mm)=	76.19	76.19	76.19

RUNOFF COEFFICIENT = 0.99 0.46 0.57

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	5.21	0.628	1.00	37.86
+ ID2= 2 (0007):	0.20	0.045	1.00	43.06
ID = 3 (0035):	5.42	0.674	1.00	38.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0028) | Area (ha)= 1.20
ID= 1 DT= 5.0 min | Total Imp(%)= 24.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.29	0.91
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	89.37	31.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

			TOTALS
Max.Eff.Inten.(mm/hr)=	191.10	61.15	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.84 (ii)	9.22 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.12	
PEAK FLOW (cms)=	0.03	0.11	0.118 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.08
RUNOFF VOLUME (mm)=	74.19	22.48	25.06
TOTAL RAINFALL (mm)=	76.19	76.19	76.19

RUNOFF COEFFICIENT = 0.97 0.30 0.33

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0024) | Area (ha)= 10.08
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 36.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	5.55
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	259.27	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	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

			TOTALS
Max.Eff.Inten.(mm/hr)=	191.10	51.60	
over (min)	5.00	15.00	
Storage Coeff. (min)=	3.49 (ii)	12.69 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.26	0.08	
PEAK FLOW (cms)=	1.84	0.46	2.045 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.00
RUNOFF VOLUME (mm)=	74.19	20.63	39.91
TOTAL RAINFALL (mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT =	0.97	0.27	0.52

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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 (0030)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0024):	10.08	2.045	1.00	39.91
+ ID2= 2 (0028):	1.20	0.118	1.08	25.06
ID = 3 (0030):	11.28	2.155	1.00	38.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0012) | Area (ha)= 0.17
ID= 1 DT= 5.0 min | Total Imp(%)= 70.00 Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.12	0.05
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	0.80	1.00
Length (m)=	33.47	10.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

			TOTALS
Max.Eff.Inten.(mm/hr)=	191.10	104.26	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.09 (ii)	3.47 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.26	
PEAK FLOW (cms)=	0.04	0.02	0.060 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	75.19	27.76	51.47
TOTAL RAINFALL (mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT =	0.99	0.36	0.68

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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)= 0.94

|ID= 1 DT= 5.0 min | Total Imp(%)= 41.00 Dir. Conn.(%)= 5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.38	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	0.70
Length	(m)=	79.04	300.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

Max.Eff.Inten.(mm/hr)=		191.10	40.71	
over (min)		5.00	50.00	
Storage Coeff. (min)=		1.39 (ii)	47.80 (ii)	
Unit Hyd. Tpeak (min)=		5.00	50.00	
Unit Hyd. peak (cms)=		0.33	0.02	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.04	0.038 (iii)
TIME TO PEAK	(hrs)=	1.00	1.83	1.83
RUNOFF VOLUME	(mm)=	75.19	27.11	29.48
TOTAL RAINFALL	(mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT	=	0.99	0.36	0.39

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):			0.17	0.060	1.00	51.47
+ ID2= 2 (0004):			0.94	0.038	1.83	29.48
ID = 3 (0040):			1.11	0.089	1.00	32.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0032)|

1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0030):		11.28	2.155	1.00	38.33
+ ID2= 2 (0040):		1.11	0.089	1.00	32.83
ID = 3 (0032):		12.39	2.243	1.00	37.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0032):			12.39	2.243	1.00	37.84
+ ID2= 2 (0035):			5.42	0.674	1.00	38.05
ID = 3 (0025):			17.80	2.917	1.00	37.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:05:43

USER:


COMMENTS: _____________________________________________________
```

```
  ************************************************
  ** SIMULATION : 7 - 250yr - 3hr Chicago       **
  ************************************************

------------------
| CHICAGO STORM    |    IDF curve parameters: A=3048.220
| Ptotal= 86.57 mm |                          B=  10.030
------------------                          C=   0.888
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	5.83	0.83	212.89	1.67	12.40	2.50	5.57
0.17	7.65	1.00	74.20	1.83	10.01	2.67	5.00
0.33	11.03	1.17	35.98	2.00	8.37	2.83	4.54
0.50	19.09	1.33	22.61	2.17	7.17		
0.67	54.67	1.50	16.13	2.33	6.27		

```
------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=   2.73   Curve Number   (CN)= 76.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.20   # of Linear Res.(N)= 3.00
```



```
-------------------   U.H. Tp(hrs)=   0.48

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

```
    Unit Hyd Qpeak  (cms)=   0.219

    PEAK FLOW       (cms)=   0.233 (i)
    TIME TO PEAK    (hrs)=   1.500
    RUNOFF VOLUME    (mm)=  40.222
    TOTAL RAINFALL   (mm)=  86.569
    RUNOFF COEFFICIENT   =   0.465

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

------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0029) |   Area    (ha)=   2.18
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.87         1.31
    Dep. Storage     (mm)=      2.00         5.00
    Average Slope     (%)=      1.00         2.00
    Length            (m)=    120.64        30.00
    Mannings n           =     0.013        0.250

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

```
    Max.Eff.Inten.(mm/hr)=     212.89        96.66
              over (min)          5.00        10.00
    Storage Coeff.  (min)=       2.11 (ii)    8.13 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.31         0.13
                                                    *TOTALS*
```



```
    PEAK FLOW       (cms)=       0.38         0.25          0.578 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.08           1.00
    RUNOFF VOLUME    (mm)=      84.57        36.65          51.02
    TOTAL RAINFALL   (mm)=      86.57        86.57          86.57
    RUNOFF COEFFICIENT   =       0.98         0.42           0.59

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  68.0    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  (  0031)|
|  1 +  2 =  3     |        AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):     2.18   0.578     1.00    51.02
     + ID2= 2 (  0041):     2.73   0.233     1.50    40.22
       ================================================
       ID = 3 (  0031):     4.92   0.622     1.00    45.02

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0005) |   Area    (ha)=   0.23
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  43.00   Dir. Conn.(%)=  43.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.10         0.13
    Dep. Storage     (mm)=      1.00         5.00
    Average Slope     (%)=      4.00         8.30
    Length            (m)=     39.24         8.50
    Mannings n           =     0.013        0.250

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

```
    Max.Eff.Inten.(mm/hr)=     212.89        86.19
              over (min)          5.00         5.00
    Storage Coeff.  (min)=       0.71 (ii)    2.22 (ii)
    Unit Hyd. Tpeak (min)=       5.00         5.00
    Unit Hyd. peak  (cms)=       0.34         0.30
                                                    *TOTALS*
    PEAK FLOW       (cms)=       0.06         0.04          0.095 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00           1.00
```



```
    RUNOFF VOLUME    (mm)=      85.57        37.91          58.40
    TOTAL RAINFALL   (mm)=      86.57        86.57          86.57
    RUNOFF COEFFICIENT   =       0.99         0.44           0.67

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  73.0    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 (  0006) |   Area    (ha)=   0.06
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  36.00   Dir. Conn.(%)=  19.00
-------------------

                        IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.02         0.04
    Dep. Storage     (mm)=      1.00         5.00
    Average Slope     (%)=      2.00         3.00
    Length            (m)=     20.66        15.00
    Mannings n           =     0.013        0.250

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

```
    Max.Eff.Inten.(mm/hr)=     212.89       129.17
              over (min)          5.00         5.00
    Storage Coeff.  (min)=       0.60 (ii)    4.76 (ii)
    Unit Hyd. Tpeak (min)=       5.00         5.00
    Unit Hyd. peak  (cms)=       0.34         0.22
                                                    *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.01          0.021 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00           1.00
    RUNOFF VOLUME    (mm)=      85.57        43.52          51.46
    TOTAL RAINFALL   (mm)=      86.57        86.57          86.57
    RUNOFF COEFFICIENT   =       0.99         0.50           0.59

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  73.0    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 (0033)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0005):		0.23	0.095	1.00	58.40
+ ID2= 2 (0006):		0.06	0.021	1.00	51.46
ID = 3 (0033):		0.30	0.117	1.00	56.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0031):		4.92	0.622	1.00	45.02
+ ID2= 2 (0033):		0.30	0.117	1.00	56.90
ID = 3 (0034):		5.21	0.739	1.00	45.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0007)	Area	(ha)= 0.20		
ID= 1 DT= 5.0 min	Total Imp(%)=	35.00	Dir. Conn.(%)=	20.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

Max.Eff.Inten.(mm/hr)=	212.89	123.28		
over (min)	5.00	10.00		
Storage Coeff. (min)=	0.84 (ii)	5.83 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.34	0.15		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.04	0.054 (iii)	
TIME TO PEAK (hrs)=	1.00	1.08	1.00	
RUNOFF VOLUME (mm)=	85.57	42.86	51.38	
TOTAL RAINFALL (mm)=	86.57	86.57	86.57	

RUNOFF COEFFICIENT =	0.99	0.50	0.59

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0034):		5.21	0.739	1.00	45.69
+ ID2= 2 (0007):		0.20	0.054	1.00	51.38
ID = 3 (0035):		5.42	0.793	1.00	45.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0028)	Area	(ha)= 1.20		
ID= 1 DT= 5.0 min	Total Imp(%)=	24.00	Dir. Conn.(%)=	5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.29	0.91
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	89.37	31.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

Max.Eff.Inten.(mm/hr)=	212.89	76.10		
over (min)	5.00	10.00		
Storage Coeff. (min)=	1.77 (ii)	8.52 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.32	0.12		
			TOTALS	
PEAK FLOW (cms)=	0.04	0.14	0.151 (iii)	
TIME TO PEAK (hrs)=	1.00	1.08	1.08	
RUNOFF VOLUME (mm)=	84.57	28.15	30.96	
TOTAL RAINFALL (mm)=	86.57	86.57	86.57	

RUNOFF COEFFICIENT =	0.98	0.33	0.36

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0024)	Area	(ha)= 10.08		
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00	Dir. Conn.(%)=	36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.54	5.55
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	259.27	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	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

Max.Eff.Inten.(mm/hr)=	212.89	64.49		
over (min)	5.00	15.00		
Storage Coeff. (min)=	3.34 (ii)	11.76 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.26	0.09		
			TOTALS	
PEAK FLOW (cms)=	2.07	0.60	2.336 (iii)	
TIME TO PEAK (hrs)=	1.00	1.17	1.00	
RUNOFF VOLUME (mm)=	84.57	25.95	47.05	
TOTAL RAINFALL (mm)=	86.57	86.57	86.57	
RUNOFF COEFFICIENT =	0.98	0.30	0.54	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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 (0030)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0024):		10.08	2.336	1.00	47.05
+ ID2= 2 (0028):		1.20	0.151	1.08	30.96
ID = 3 (0030):		11.28	2.474	1.00	45.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0012)	Area	(ha)= 0.17		
ID= 1 DT= 5.0 min	Total Imp(%)=	70.00	Dir. Conn.(%)=	50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.05
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.80	1.00
Length	(m)=	33.47	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

Max.Eff.Inten.(mm/hr)=	212.89	128.14		
over (min)	5.00	5.00		
Storage Coeff. (min)=	1.05 (ii)	3.33 (ii)		
Unit Hyd. Tpeak (min)=	5.00	5.00		
Unit Hyd. peak (cms)=	0.34	0.26		
			TOTALS	
PEAK FLOW (cms)=	0.05	0.02	0.069 (iii)	
TIME TO PEAK (hrs)=	1.00	1.00	1.00	
RUNOFF VOLUME (mm)=	85.57	34.35	59.95	
TOTAL RAINFALL (mm)=	86.57	86.57	86.57	
RUNOFF COEFFICIENT =	0.99	0.40	0.69	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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)= 0.94		

|ID= 1 DT= 5.0 min | Total Imp(%)= 41.00 Dir. Conn.(%)= 5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.38	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	0.70
Length	(m)=	79.04	300.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

				TOTALS
Max.Eff.Inten.(mm/hr)=		212.89	59.19	
over (min)		5.00	45.00	
Storage Coeff. (min)=		1.33 (ii)	41.29 (ii)	
Unit Hyd. Tpeak (min)=		5.00	45.00	
Unit Hyd. peak (cms)=		0.33	0.03	
PEAK FLOW	(cms)=	0.03	0.05	0.052 (iii)
TIME TO PEAK	(hrs)=	1.00	1.75	1.67
RUNOFF VOLUME	(mm)=	85.57	33.59	36.16
TOTAL RAINFALL	(mm)=	86.57	86.57	86.57
RUNOFF COEFFICIENT	=	0.99	0.39	0.42

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0012):		0.17	0.069	1.00	59.95
+	ID2= 2 (0004):		0.94	0.052	1.67	36.16
	ID = 3 (0040):		1.11	0.102	1.00	39.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0032)|

1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0030):	11.28	2.474	1.00	45.34
+	ID2= 2 (0040):	1.11	0.102	1.00	39.78
	ID = 3 (0032):	12.39	2.576	1.00	44.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0032):		12.39	2.576	1.00	44.85
+	ID2= 2 (0035):		5.42	0.793	1.00	45.90
	ID = 3 (0025):		17.80	3.369	1.00	45.17

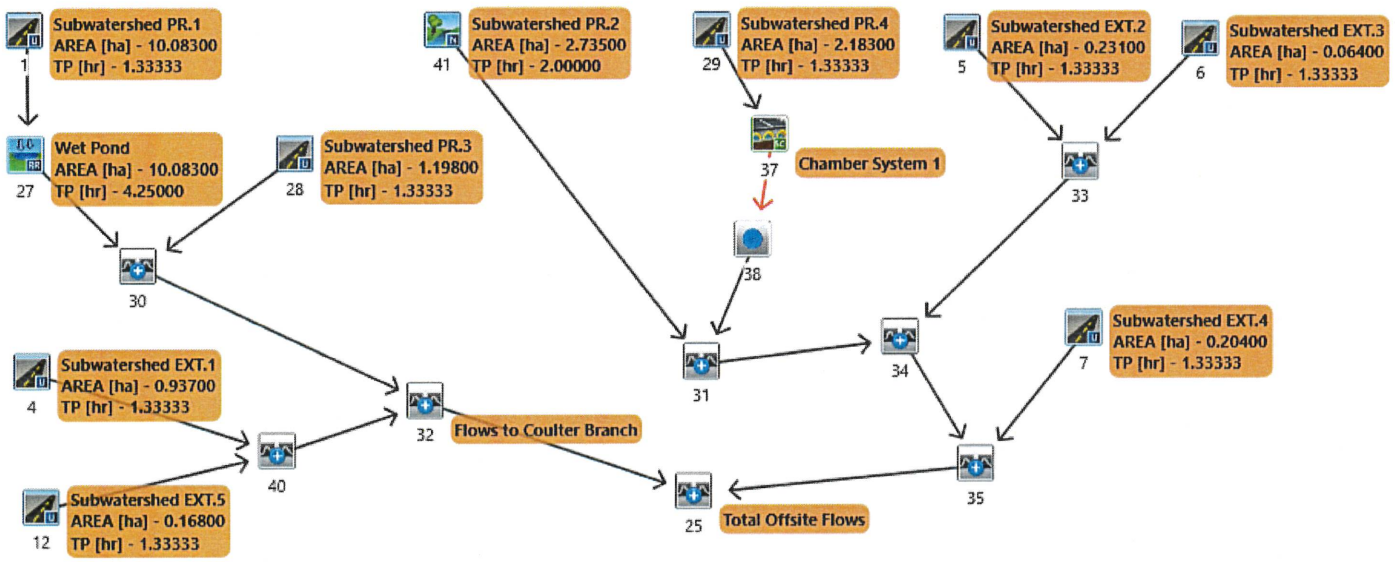
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

APPENDIX IV

VISUAL OTTHYMO OUTPUT
POST DEVELOPMENT: CONTROLLED

Post Development

Schematic



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

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M M 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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  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:21:59

USER:


COMMENTS: _____
```

****
** SIMULATION : 1 - 25mm - 4hr Storm Event **
****

CHICAGO STORM	Ptotal= 25.04 mm

IDF curve parameters: A= 538.850
B= 6.331
C= 0.809
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	1.52	1.00	13.45	2.00	3.80	3.00	1.84
0.17	1.75	1.17	56.25	2.17	3.20	3.17	1.70
0.33	2.08	1.33	17.87	2.33	2.78	3.33	1.58
0.50	2.58	1.50	9.22	2.50	2.45	3.50	1.48
0.67	3.46	1.67	6.21	2.67	2.20	3.67	1.40
0.83	5.39	1.83	4.70	2.83	2.00	3.83	1.32

CALIB NASHYD (0041)	Area (ha)= 2.73	Curve Number (CN)= 76.0

ID= 1 DT= 5.0 min	Ia (mm)= 6.20 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.48

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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Unit Hyd Qpeak (cms)= 0.219

PEAK FLOW (cms)= 0.016 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 3.584
TOTAL RAINFALL (mm)= 25.042
RUNOFF COEFFICIENT = 0.143

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

CALIB STANDHYD (0029)	Area (ha)= 2.18
ID= 1 DT= 5.0 min	Total Imp(%)= 40.00 Dir. Conn.(%)= 30.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.87	1.31
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	120.64	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	5.18	
over (min)	5.00	25.00	
Storage Coeff. (min)=	3.60 (ii)	23.00 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.26	0.05	
			TOTALS
PEAK FLOW (cms)=	0.10	0.01	0.099 (iii)
TIME TO PEAK (hrs)=	1.33	1.75	1.33
RUNOFF VOLUME (mm)=	23.04	3.50	9.35
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.92	0.14	0.37

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 68.0 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.

CHAMBER(0037)	OUTFLOW: OFF, UNDERDRAIN: OFF, INFIL: ON
IN= 2--> OUT= 3	CHAMBER:
DT= 5.0 min	MAX STO VOL (cu.m.)= 94.45 Bottom Area(m2) = 246.55

DEPTH (mm)	STORAGE (cu.m.)	DEPTH (mm)	STORAGE (cu.m.)
0.00	0.00	381.00	56.16
25.00	2.50	406.00	60.19
51.00	5.01	432.00	64.05
76.00	7.51	457.00	67.72
102.00	10.02	483.00	71.12
127.00	12.52	508.00	74.06
152.00	15.03	533.00	76.82
178.00	19.90	559.00	79.42
203.00	24.72	584.00	81.93
229.00	29.47	610.00	84.43
254.00	34.16	635.00	86.94
279.00	38.76	660.00	89.44
305.00	43.27	686.00	91.95
330.00	47.68	711.00	94.45
356.00	51.99	0.00	0.00

NATIVE SOIL LAYER:
Infiltration (m/hr) = 0.0300

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW:ID= 2	2.18	0.099	1.33	9.35
OVERFLOW:ID= 3	2.18	0.028	1.58	3.78

Volume Reduction Rate[(RVin-RVout)/RVin](%)=	59.55
Time to reach Max storage (Hr)=	1.50
Volume of water for drawdown in LID (cu.m.)=	87.72
Volume of maximum water storage (cu.m.)=	94.45
Calculated Drawdown Time (Hr)=	11.83

Junction Command(0038)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 3(0037)	2.18	0.03	1.58	3.78
OUTFLOW: ID= 2(0038)	2.18	0.03	1.58	3.78

ADD HYD (0031)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0038):	2.18	0.028	1.58	3.78
	+ ID2= 2 (0041):	2.73	0.016	2.00	3.58
	ID = 3 (0031):	4.92	0.037	1.67	3.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0006)	Area (ha)= 0.06
ID= 1 DT= 5.0 min	Total Imp(%)= 36.00 Dir. Conn.(%)= 19.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.02	0.04
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	3.00
Length (m)=	20.66	15.00
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	9.70	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.01 (ii)	9.84 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.11	
			TOTALS
PEAK FLOW (cms)=	0.00	0.00	0.002 (iii)
TIME TO PEAK (hrs)=	1.33	1.42	1.33
RUNOFF VOLUME (mm)=	24.04	4.67	8.27
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.96	0.19	0.33

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0005)	Area (ha)= 0.23
ID= 1 DT= 5.0 min	Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	4.00	8.30
Length	(m)=	39.24	8.50
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

				TOTALS
Max.Eff.Inten.(mm/hr)=		56.25	5.44	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.21 (ii)	3.77 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.33	0.25	
PEAK FLOW	(cms)=	0.02	0.00	0.018 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	24.04	3.52	12.34
TOTAL RAINFALL	(mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT	=	0.96	0.14	0.49

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0033)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0005):	0.23	0.018	1.33	12.34
+	ID2= 2 (0006):	0.06	0.002	1.33	8.27
	ID = 3 (0033):	0.30	0.020	1.33	11.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0031):	4.92	0.037	1.67	3.67
+	ID2= 2 (0033):	0.30	0.020	1.33	11.46
	ID = 3 (0034):	5.21	0.042	1.67	4.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0007)	Area (ha)= 0.20
ID= 1 DT= 5.0 min	Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

				TOTALS
Max.Eff.Inten.(mm/hr)=		56.25	7.27	
over (min)		5.00	20.00	
Storage Coeff. (min)=		1.44 (ii)	16.92 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		0.33	0.06	
PEAK FLOW	(cms)=	0.01	0.00	0.007 (iii)
TIME TO PEAK	(hrs)=	1.33	1.67	1.33
RUNOFF VOLUME	(mm)=	24.04	4.52	8.37
TOTAL RAINFALL	(mm)=	25.04	25.04	25.04

RUNOFF COEFFICIENT =	0.96	0.18	0.33

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0034):	5.21	0.042	1.67	4.11
+	ID2= 2 (0007):	0.20	0.007	1.33	8.37
	ID = 3 (0035):	5.42	0.044	1.67	4.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0001)	Area (ha)= 10.08
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.54	5.55
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	259.27	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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

				TOTALS
Max.Eff.Inten.(mm/hr)=		56.25	2.36	
over (min)		5.00	40.00	
Storage Coeff. (min)=		5.70 (ii)	37.30 (ii)	
Unit Hyd. Tpeak (min)=		5.00	40.00	
Unit Hyd. peak (cms)=		0.20	0.03	
PEAK FLOW	(cms)=	0.49	0.02	0.491 (iii)

TIME TO PEAK (hrs)=	1.33	2.08	1.33
RUNOFF VOLUME (mm)=	23.04	2.16	9.67
TOTAL RAINFALL (mm)=	25.04	25.04	25.04
RUNOFF COEFFICIENT =	0.92	0.09	0.39

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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(0027)	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	0.0119	0.2754
0.0030	0.0202	0.0125	0.3093
0.0049	0.0422	0.0131	0.3441
0.0062	0.0660	0.0136	0.3798
0.0073	0.0916	0.0142	0.4162
0.0083	0.1190	0.0844	0.4536
0.0091	0.1482	0.2123	0.4917
0.0099	0.1787	0.2412	0.5308
0.0106	0.2101	0.7242	0.5706
0.0113	0.2423	1.5999	0.6113

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (	0001)	10.083	0.491	1.33	9.67
OUTFLOW: ID= 1 (	0027)	10.083	0.007	4.25	9.51

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.46
TIME SHIFT OF PEAK FLOW (min)=175.00
MAXIMUM STORAGE USED (ha.m.)= 0.0889

CALIB	
STANDHYD (0028)	Area (ha)= 1.20
ID= 1 DT= 5.0 min	Total Imp(%)= 24.00 Dir. Conn.(%)= 5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.29	0.91
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	89.37	31.00
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58

0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	3.44		
over (min)	5.00	30.00		
Storage Coeff. (min)=	3.01 (ii)	26.32 (ii)		
Unit Hyd. Tpeak (min)=	5.00	30.00		
Unit Hyd. peak (cms)=	0.28	0.04		
			TOTALS	
PEAK FLOW (cms)=	0.01	0.00	0.010 (iii)	
TIME TO PEAK (hrs)=	1.33	1.83	1.33	
RUNOFF VOLUME (mm)=	23.04	2.45	3.47	
TOTAL RAINFALL (mm)=	25.04	25.04	25.04	
RUNOFF COEFFICIENT =	0.92	0.10	0.14	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0030)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0027):	10.08	0.007	4.25	9.51
+ ID2= 2 (0028):	1.20	0.010	1.33	3.47
ID = 3 (0030):	11.28	0.013	1.33	8.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0004)	Area (ha)= 0.94		
ID= 1 DT= 5.0 min	Total Imp(%)= 41.00	Dir. Conn.(%)= 5.00	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.38	0.55	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	2.00	0.70	
Length (m)=	79.04	300.00	
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70

0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	3.73		
over (min)	5.00	125.00		
Storage Coeff. (min)=	2.27 (ii)	122.95 (ii)		
Unit Hyd. Tpeak (min)=	5.00	125.00		
Unit Hyd. peak (cms)=	0.30	0.01		
			TOTALS	
PEAK FLOW (cms)=	0.01	0.00	0.007 (iii)	
TIME TO PEAK (hrs)=	1.33	3.67	1.33	
RUNOFF VOLUME (mm)=	24.04	3.30	4.26	
TOTAL RAINFALL (mm)=	25.04	25.04	25.04	
RUNOFF COEFFICIENT =	0.96	0.13	0.17	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0012)	Area (ha)= 0.17		
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00	Dir. Conn.(%)= 50.00	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.12	0.05	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	0.80	1.00	
Length (m)=	33.47	10.00	
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	1.52	1.083	13.45	2.083	3.80	3.08	1.84
0.167	1.52	1.167	13.45	2.167	3.80	3.17	1.84
0.250	1.75	1.250	56.25	2.250	3.20	3.25	1.70
0.333	1.75	1.333	56.25	2.333	3.20	3.33	1.70
0.417	2.08	1.417	17.87	2.417	2.78	3.42	1.58
0.500	2.08	1.500	17.87	2.500	2.78	3.50	1.58
0.583	2.58	1.583	9.22	2.583	2.45	3.58	1.48
0.667	2.58	1.667	9.22	2.667	2.45	3.67	1.48
0.750	3.46	1.750	6.21	2.750	2.20	3.75	1.40
0.833	3.46	1.833	6.21	2.833	2.20	3.83	1.40
0.917	5.39	1.917	4.70	2.917	2.00	3.92	1.32
1.000	5.39	2.000	4.70	3.000	2.00	4.00	1.32

Max.Eff.Inten.(mm/hr)=	56.25	9.59		
over (min)	5.00	10.00		
Storage Coeff. (min)=	1.78 (ii)	5.66 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.32	0.15		
			TOTALS	
PEAK FLOW (cms)=	0.01	0.00	0.014 (iii)	
TIME TO PEAK (hrs)=	1.33	1.42	1.33	
RUNOFF VOLUME (mm)=	24.04	3.43	13.71	
TOTAL RAINFALL (mm)=	25.04	25.04	25.04	
RUNOFF COEFFICIENT =	0.96	0.14	0.55	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	0.17	0.014	1.33	13.71
+ ID2= 2 (0004):	0.94	0.007	1.33	4.26
ID = 3 (0040):	1.11	0.021	1.33	5.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0032)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	11.28	0.013	1.33	8.86
+ ID2= 2 (0040):	1.11	0.021	1.33	5.69
ID = 3 (0032):	12.39	0.035	1.33	8.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0032):	12.39	0.035	1.33	8.58
+ ID2= 2 (0035):	5.42	0.044	1.67	4.27
ID = 3 (0025):	17.80	0.063	1.33	7.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
Output filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024 TIME: 04:21:58

USER:

COMMENTS: _____

****
** SIMULATION : 2 - 5yr - 3hr Chicago **
****

| CHICAGO STORM | Ptotal= 44.34 mm |

IDF curve parameters: A=1137.257
B= 7.184
C= 0.830
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.65	0.83	107.33	1.67	6.92	2.50	3.52
0.17	4.60	1.00	34.77	1.83	5.77	2.67	3.21
0.33	6.26	1.17	17.56	2.00	4.96	2.83	2.96
0.50	10.01	1.33	11.61	2.17	4.36		
0.67	25.98	1.50	8.67	2.33	3.89		

| CALIB | NASHYD (0041) | ID= 1 DT= 5.0 min |

Area (ha)= 2.73 Curve Number (CN)= 76.0
Ia (mm)= 6.20 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.48

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

Unit Hyd Qpeak (cms)= 0.219

PEAK FLOW (cms)= 0.064 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 12.289
TOTAL RAINFALL (mm)= 44.338
RUNOFF COEFFICIENT = 0.277

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

| CALIB | STANDHYD (0029) | ID= 1 DT= 5.0 min |

Area (ha)= 2.18
Total Imp(%)= 40.00 Dir. Conn.(%)= 30.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.87	1.31
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	120.64	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	22.00	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.78 (ii)	13.66 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.28	0.08	

PEAK FLOW (cms)=	0.19	0.05	0.213 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.00
RUNOFF VOLUME (mm)=	42.34	11.26	20.58
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.95	0.25	0.46

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 68.0 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.

| CHAMBER(0037) | IN= 2--> OUT= 3 | DT= 5.0 min |

OUTFLOW: OFF, UNDERDRAIN: OFF, INFIL: ON
CHAMBER:
MAX STO VOL (cu.m.)= 94.45 Bottom Area(m2) = 246.55

DEPTH (mm)	STORAGE (cu.m.)	DEPTH (mm)	STORAGE (cu.m.)
0.00	0.00	381.00	56.16
25.00	2.50	406.00	60.19
51.00	5.01	432.00	64.05
76.00	7.51	457.00	67.72
102.00	10.02	483.00	71.12
127.00	12.52	508.00	74.06
152.00	15.03	533.00	76.82
178.00	19.90	559.00	79.42
203.00	24.72	584.00	81.93
229.00	29.47	610.00	84.43
254.00	34.16	635.00	86.94
279.00	38.76	660.00	89.44
305.00	43.27	686.00	91.95
330.00	47.68	711.00	94.45
356.00	51.99	0.00	0.00

NATIVE SOIL LAYER:
Infiltration (m/hr) = 0.0300

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW:ID= 2	2.18	0.213	1.00	20.58
OVERFLOW:ID= 3	2.18	0.193	1.00	15.19

Volume Reduction Rate[(RVin-RVout)/RVin](%)=		26.17
Time to reach Max storage	(Hr)=	1.00
Volume of water for drawdown in LID (cu.m.)=		90.47
Volume of maximum water storage	(cu.m.)=	94.45
Calculated Drawdown Time	(Hr)=	12.17

| Junction Command(0038) |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 3(0037)	2.18	0.19	1.00	15.19
OUTFLOW: ID= 2(0038)	2.18	0.19	1.00	15.19

ADD HYD (0031)	1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0038):		2.18	0.193	1.00	15.19
+	ID2= 2 (0041):		2.73	0.064	1.58	12.29
	ID = 3 (0031):		4.92	0.202	1.00	13.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB | STANDHYD (0006) | ID= 1 DT= 5.0 min |

Area (ha)= 0.06
Total Imp(%)= 36.00 Dir. Conn.(%)= 19.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.02	0.04
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	3.00
Length (m)=	20.66	15.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	37.36	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.78 (ii)	5.93 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.15	

PEAK FLOW (cms)=	0.00	0.00	0.006 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.00
RUNOFF VOLUME (mm)=	43.34	14.23	19.69
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.98	0.32	0.44

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0005) ID= 1 DT= 5.0 min	Area (ha)= 0.23 Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.10	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	4.00	8.30
Length (m)=	39.24	8.50
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	22.91	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.93 (ii)	2.91 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.28	
PEAK FLOW (cms)=	0.03	0.01	0.039 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	43.34	11.61	25.25
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.98	0.26	0.57

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0033)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	0.23	0.039	1.00	25.25
+ ID2= 2 (0006):	0.06	0.006	1.00	19.69
ID = 3 (0033):	0.30	0.046	1.00	24.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	5.21	0.248	1.00	14.17
+ ID2= 2 (0007):	0.20	0.018	1.00	19.77
ID = 3 (0035):	5.42	0.266	1.00	14.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0001) ID= 1 DT= 5.0 min	Area (ha)= 10.08 Total Imp(%)= 45.00 Dir. Conn.(%)= 36.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	5.55
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	259.27	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	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	12.75	
over (min)	5.00	25.00	
Storage Coeff. (min)=	4.40 (ii)	20.49 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.23	0.05	
PEAK FLOW (cms)=	1.00	0.11	1.018 (iii)
TIME TO PEAK (hrs)=	1.00	1.33	1.00
RUNOFF VOLUME (mm)=	42.34	7.33	19.93
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.95	0.17	0.45

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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(0027) IN= 2---> OUT= 1 DT= 5.0 min	OVERFLOW IS OFF			
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0027):	4.92	0.202	1.00	13.58
+ ID2= 2 (0033):	0.30	0.046	1.00	24.04
ID = 3 (0034):	5.21	0.248	1.00	14.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0007) ID= 1 DT= 5.0 min	Area (ha)= 0.20 Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.07	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.70
Length (m)=	36.88	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	35.33	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.11 (ii)	9.34 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.12	
PEAK FLOW (cms)=	0.01	0.01	0.018 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.00
RUNOFF VOLUME (mm)=	43.34	13.91	19.77
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.98	0.31	0.45

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)

0.0000	0.0000	0.0119	0.2754
0.0030	0.0202	0.0125	0.3093
0.0049	0.0422	0.0131	0.3441
0.0062	0.0660	0.0136	0.3798
0.0073	0.0916	0.0142	0.4162
0.0083	0.1190	0.0844	0.4536
0.0091	0.1482	0.2123	0.4917
0.0099	0.1787	0.2412	0.5308
0.0106	0.2101	0.7242	0.5706
0.0113	0.2423	1.5999	0.6113

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	10.083	1.018	1.00	19.93
OUTFLOW: ID= 1 (0027)	10.083	0.010	3.50	19.76

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.00
TIME SHIFT OF PEAK FLOW (min)=150.00
MAXIMUM STORAGE USED (ha.m.)= 0.1911

CALIB STANDHYD (0028) ID= 1 DT= 5.0 min	Area (ha)= 1.20 Total Imp(%)= 24.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.29	0.91
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	89.37	31.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

			TOTALS
Max.Eff.Inten.(mm/hr)=	107.33	16.58	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.32 (ii)	14.75 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.30	0.08	
PEAK FLOW (cms)=	0.02	0.03	0.032 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.17
RUNOFF VOLUME (mm)=	42.34	8.14	9.84
TOTAL RAINFALL (mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT =	0.95	0.18	0.22

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

Post-Development - Controlled - 5-Year Storm
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0030)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0027):		10.08	0.010	3.50	19.76
+ ID2= 2 (0028):		1.20	0.032	1.17	9.84
ID = 3 (0030):		11.28	0.040	1.17	18.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0004)	Area (ha)= 0.94			
ID= 1 DT= 5.0 min	Total Imp(%)= 41.00	Dir. Conn.(%)= 5.00		

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.38	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	0.70
Length	(m)=	79.04	300.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

				TOTALS
Max.Eff.Inten.(mm/hr)=		107.33	12.99	
over (min)		5.00	80.00	
Storage Coeff. (min)=		1.75 (ii)	75.04 (ii)	
Unit Hyd. Tpeak (min)=		5.00	80.00	
Unit Hyd. peak (cms)=		0.32	0.01	
PEAK FLOW	(cms)=	0.01	0.01	0.014 (iii)
TIME TO PEAK	(hrs)=	1.00	2.42	1.00
RUNOFF VOLUME	(mm)=	43.34	10.29	11.90
TOTAL RAINFALL	(mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT	=	0.98	0.23	0.27

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

Post-Development - Controlled - 5-Year Storm
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0012)	Area (ha)= 0.17		
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00	Dir. Conn.(%)= 50.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.05
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.80	1.00
Length	(m)=	33.47	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.65	0.833	25.98	1.583	8.67	2.33	4.36
0.167	3.65	0.917	107.33	1.667	8.67	2.42	3.89
0.250	4.60	1.000	107.33	1.750	6.92	2.50	3.89
0.333	4.60	1.083	34.77	1.833	6.92	2.58	3.52
0.417	6.26	1.167	34.77	1.917	5.77	2.67	3.52
0.500	6.26	1.250	17.56	2.000	5.77	2.75	3.21
0.583	10.01	1.333	17.56	2.083	4.96	2.83	3.21
0.667	10.01	1.417	11.61	2.167	4.96	2.92	2.96
0.750	25.98	1.500	11.61	2.250	4.36	3.00	2.96

				TOTALS
Max.Eff.Inten.(mm/hr)=		107.33	35.62	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.38 (ii)	4.37 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.33	0.23	
PEAK FLOW	(cms)=	0.03	0.01	0.030 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	43.34	10.61	26.96
TOTAL RAINFALL	(mm)=	44.34	44.34	44.34
RUNOFF COEFFICIENT	=	0.98	0.24	0.61

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)

Post-Development - Controlled - 5-Year Storm

ID1= 1 (0012):		0.17	0.030	1.00	26.96
+ ID2= 2 (0004):		0.94	0.014	1.00	11.90
ID = 3 (0040):		1.11	0.045	1.00	14.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0032)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0030):		11.28	0.040	1.17	18.71
+ ID2= 2 (0040):		1.11	0.045	1.00	14.19
ID = 3 (0032):		12.39	0.079	1.00	18.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0032):		12.39	0.079	1.00	18.31
+ ID2= 2 (0035):		5.42	0.266	1.00	14.38
ID = 3 (0025):		17.80	0.345	1.00	17.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50

DATE: 04-02-2024                          TIME: 04:21:57

USER:


COMMENTS: _____________________________________________________

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  ************************************************
  ** SIMULATION : 3 - 10yr - 3hr Chicago        **
  ************************************************

-------------------
| CHICAGO STORM    |    IDF curve parameters: A=1425.011
| Ptotal= 51.86 mm |                          B=   7.382
-------------------                          C=   0.843
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33

                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.00    4.05 |  0.83  128.36 |   1.67    7.83 |  2.50    3.89
                  0.17    5.13 |  1.00   41.12 |   1.83    6.49 |  2.67    3.55
                  0.33    7.06 |  1.17   20.44 |   2.00    5.55 |  2.83    3.26
                  0.50   11.46 |  1.33   13.35 |   2.17    4.86 |
                  0.67   30.55 |  1.50    9.87 |   2.33    4.32 |


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-------------------
| CALIB             |
| NASHYD   (  0041)|   Area     (ha)=   2.73   Curve Number   (CN)= 76.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.20   # of Linear Res.(N)= 3.00
                                                                    Page 1
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-------------------   U.H. Tp(hrs)=   0.48

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


                                  ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.083   4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
                  0.167   4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
                  0.250   5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
                  0.333   5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
                  0.417   7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
                  0.500   7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
                  0.583  11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
                  0.667  11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
                  0.750  30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Unit Hyd Qpeak  (cms)=   0.219

    PEAK FLOW       (cms)=   0.090 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  16.560
    TOTAL RAINFALL   (mm)=  51.857
    RUNOFF COEFFICIENT   =   0.319

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

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-------------------
| CALIB             |
| STANDHYD (  0029)|   Area     (ha)=   2.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
-------------------

                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.87         1.31
    Dep. Storage     (mm)=      2.00         5.00
    Average Slope     (%)=      1.00         2.00
    Length            (m)=    120.64        30.00
    Mannings n           =     0.013        0.250

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


                                  ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.083   4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
                  0.167   4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
                  0.250   5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
                  0.333   5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
                  0.417   7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
                  0.500   7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
                  0.583  11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
                  0.667  11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
                  0.750  30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Max.Eff.Inten.(mm/hr)=     128.36        37.03
              over (min)          5.00        15.00
    Storage Coeff.  (min)=       2.59 (ii)   11.42 (ii)
    Unit Hyd. Tpeak (min)=       5.00        15.00
    Unit Hyd. peak  (cms)=       0.29         0.09
                                                          *TOTALS*
                                                    Page 2
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    PEAK FLOW       (cms)=       0.23         0.08          0.265 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17          1.00
    RUNOFF VOLUME    (mm)=      49.86        15.08         25.51
    TOTAL RAINFALL   (mm)=      51.86        51.86         51.86
    RUNOFF COEFFICIENT   =       0.96         0.29          0.49

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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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-------------------
| CHAMBER(  0037)|  OUTFLOW: OFF,  UNDERDRAIN: OFF,  INFIL: ON
|IN= 2--> OUT= 3 |  CHAMBER:
| DT=  5.0 min   |  MAX STO VOL (cu.m.)=   94.45  Bottom Area(m2)   =  246.55
-------------------

                    DEPTH       STORAGE          |   DEPTH      STORAGE
                    (mm)        (cu.m.)          |   (mm)       (cu.m.)
                       0.00          0.00        |    381.00        56.16
                      25.00          2.50        |    406.00        60.19
                      51.00          5.01        |    432.00        64.05
                      76.00          7.51        |    457.00        67.72
                     102.00         10.02        |    483.00        71.12
                     127.00         12.52        |    508.00        74.06
                     152.00         15.03        |    533.00        76.82
                     178.00         19.90        |    559.00        79.42
                     203.00         24.72        |    584.00        81.93
                     229.00         29.47        |    610.00        84.43
                     254.00         34.16        |    635.00        86.94
                     279.00         38.76        |    660.00        89.44
                     305.00         43.27        |    686.00        91.95
                     330.00         47.68        |    711.00        94.45
                     356.00         51.99        |      0.00         0.00

                    NATIVE SOIL LAYER:
                    Infiltration (m/hr) = 0.0300

                       AREA         QPEAK            TPEAK         R.V.
                       (ha)         (cms)            (hrs)         (mm)
      INFLOW:ID= 2     2.18         0.265             1.00        25.51
    OVERFLOW:ID= 3     2.18         0.263             1.00        20.11

              Volume Reduction Rate[(RVin-RVout)/RVin](%)=       21.17
              Time to reach Max storage              (Hr)=        0.92
              Volume of water for drawdown in LID (cu.m.)=       90.78
              Volume of maximum water storage     (cu.m.)=       94.45
              Calculated Drawdown Time               (Hr)=       12.25

  --------------------------
  | Junction Command(0038) |
  --------------------------

                           AREA     QPEAK   TPEAK     R.V.
                           (ha)     (cms)    (hrs)     (mm)
  INFLOW : ID= 3(  0037)    2.18     0.26    1.00    20.11
  OUTFLOW: ID= 2(  0038)    2.18     0.26    1.00    20.11

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                                                    Page 3
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-------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0038):     2.18    0.263     1.00     20.11
     + ID2= 2 (  0041):     2.73    0.090     1.58     16.56
       ================================================
       ID = 3 (  0031):     4.92    0.277     1.00     18.14

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| STANDHYD (  0006)|   Area     (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  19.00
-------------------

                         IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=      0.02         0.04
    Dep. Storage     (mm)=      1.00         5.00
    Average Slope     (%)=      2.00         3.00
    Length            (m)=     20.66        15.00
    Mannings n           =     0.013        0.250

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


                                  ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.083   4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
                  0.167   4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
                  0.250   5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
                  0.333   5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
                  0.417   7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
                  0.500   7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
                  0.583  11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
                  0.667  11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
                  0.750  30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

    Max.Eff.Inten.(mm/hr)=     128.36        52.07
              over (min)          5.00        10.00
    Storage Coeff.  (min)=       0.73 (ii)    5.23 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.34         0.16
                                                          *TOTALS*
    PEAK FLOW       (cms)=       0.00         0.01          0.008 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.08          1.00
    RUNOFF VOLUME    (mm)=      50.86        18.79         24.82
    TOTAL RAINFALL   (mm)=      51.86        51.86         51.86
    RUNOFF COEFFICIENT   =       0.98         0.36          0.48

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  73.0    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 (  0005)|   Area    (ha)=   0.23
|ID= 1 DT= 5.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  43.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.10         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       4.00         8.30
     Length            (m)=      39.24         8.50
     Mannings n            =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
               0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
               0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
               0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
               0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
               0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
               0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
               0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
               0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

     Max.Eff.Inten.(mm/hr)=     128.36        32.70
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       0.87 (ii)    2.71 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.29
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.01          0.050 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.00           1.00
     RUNOFF VOLUME    (mm)=      50.86        15.59          30.75
     TOTAL RAINFALL   (mm)=      51.86        51.86          51.86
     RUNOFF COEFFICIENT   =       0.98         0.30           0.59

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  73.0    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  (  0033)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0005):     0.23    0.050     1.00    30.75
     + ID2= 2 (  0006):     0.06    0.008     1.00    24.82
       ================================================
       ID = 3 (  0033):     0.30    0.058     1.00    29.47

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0034)|
```



```
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0034):     5.21    0.335     1.00    18.78
     + ID2= 2 (  0007):     0.20    0.024     1.00    24.87
       ================================================
       ID = 3 (  0035):     5.42    0.359     1.00    19.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB                |
| STANDHYD (  0001)|   Area    (ha)=  10.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  45.00   Dir. Conn.(%)=  36.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.54         5.55
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     259.27        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    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
               0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
               0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
               0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
               0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
               0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
               0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
               0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
               0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

     Max.Eff.Inten.(mm/hr)=     128.36        19.63
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       4.09 (ii)   17.63 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.24         0.06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.21         0.17          1.256 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.25           1.00
     RUNOFF VOLUME    (mm)=      49.86        10.00          24.35
     TOTAL RAINFALL   (mm)=      51.86        51.86          51.86
     RUNOFF COEFFICIENT   =       0.96         0.19           0.47

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  55.0    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(  0027)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)  |    (cms)     (ha.m.)
```



```
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0031):     4.92    0.277     1.00    18.14
     + ID2= 2 (  0033):     0.30    0.058     1.00    29.47
       ================================================
       ID = 3 (  0034):     5.21    0.335     1.00    18.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB                |
| STANDHYD (  0007)|   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  35.00   Dir. Conn.(%)=  20.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.07         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.70
     Length            (m)=      36.88        30.00
     Mannings n            =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
               0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
               0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
               0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
               0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
               0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
               0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
               0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
               0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

     Max.Eff.Inten.(mm/hr)=     128.36        49.36
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.03 (ii)    8.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.13
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01          0.024 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.00
     RUNOFF VOLUME    (mm)=      50.86        18.40          24.87
     TOTAL RAINFALL   (mm)=      51.86        51.86          51.86
     RUNOFF COEFFICIENT   =       0.98         0.35           0.48

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  73.0    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  (  0035)|
```



```
               0.0000    0.0000   |   0.0119    0.2754
               0.0030    0.0202   |   0.0125    0.3093
               0.0049    0.0422   |   0.0131    0.3441
               0.0062    0.0660   |   0.0136    0.3798
               0.0073    0.0916   |   0.0142    0.4162
               0.0083    0.1190   |   0.0844    0.4536
               0.0091    0.1482   |   0.2123    0.4917
               0.0099    0.1787   |   0.2412    0.5308
               0.0106    0.2101   |   0.7242    0.5706
               0.0113    0.2423   |   1.5999    0.6113

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
   INFLOW : ID= 2 (  0001)     10.083     1.256      1.00      24.35
   OUTFLOW: ID= 1 (  0027)     10.083     0.011      3.42      24.18

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.89
                TIME SHIFT OF PEAK FLOW         (min)=145.00
                MAXIMUM  STORAGE   USED        (ha.m.)=  0.2350

--------------------------------------------------------------------------------
--------------------
| CALIB                |
| STANDHYD (  0028)|   Area    (ha)=   1.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  24.00   Dir. Conn.(%)=   5.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.29         0.91
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      89.37        31.00
     Mannings n            =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.05 | 0.833   30.55 | 1.583    9.87 |  2.33    4.86
               0.167    4.05 | 0.917  128.36 | 1.667    9.87 |  2.42    4.32
               0.250    5.13 | 1.000  128.36 | 1.750    7.83 |  2.50    4.32
               0.333    5.13 | 1.083   41.12 | 1.833    7.83 |  2.58    3.89
               0.417    7.06 | 1.167   41.12 | 1.917    6.49 |  2.67    3.89
               0.500    7.06 | 1.250   20.44 | 2.000    6.49 |  2.75    3.55
               0.583   11.46 | 1.333   20.44 | 2.083    5.55 |  2.83    3.55
               0.667   11.46 | 1.417   13.35 | 2.167    5.55 |  2.92    3.26
               0.750   30.55 | 1.500   13.35 | 2.250    4.86 |  3.00    3.26

     Max.Eff.Inten.(mm/hr)=     128.36        23.52
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       2.16 (ii)   12.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.31         0.08
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.04          0.047 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.17           1.17
     RUNOFF VOLUME    (mm)=      49.86        11.04          12.97
     TOTAL RAINFALL   (mm)=      51.86        51.86          51.86
     RUNOFF COEFFICIENT   =       0.96         0.21           0.25

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0030)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0027):		10.08	0.011	3.42	24.18
+ ID2= 2 (0028):		1.20	0.047	1.17	12.97
ID = 3 (0030):		11.28	0.056	1.17	22.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0004)	Area (ha)=	0.94	
ID= 1 DT= 5.0 min	Total Imp(%)=	41.00	Dir. Conn.(%)= 5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.38	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	0.70
Length	(m)=	79.04	300.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.05	0.833	30.55	1.583	9.87	2.33	4.86
0.167	4.05	0.917	128.36	1.667	9.87	2.42	4.32
0.250	5.13	1.000	128.36	1.750	7.83	2.50	4.32
0.333	5.13	1.083	41.12	1.833	7.83	2.58	3.89
0.417	7.06	1.167	41.12	1.917	6.49	2.67	3.89
0.500	7.06	1.250	20.44	2.000	6.49	2.75	3.55
0.583	11.46	1.333	20.44	2.083	5.55	2.83	3.55
0.667	11.46	1.417	13.35	2.167	5.55	2.92	3.26
0.750	30.55	1.500	13.35	2.250	4.86	3.00	3.26

				TOTALS
Max.Eff.Inten.(mm/hr)=		128.36	17.61	
over (min)		5.00	70.00	
Storage Coeff. (min)=		1.63 (ii)	66.52 (ii)	
Unit Hyd. Tpeak (min)=		5.00	70.00	
Unit Hyd. peak (cms)=		0.32	0.02	
PEAK FLOW	(cms)=	0.02	0.01	0.017 (iii)
TIME TO PEAK	(hrs)=	1.00	2.25	1.00
RUNOFF VOLUME	(mm)=	50.86	13.76	15.58
TOTAL RAINFALL	(mm)=	51.86	51.86	51.86
RUNOFF COEFFICIENT	=	0.98	0.27	0.30

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0012)	Area (ha)=	0.17	
ID= 1 DT= 5.0 min	Total Imp(%)=	70.00	Dir. Conn.(%)= 50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.05
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.80	1.00
Length	(m)=	33.47	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.05	0.833	30.55	1.583	9.87	2.33	4.86
0.167	4.05	0.917	128.36	1.667	9.87	2.42	4.32
0.250	5.13	1.000	128.36	1.750	7.83	2.50	4.32
0.333	5.13	1.083	41.12	1.833	7.83	2.58	3.89
0.417	7.06	1.167	41.12	1.917	6.49	2.67	3.89
0.500	7.06	1.250	20.44	2.000	6.49	2.75	3.55
0.583	11.46	1.333	20.44	2.083	5.55	2.83	3.55
0.667	11.46	1.417	13.35	2.167	5.55	2.92	3.26
0.750	30.55	1.500	13.35	2.250	4.86	3.00	3.26

				TOTALS
Max.Eff.Inten.(mm/hr)=		128.36	49.86	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.28 (ii)	4.07 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.33	0.24	
PEAK FLOW	(cms)=	0.03	0.01	0.037 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	50.86	14.16	32.50
TOTAL RAINFALL	(mm)=	51.86	51.86	51.86
RUNOFF COEFFICIENT	=	0.98	0.27	0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):		0.17	0.037	1.00	32.50
+ ID2= 2 (0004):		0.94	0.017	1.00	15.58
ID = 3 (0040):		1.11	0.055	1.00	18.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0032)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0030):		11.28	0.056	1.17	22.99
+ ID2= 2 (0040):		1.11	0.055	1.00	18.15
ID = 3 (0032):		12.39	0.100	1.00	22.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0032):		12.39	0.100	1.00	22.56
+ ID2= 2 (0035):		5.42	0.359	1.00	19.01
ID = 3 (0025):		17.80	0.458	1.00	21.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:21:59

USER:


COMMENTS: _____________________________________________________

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  ************************************************
  ** SIMULATION : 4 - 25yr - 3hr Chicago        **
  ************************************************

-------------------
| CHICAGO STORM    |    IDF curve parameters: A=1835.352
| Ptotal= 61.62 mm |                          B=   7.844
-------------------                          C=   0.858
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    4.54 |  0.83  154.86 |  1.67    9.01 |  2.50    4.36
                0.17    5.80 |  1.00   49.76 |  1.83    7.41 |  2.67    3.95
                0.33    8.09 |  1.17   24.35 |  2.00    6.30 |  2.83    3.62
                0.50   13.39 |  1.33   15.69 |  2.17    5.48 |
                0.67   36.78 |  1.50   11.46 |  2.33    4.85 |


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-------------------
| CALIB            |
| NASHYD   (  0041)|   Area     (ha)=   2.73   Curve Number   (CN)= 76.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.20   # of Linear Res.(N)= 3.00
                                                                    Page 1
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-------------------   U.H. Tp(hrs)=   0.48

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


                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
                0.167   4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
                0.250   5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
                0.333   5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
                0.417   8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
                0.500   8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
                0.583  13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
                0.667  13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
                0.750  36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Unit Hyd Qpeak  (cms)=   0.219

    PEAK FLOW       (cms)=   0.126 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  22.642
    TOTAL RAINFALL   (mm)=  61.618
    RUNOFF COEFFICIENT   =   0.367

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

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-------------------
| CALIB            |
| STANDHYD (  0029)|   Area     (ha)=   2.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
-------------------

                                 IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=           0.87          1.31
    Dep. Storage     (mm)=           2.00          5.00
    Average Slope     (%)=           1.00          2.00
    Length            (m)=         120.64         30.00
    Mannings n           =          0.013         0.250

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


                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
                0.167   4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
                0.250   5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
                0.333   5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
                0.417   8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
                0.500   8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
                0.583  13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
                0.667  13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
                0.750  36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Max.Eff.Inten.(mm/hr)=     154.86        52.89
              over (min)          5.00        15.00
    Storage Coeff.  (min)=       2.40 (ii)  10.06 (ii)
    Unit Hyd. Tpeak (min)=       5.00        15.00
    Unit Hyd. peak  (cms)=       0.30         0.10
                                                          *TOTALS*
                                                    Page 2
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    PEAK FLOW       (cms)=       0.28         0.12          0.334 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.17          1.00
    RUNOFF VOLUME    (mm)=      59.62        20.57         32.28
    TOTAL RAINFALL   (mm)=      61.62        61.62         61.62
    RUNOFF COEFFICIENT   =       0.97         0.33          0.52

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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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-------------------
| CHAMBER(  0037)|  OUTFLOW: OFF,  UNDERDRAIN: OFF,  INFIL: ON
|IN= 2--> OUT= 3 |  CHAMBER:
| DT=  5.0 min   |  MAX STO VOL (cu.m.)=   94.45  Bottom Area(m2)   =  246.55
-------------------

                     DEPTH       STORAGE          |   DEPTH      STORAGE
                     (mm)        (cu.m.)          |   (mm)       (cu.m.)
                        0.00          0.00         |    381.00        56.16
                       25.00          2.50         |    406.00        60.19
                       51.00          5.01         |    432.00        64.05
                       76.00          7.51         |    457.00        67.72
                      102.00         10.02         |    483.00        71.12
                      127.00         12.52         |    508.00        74.06
                      152.00         15.03         |    533.00        76.82
                      178.00         19.90         |    559.00        79.42
                      203.00         24.72         |    584.00        81.93
                      229.00         29.47         |    610.00        84.43
                      254.00         34.16         |    635.00        86.94
                      279.00         38.76         |    660.00        89.44
                      305.00         43.27         |    686.00        91.95
                      330.00         47.68         |    711.00        94.45
                      356.00         51.99         |      0.00         0.00

                     NATIVE SOIL LAYER:
                     Infiltration (m/hr) = 0.0300

                        AREA         QPEAK            TPEAK         R.V.
                        (ha)         (cms)            (hrs)         (mm)
      INFLOW:ID= 2     2.18         0.334             1.00         32.28
    OVERFLOW:ID= 3     2.18         0.332             1.00         26.89

              Volume Reduction Rate[(RVin-RVout)/RVin](%)=       16.71
              Time to reach Max storage              (Hr)=        0.92
              Volume of water for drawdown in LID (cu.m.)=       91.26
              Volume of maximum water storage     (cu.m.)=       94.45
              Calculated Drawdown Time               (Hr)=       12.33

  --------------------------
  | Junction Command(0038) |
  --------------------------

                           AREA     QPEAK   TPEAK     R.V.
                           (ha)     (cms)    (hrs)     (mm)
  INFLOW : ID= 3(  0037)    2.18     0.33     1.00    26.89
  OUTFLOW: ID= 2(  0038)    2.18     0.33     1.00    26.89

  --------------------------------------------------------------------------------
                                                    Page 3
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-------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK      R.V.
-------------------           (ha)    (cms)    (hrs)       (mm)
       ID1= 1 (  0038):      2.18    0.332     1.00      26.89
     + ID2= 2 (  0041):      2.73    0.126     1.58      22.64
       ================================================
       ID = 3 (  0031):      4.92    0.353     1.00      24.53

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB            |
| STANDHYD (  0006)|   Area     (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  19.00
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                                 IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=           0.02          0.04
    Dep. Storage     (mm)=           1.00          5.00
    Average Slope     (%)=           2.00          3.00
    Length            (m)=          20.66         15.00
    Mannings n           =          0.013         0.250

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


                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   4.54 | 0.833   36.78 | 1.583   11.46 |  2.33    5.48
                0.167   4.54 | 0.917  154.86 | 1.667   11.46 |  2.42    4.85
                0.250   5.80 | 1.000  154.86 | 1.750    9.01 |  2.50    4.85
                0.333   5.80 | 1.083   49.76 | 1.833    9.01 |  2.58    4.36
                0.417   8.09 | 1.167   49.76 | 1.917    7.41 |  2.67    4.36
                0.500   8.09 | 1.250   24.35 | 2.000    7.41 |  2.75    3.95
                0.583  13.39 | 1.333   24.35 | 2.083    6.30 |  2.83    3.95
                0.667  13.39 | 1.417   15.69 | 2.167    6.30 |  2.92    3.62
                0.750  36.78 | 1.500   15.69 | 2.250    5.48 |  3.00    3.62

    Max.Eff.Inten.(mm/hr)=     154.86        73.08
              over (min)          5.00        10.00
    Storage Coeff.  (min)=       0.68 (ii)   5.41 (ii)
    Unit Hyd. Tpeak (min)=       5.00        10.00
    Unit Hyd. peak  (cms)=       0.34         0.16
                                                          *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.01          0.011 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.08          1.00
    RUNOFF VOLUME    (mm)=      60.62        25.21         31.91
    TOTAL RAINFALL   (mm)=      61.62        61.62         61.62
    RUNOFF COEFFICIENT   =       0.98         0.41          0.52

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  73.0    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 (0005) ID= 1 DT= 5.0 min	Area (ha)= 0.23 Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.10	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	4.00	8.30
Length (m)=	39.24	8.50
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

		TOTALS
Max.Eff.Inten.(mm/hr)=	154.86	46.96
over (min)	5.00	5.00
Storage Coeff. (min)=	0.81 (ii)	2.52 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.29
PEAK FLOW (cms)=	0.04	0.02 0.063 (iii)
TIME TO PEAK (hrs)=	1.00	1.00 1.00
RUNOFF VOLUME (mm)=	60.62	21.29 38.20
TOTAL RAINFALL (mm)=	61.62	61.62 61.62
RUNOFF COEFFICIENT =	0.98	0.35 0.62

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0033)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	0.23	0.063	1.00	38.20
+ ID2= 2 (0006):	0.06	0.011	1.00	31.91
ID = 3 (0033):	0.30	0.074	1.00	36.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	5.21	0.426	1.00	25.22
+ ID2= 2 (0007):	0.20	0.032	1.00	31.90
ID = 3 (0035):	5.42	0.459	1.00	25.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0001) ID= 1 DT= 5.0 min	Area (ha)= 10.08 Total Imp(%)= 45.00 Dir. Conn.(%)= 36.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	5.55
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	259.27	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	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

		TOTALS
Max.Eff.Inten.(mm/hr)=	154.86	28.42
over (min)	5.00	20.00
Storage Coeff. (min)=	3.80 (ii)	15.47 (ii)
Unit Hyd. Tpeak (min)=	5.00	20.00
Unit Hyd. peak (cms)=	0.25	0.07
PEAK FLOW (cms)=	1.47	0.26 1.554 (iii)
TIME TO PEAK (hrs)=	1.00	1.25 1.00
RUNOFF VOLUME (mm)=	59.62	13.93 30.38
TOTAL RAINFALL (mm)=	61.62	61.62 61.62
RUNOFF COEFFICIENT =	0.97	0.23 0.49

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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(0027)
IN= 2---> OUT= 1
DT= 5.0 min | OVERFLOW IS OFF |

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	10.08	0.972	1.00	30.38
+ ID2= 2 (0027):	0.01	0.000	3.42	30.21
ID = 3 (0035):	10.08	0.972	1.00	30.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0007) ID= 1 DT= 5.0 min	Area (ha)= 0.20 Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.07	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.70
Length (m)=	36.88	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

		TOTALS
Max.Eff.Inten.(mm/hr)=	154.86	69.45
over (min)	5.00	10.00
Storage Coeff. (min)=	0.96 (ii)	7.24 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.14
PEAK FLOW (cms)=	0.02	0.02 0.032 (iii)
TIME TO PEAK (hrs)=	1.00	1.08 1.00
RUNOFF VOLUME (mm)=	60.62	24.74 31.90
TOTAL RAINFALL (mm)=	61.62	61.62 61.62
RUNOFF COEFFICIENT =	0.98	0.40 0.52

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)

0.0000	0.0000	0.0119	0.2754
0.0030	0.0202	0.0125	0.3093
0.0049	0.0422	0.0131	0.3441
0.0062	0.0660	0.0136	0.3798
0.0073	0.0916	0.0142	0.4162
0.0083	0.1190	0.0844	0.4536
0.0091	0.1482	0.2123	0.4917
0.0099	0.1787	0.2412	0.5308
0.0106	0.2101	0.7242	0.5706
0.0113	0.2423	1.5999	0.6113

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	10.083	1.554	1.00	30.38
OUTFLOW: ID= 1 (0027)	10.083	0.012	3.42	30.21

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.79
TIME SHIFT OF PEAK FLOW (min)=145.00
MAXIMUM STORAGE USED (ha.m.)= 0.2948

CALIB STANDHYD (0028) ID= 1 DT= 5.0 min	Area (ha)= 1.20 Total Imp(%)= 24.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.29	0.91
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	89.37	31.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

		TOTALS
Max.Eff.Inten.(mm/hr)=	154.86	40.49
over (min)	5.00	15.00
Storage Coeff. (min)=	2.00 (ii)	10.70 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.31	0.09
PEAK FLOW (cms)=	0.03	0.06 0.072 (iii)
TIME TO PEAK (hrs)=	1.00	1.17 1.17
RUNOFF VOLUME (mm)=	59.62	15.28 17.49
TOTAL RAINFALL (mm)=	61.62	61.62 61.62
RUNOFF COEFFICIENT =	0.97	0.25 0.28

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0030)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0027):	10.08	0.012	3.42	30.21
+ ID2= 2 (0028):	1.20	0.072	1.17	17.49
ID = 3 (0030):	11.28	0.081	1.17	28.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0004)
ID= 1 DT= 5.0 min | Area (ha)= 0.94 | Total Imp(%)= 41.00 | Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.38	0.55
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	0.70
Length (m)=	79.04	300.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

			TOTALS
Max.Eff.Inten.(mm/hr)=	154.86	24.32	
over (min)	5.00	60.00	
Storage Coeff. (min)=	1.51 (ii)	58.54 (ii)	
Unit Hyd. Tpeak (min)=	5.00	60.00	
Unit Hyd. peak (cms)=	0.33	0.02	
PEAK FLOW (cms)=	0.02	0.02	0.022 (iii)
TIME TO PEAK (hrs)=	1.00	2.00	2.00
RUNOFF VOLUME (mm)=	60.62	18.76	20.82
TOTAL RAINFALL (mm)=	61.62	61.62	61.62
RUNOFF COEFFICIENT =	0.98	0.30	0.34

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0012)
ID= 1 DT= 5.0 min | Area (ha)= 0.17 | Total Imp(%)= 70.00 | Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.12	0.05
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	0.80	1.00
Length (m)=	33.47	10.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.54	0.833	36.78	1.583	11.46	2.33	5.48
0.167	4.54	0.917	154.86	1.667	11.46	2.42	4.85
0.250	5.80	1.000	154.86	1.750	9.01	2.50	4.85
0.333	5.80	1.083	49.76	1.833	9.01	2.58	4.36
0.417	8.09	1.167	49.76	1.917	7.41	2.67	4.36
0.500	8.09	1.250	24.35	2.000	7.41	2.75	3.95
0.583	13.39	1.333	24.35	2.083	6.30	2.83	3.95
0.667	13.39	1.417	15.69	2.167	6.30	2.92	3.62
0.750	36.78	1.500	15.69	2.250	5.48	3.00	3.62

			TOTALS
Max.Eff.Inten.(mm/hr)=	154.86	70.60	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.19 (ii)	3.78 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.33	0.25	
PEAK FLOW (cms)=	0.04	0.01	0.047 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	60.62	19.26	39.93
TOTAL RAINFALL (mm)=	61.62	61.62	61.62
RUNOFF COEFFICIENT =	0.98	0.31	0.65

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)
1 + 2 = 3

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

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	0.17	0.047	1.00	39.93
+ ID2= 2 (0004):	0.94	0.022	2.00	20.82
ID = 3 (0040):	1.11	0.068	1.00	23.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0032)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0030):	11.28	0.081	1.17	28.86
+ ID2= 2 (0040):	1.11	0.068	1.00	23.73
ID = 3 (0032):	12.39	0.130	1.00	28.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0032):	12.39	0.130	1.00	28.40
+ ID2= 2 (0035):	5.42	0.459	1.00	25.48
ID = 3 (0025):	17.80	0.588	1.00	27.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:21:58

USER:


COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 5 - 50yr - 3hr Chicago        **
  ************************************************

-------------------
| CHICAGO STORM   |    IDF curve parameters: A=2225.884
| Ptotal= 69.56 mm |                          B=   8.620
-------------------                          C=   0.871
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    4.91 |  0.83  174.32 |  1.67   10.02 |  2.50    4.70
                0.17    6.34 |  1.00   57.54 |  1.83    8.18 |  2.67    4.25
                0.33    8.96 |  1.17   27.95 |  2.00    6.90 |  2.83    3.88
                0.50   15.11 |  1.33   17.79 |  2.17    5.97 |
                0.67   42.43 |  1.50   12.87 |  2.33    5.26 |


--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD   (  0041)|   Area     (ha)=   2.73   Curve Number   (CN)= 76.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.20   # of Linear Res.(N)= 3.00
```



```
-------------------   U.H. Tp(hrs)=   0.48

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


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   4.91 | 0.833  42.43 | 1.583  12.87 |  2.33    5.97
                0.167   4.91 | 0.917 174.32 | 1.667  12.87 |  2.42    5.26
                0.250   6.34 | 1.000 174.32 | 1.750  10.02 |  2.50    5.26
                0.333   6.34 | 1.083  57.54 | 1.833  10.02 |  2.58    4.70
                0.417   8.96 | 1.167  57.54 | 1.917   8.18 |  2.67    4.70
                0.500   8.96 | 1.250  27.95 | 2.000   8.18 |  2.75    4.25
                0.583  15.11 | 1.333  27.95 | 2.083   6.90 |  2.83    4.25
                0.667  15.11 | 1.417  17.79 | 2.167   6.90 |  2.92    3.88
                0.750  42.43 | 1.500  17.79 | 2.250   5.97 |  3.00    3.88

    Unit Hyd Qpeak  (cms)=   0.219

    PEAK FLOW       (cms)=   0.158 (i)
    TIME TO PEAK    (hrs)=   1.583
    RUNOFF VOLUME    (mm)=  27.962
    TOTAL RAINFALL   (mm)=  69.563
    RUNOFF COEFFICIENT   =   0.402

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0029)|   Area     (ha)=   2.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
-------------------

                                IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=          0.87          1.31
    Dep. Storage     (mm)=          2.00          5.00
    Average Slope     (%)=          1.00          2.00
    Length            (m)=        120.64         30.00
    Mannings n           =         0.013         0.250

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


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   4.91 | 0.833  42.43 | 1.583  12.87 |  2.33    5.97
                0.167   4.91 | 0.917 174.32 | 1.667  12.87 |  2.42    5.26
                0.250   6.34 | 1.000 174.32 | 1.750  10.02 |  2.50    5.26
                0.333   6.34 | 1.083  57.54 | 1.833  10.02 |  2.58    4.70
                0.417   8.96 | 1.167  57.54 | 1.917   8.18 |  2.67    4.70
                0.500   8.96 | 1.250  27.95 | 2.000   8.18 |  2.75    4.25
                0.583  15.11 | 1.333  27.95 | 2.083   6.90 |  2.83    4.25
                0.667  15.11 | 1.417  17.79 | 2.167   6.90 |  2.92    3.88
                0.750  42.43 | 1.500  17.79 | 2.250   5.97 |  3.00    3.88

    Max.Eff.Inten.(mm/hr)=     174.32         66.33
              over (min)          5.00         10.00
    Storage Coeff.  (min)=       2.29 (ii)     9.29 (ii)
    Unit Hyd. Tpeak (min)=       5.00         10.00
    Unit Hyd. peak  (cms)=       0.30          0.12
                                                        *TOTALS*
```



```
    PEAK FLOW       (cms)=       0.31          0.16          0.435 (iii)
    TIME TO PEAK    (hrs)=       1.00          1.08          1.00
    RUNOFF VOLUME    (mm)=      67.56         25.40         38.05
    TOTAL RAINFALL   (mm)=      69.56         69.56         69.56
    RUNOFF COEFFICIENT   =       0.97          0.37          0.55

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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.

--------------------------------------------------------------------------------
-------------------
| CHAMBER(  0037)|  OUTFLOW: OFF,  UNDERDRAIN: OFF,  INFIL: ON
|IN= 2--> OUT= 3 |  CHAMBER:
| DT=  5.0 min   |  MAX STO VOL (cu.m.)=   94.45  Bottom Area(m2)   =  246.55
-------------------

                     DEPTH       STORAGE          |   DEPTH      STORAGE
                     (mm)        (cu.m.)          |   (mm)       (cu.m.)
                        0.00          0.00        |    381.00        56.16
                       25.00          2.50        |    406.00        60.19
                       51.00          5.01        |    432.00        64.05
                       76.00          7.51        |    457.00        67.72
                      102.00         10.02        |    483.00        71.12
                      127.00         12.52        |    508.00        74.06
                      152.00         15.03        |    533.00        76.82
                      178.00         19.90        |    559.00        79.42
                      203.00         24.72        |    584.00        81.93
                      229.00         29.47        |    610.00        84.43
                      254.00         34.16        |    635.00        86.94
                      279.00         38.76        |    660.00        89.44
                      305.00         43.27        |    686.00        91.95
                      330.00         47.68        |    711.00        94.45
                      356.00         51.99        |      0.00         0.00

                     NATIVE SOIL LAYER:
                     Infiltration (m/hr) = 0.0300

                        AREA         QPEAK            TPEAK         R.V.
                        (ha)         (cms)            (hrs)         (mm)
      INFLOW:ID= 2     2.18         0.435             1.00         38.05
    OVERFLOW:ID= 3     2.18         0.433             1.00         32.68

              Volume Reduction Rate[(RVin-RVout)/RVin](%)=       14.12
              Time to reach Max storage              (Hr)=        0.92
              Volume of water for drawdown in LID (cu.m.)=       91.37
              Volume of maximum water storage     (cu.m.)=       94.45
              Calculated Drawdown Time               (Hr)=       12.33

  --------------------------
  | Junction Command(0038) |
  --------------------------

                           AREA     QPEAK   TPEAK     R.V.
                           (ha)     (cms)    (hrs)     (mm)
  INFLOW : ID= 3(  0037)    2.18     0.43    1.00    32.68
  OUTFLOW: ID= 2(  0038)    2.18     0.43    1.00    32.68

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



```
-------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK      R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0038):     2.18    0.433     1.00     32.68
     + ID2= 2 (  0041):     2.73    0.158     1.58     27.96
       ================================================
       ID = 3 (  0031):     4.92    0.460     1.00     30.06

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0006)|   Area     (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  19.00
-------------------

                                IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=          0.02          0.04
    Dep. Storage     (mm)=          1.00          5.00
    Average Slope     (%)=          2.00          3.00
    Length            (m)=         20.66         15.00
    Mannings n           =         0.013         0.250

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


                                ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   4.91 | 0.833  42.43 | 1.583  12.87 |  2.33    5.97
                0.167   4.91 | 0.917 174.32 | 1.667  12.87 |  2.42    5.26
                0.250   6.34 | 1.000 174.32 | 1.750  10.02 |  2.50    5.26
                0.333   6.34 | 1.083  57.54 | 1.833  10.02 |  2.58    4.70
                0.417   8.96 | 1.167  57.54 | 1.917   8.18 |  2.67    4.70
                0.500   8.96 | 1.250  27.95 | 2.000   8.18 |  2.75    4.25
                0.583  15.11 | 1.333  27.95 | 2.083   6.90 |  2.83    4.25
                0.667  15.11 | 1.417  17.79 | 2.167   6.90 |  2.92    3.88
                0.750  42.43 | 1.500  17.79 | 2.250   5.97 |  3.00    3.88

    Max.Eff.Inten.(mm/hr)=     174.32         90.56
              over (min)          5.00         10.00
    Storage Coeff.  (min)=       0.65 (ii)     5.16 (ii)
    Unit Hyd. Tpeak (min)=       5.00         10.00
    Unit Hyd. peak  (cms)=       0.34          0.16
                                                        *TOTALS*
    PEAK FLOW       (cms)=       0.01          0.01          0.013 (iii)
    TIME TO PEAK    (hrs)=       1.00          1.08          1.00
    RUNOFF VOLUME    (mm)=      68.56         30.78         37.93
    TOTAL RAINFALL   (mm)=      69.56         69.56         69.56
    RUNOFF COEFFICIENT   =       0.99          0.44          0.55

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  73.0    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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Post-Development - Controlled - 50-Year Storm

```
| CALIB                |
| STANDHYD (  0005)|   Area    (ha)=   0.23
|ID= 1 DT= 5.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  43.00
-------------------
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.10	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	4.00	8.30
Length (m)=	39.24	8.50
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

			TOTALS
Max.Eff.Inten.(mm/hr)=	174.32	59.03	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.77 (ii)	2.40 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.30	
PEAK FLOW (cms)=	0.05	0.03	0.073 (iii)
TIME TO PEAK (hrs)=	1.00	1.00	1.00
RUNOFF VOLUME (mm)=	68.56	26.30	44.47
TOTAL RAINFALL (mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT =	0.99	0.38	0.64

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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  (  0033)|
|   1 +  2 =  3    |
-------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):	0.23	0.073	1.00	44.47
+ ID2= 2 (0006):	0.06	0.013	1.00	37.93
ID = 3 (0033):	0.30	0.086	1.00	43.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD  (  0034)|
```


Post-Development - Controlled - 50-Year Storm

```
|   1 +  2 =  3    |
-------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	5.21	0.547	1.00	30.79
+ ID2= 2 (0007):	0.20	0.039	1.00	37.90
ID = 3 (0035):	5.42	0.586	1.00	31.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB                |
| STANDHYD (  0001)|   Area    (ha)=  10.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  45.00   Dir. Conn.(%)=  36.00
-------------------
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	5.55
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	259.27	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	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

			TOTALS
Max.Eff.Inten.(mm/hr)=	174.32	43.11	
over (min)	5.00	15.00	
Storage Coeff. (min)=	3.62 (ii)	13.50 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.25	0.08	
PEAK FLOW (cms)=	1.67	0.37	1.833 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.00
RUNOFF VOLUME (mm)=	67.56	17.47	35.50
TOTAL RAINFALL (mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT =	0.97	0.25	0.51

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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(  0027)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
```


Post-Development - Controlled - 50-Year Storm

```
|   1 +  2 =  3    |
-------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0027):	4.92	0.460	1.00	30.06
+ ID2= 2 (0033):	0.30	0.086	1.00	43.05
ID = 3 (0034):	5.21	0.547	1.00	30.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB                |
| STANDHYD (  0007)|   Area    (ha)=   0.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  35.00   Dir. Conn.(%)=  20.00
-------------------
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.07	0.13
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.70
Length (m)=	36.88	30.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

			TOTALS
Max.Eff.Inten.(mm/hr)=	174.32	86.20	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.91 (ii)	6.67 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.14	
PEAK FLOW (cms)=	0.02	0.02	0.039 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.00
RUNOFF VOLUME (mm)=	68.56	30.25	37.90
TOTAL RAINFALL (mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT =	0.99	0.43	0.54

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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  (  0035)|
```


Post-Development - Controlled - 50-Year Storm

0.0000	0.0000	0.0119	0.2754
0.0030	0.0202	0.0125	0.3093
0.0049	0.0422	0.0131	0.3441
0.0062	0.0660	0.0136	0.3798
0.0073	0.0916	0.0142	0.4162
0.0083	0.1190	0.0844	0.4536
0.0091	0.1482	0.2123	0.4917
0.0099	0.1787	0.2412	0.5308
0.0106	0.2101	0.7242	0.5706
0.0113	0.2423	1.5999	0.6113

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	10.083	1.833	1.00	35.50
OUTFLOW: ID= 1 (0027)	10.083	0.013	3.33	35.33

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.72
TIME SHIFT OF PEAK FLOW (min)=140.00
MAXIMUM STORAGE USED (ha.m.)= 0.3461

```
| CALIB                |
| STANDHYD (  0028)|   Area    (ha)=   1.20
|ID= 1 DT= 5.0 min |   Total Imp(%)=  24.00   Dir. Conn.(%)=   5.00
-------------------
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.29	0.91
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	89.37	31.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

			TOTALS
Max.Eff.Inten.(mm/hr)=	174.32	51.25	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.91 (ii)	9.83 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.31	0.11	
PEAK FLOW (cms)=	0.03	0.09	0.097 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.08
RUNOFF VOLUME (mm)=	67.56	19.09	21.50
TOTAL RAINFALL (mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT =	0.97	0.27	0.31

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0030)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0027):		10.08	0.013	3.33	35.33
+ ID2= 2 (0028):		1.20	0.097	1.08	21.50
ID = 3 (0030):		11.28	0.106	1.08	33.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0004)	Area	(ha)= 0.94		
ID= 1 DT= 5.0 min	Total Imp(%)=	41.00	Dir. Conn.(%)=	5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.38	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	0.70
Length	(m)=	79.04	300.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

				TOTALS
Max.Eff.Inten.(mm/hr)=		174.32	34.60	
over (min)		5.00	55.00	
Storage Coeff. (min)=		1.44 (ii)	50.97 (ii)	
Unit Hyd. Tpeak (min)=		5.00	55.00	
Unit Hyd. peak (cms)=		0.33	0.02	
PEAK FLOW	(cms)=	0.02	0.03	0.030 (iii)
TIME TO PEAK	(hrs)=	1.00	1.92	1.92
RUNOFF VOLUME	(mm)=	68.56	23.20	25.43
TOTAL RAINFALL	(mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT	=	0.99	0.33	0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0012)	Area	(ha)= 0.17		
ID= 1 DT= 5.0 min	Total Imp(%)=	70.00	Dir. Conn.(%)=	50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.05
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.80	1.00
Length	(m)=	33.47	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.91	0.833	42.43	1.583	12.87	2.33	5.97
0.167	4.91	0.917	174.32	1.667	12.87	2.42	5.26
0.250	6.34	1.000	174.32	1.750	10.02	2.50	5.26
0.333	6.34	1.083	57.54	1.833	10.02	2.58	4.70
0.417	8.96	1.167	57.54	1.917	8.18	2.67	4.70
0.500	8.96	1.250	27.95	2.000	8.18	2.75	4.25
0.583	15.11	1.333	27.95	2.083	6.90	2.83	4.25
0.667	15.11	1.417	17.79	2.167	6.90	2.92	3.88
0.750	42.43	1.500	17.79	2.250	5.97	3.00	3.88

				TOTALS
Max.Eff.Inten.(mm/hr)=		174.32	88.22	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.13 (ii)	3.60 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.25	
PEAK FLOW	(cms)=	0.04	0.01	0.054 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	68.56	23.78	46.16
TOTAL RAINFALL	(mm)=	69.56	69.56	69.56
RUNOFF COEFFICIENT	=	0.99	0.34	0.66

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):		0.17	0.054	1.00	46.16
+ ID2= 2 (0004):		0.94	0.030	1.92	25.43
ID = 3 (0040):		1.11	0.079	1.00	28.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0032)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0030):		11.28	0.106	1.08	33.86
+ ID2= 2 (0040):		1.11	0.079	1.00	28.58
ID = 3 (0032):		12.39	0.178	1.00	33.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0032):		12.39	0.178	1.00	33.39
+ ID2= 2 (0035):		5.42	0.586	1.00	31.06
ID = 3 (0025):		17.80	0.764	1.00	32.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M 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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:21:58

USER:


COMMENTS: _____________________________________________________
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  ************************************************
  ** SIMULATION : 6 - 100yr - 3hr Chicago       **
  ************************************************

-------------------
| CHICAGO STORM    |    IDF curve parameters: A=2561.151
| Ptotal= 76.19 mm |                          B=   9.093
-------------------                          C=   0.880
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    5.20 |  0.83  191.10 |  1.67   10.83 |  2.50    4.98
                0.17    6.77 |  1.00   63.94 |  1.83    8.79 |  2.67    4.49
                0.33    9.66 |  1.17   30.88 |  2.00    7.39 |  2.83    4.09
                0.50   16.51 |  1.33   19.50 |  2.17    6.36 |
                0.67   47.05 |  1.50   14.00 |  2.33    5.59 |

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-------------------
| CALIB             |
| NASHYD   (  0041)|   Area     (ha)=   2.73   Curve Number   (CN)= 76.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.20   # of Linear Res.(N)= 3.00
                                                                  Page 1
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-------------------   U.H. Tp(hrs)=   0.48

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.20 | 0.833   47.05 | 1.583   14.00 |  2.33    6.36
               0.167    5.20 | 0.917  191.10 | 1.667   14.00 |  2.42    5.59
               0.250    6.77 | 1.000  191.10 | 1.750   10.83 |  2.50    5.59
               0.333    6.77 | 1.083   63.94 | 1.833   10.83 |  2.58    4.98
               0.417    9.66 | 1.167   63.94 | 1.917    8.79 |  2.67    4.98
               0.500    9.66 | 1.250   30.88 | 2.000    8.79 |  2.75    4.49
               0.583   16.51 | 1.333   30.88 | 2.083    7.39 |  2.83    4.49
               0.667   16.51 | 1.417   19.50 | 2.167    7.39 |  2.92    4.09
               0.750   47.05 | 1.500   19.50 | 2.250    6.36 |  3.00    4.09

    Unit Hyd Qpeak  (cms)=   0.219

    PEAK FLOW       (cms)=   0.187 (i)
    TIME TO PEAK    (hrs)=   1.500
    RUNOFF VOLUME    (mm)=  32.608
    TOTAL RAINFALL   (mm)=  76.186
    RUNOFF COEFFICIENT   =   0.428

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

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-------------------
| CALIB             |
| STANDHYD (  0029)|   Area     (ha)=   2.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
-------------------

                              IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=        0.87          1.31
    Dep. Storage     (mm)=        2.00          5.00
    Average Slope     (%)=        1.00          2.00
    Length            (m)=      120.64         30.00
    Mannings n           =       0.013         0.250

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.20 | 0.833   47.05 | 1.583   14.00 |  2.33    6.36
               0.167    5.20 | 0.917  191.10 | 1.667   14.00 |  2.42    5.59
               0.250    6.77 | 1.000  191.10 | 1.750   10.83 |  2.50    5.59
               0.333    6.77 | 1.083   63.94 | 1.833   10.83 |  2.58    4.98
               0.417    9.66 | 1.167   63.94 | 1.917    8.79 |  2.67    4.98
               0.500    9.66 | 1.250   30.88 | 2.000    8.79 |  2.75    4.49
               0.583   16.51 | 1.333   30.88 | 2.083    7.39 |  2.83    4.49
               0.667   16.51 | 1.417   19.50 | 2.167    7.39 |  2.92    4.09
               0.750   47.05 | 1.500   19.50 | 2.250    6.36 |  3.00    4.09

    Max.Eff.Inten.(mm/hr)=     191.10        78.54
              over (min)        5.00        10.00
    Storage Coeff.  (min)=      2.21 (ii)    8.75 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.30         0.12
                                                          *TOTALS*
                                                  Page 2
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    PEAK FLOW       (cms)=       0.34         0.20          0.494 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.08           1.00
    RUNOFF VOLUME    (mm)=      74.19        29.65          43.01
    TOTAL RAINFALL   (mm)=      76.19        76.19          76.19
    RUNOFF COEFFICIENT   =       0.97         0.39           0.56

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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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| CHAMBER(  0037)|  OUTFLOW: OFF,  UNDERDRAIN: OFF,  INFIL: ON
|IN= 2--> OUT= 3 |  CHAMBER:
| DT=  5.0 min   |  MAX STO VOL (cu.m.)=   94.45  Bottom Area(m2)   =  246.55
-------------------

                    DEPTH       STORAGE          |   DEPTH      STORAGE
                    (mm)        (cu.m.)          |    (mm)      (cu.m.)
                       0.00          0.00        |     381.00        56.16
                      25.00          2.50        |     406.00        60.19
                      51.00          5.01        |     432.00        64.05
                      76.00          7.51        |     457.00        67.72
                     102.00         10.02        |     483.00        71.12
                     127.00         12.52        |     508.00        74.06
                     152.00         15.03        |     533.00        76.82
                     178.00         19.90        |     559.00        79.42
                     203.00         24.72        |     584.00        81.93
                     229.00         29.47        |     610.00        84.43
                     254.00         34.16        |     635.00        86.94
                     279.00         38.76        |     660.00        89.44
                     305.00         43.27        |     686.00        91.95
                     330.00         47.68        |     711.00        94.45
                     356.00         51.99        |       0.00         0.00

                    NATIVE SOIL LAYER:
                    Infiltration (m/hr) = 0.0300

                      AREA         QPEAK            TPEAK         R.V.
                      (ha)         (cms)            (hrs)         (mm)
      INFLOW:ID= 2     2.18         0.494             1.00        43.01
    OVERFLOW:ID= 3     2.18         0.492             1.00        37.64

            Volume Reduction Rate[(RVin-RVout)/RVin](%)=       12.48
            Time to reach Max storage              (Hr)=        0.92
            Volume of water for drawdown in LID (cu.m.)=       91.31
            Volume of maximum water storage     (cu.m.)=       94.45
            Calculated Drawdown Time               (Hr)=       12.33

  --------------------------
  | Junction Command(0038) |
  --------------------------

                         AREA     QPEAK   TPEAK     R.V.
                         (ha)     (cms)    (hrs)     (mm)
  INFLOW : ID= 3(  0037)    2.18     0.49    1.00    37.64
  OUTFLOW: ID= 2(  0038)    2.18     0.49    1.00    37.64

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                                                  Page 3
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| ADD HYD  (  0031)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK      R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0038):     2.18    0.492     1.00     37.64
     + ID2= 2 (  0041):     2.73    0.187     1.50     32.61
       ================================================
       ID = 3 (  0031):     4.92    0.526     1.00     34.84

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-------------------
| CALIB             |
| STANDHYD (  0006)|   Area     (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  19.00
-------------------

                              IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=        0.02          0.04
    Dep. Storage     (mm)=        1.00          5.00
    Average Slope     (%)=        2.00          3.00
    Length            (m)=       20.66         15.00
    Mannings n           =       0.013         0.250

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

                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.20 | 0.833   47.05 | 1.583   14.00 |  2.33    6.36
               0.167    5.20 | 0.917  191.10 | 1.667   14.00 |  2.42    5.59
               0.250    6.77 | 1.000  191.10 | 1.750   10.83 |  2.50    5.59
               0.333    6.77 | 1.083   63.94 | 1.833   10.83 |  2.58    4.98
               0.417    9.66 | 1.167   63.94 | 1.917    8.79 |  2.67    4.98
               0.500    9.66 | 1.250   30.88 | 2.000    8.79 |  2.75    4.49
               0.583   16.51 | 1.333   30.88 | 2.083    7.39 |  2.83    4.49
               0.667   16.51 | 1.417   19.50 | 2.167    7.39 |  2.92    4.09
               0.750   47.05 | 1.500   19.50 | 2.250    6.36 |  3.00    4.09

    Max.Eff.Inten.(mm/hr)=     191.10       106.25
              over (min)        5.00         5.00
    Storage Coeff.  (min)=      0.62 (ii)    4.97 (ii)
    Unit Hyd. Tpeak (min)=      5.00         5.00
    Unit Hyd. peak  (cms)=      0.34         0.22
                                                          *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.01          0.018 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00           1.00
    RUNOFF VOLUME    (mm)=      75.19        35.63          43.10
    TOTAL RAINFALL   (mm)=      76.19        76.19          76.19
    RUNOFF COEFFICIENT   =       0.99         0.47           0.57

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  73.0    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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Post-Development - Controlled - 100-Year Storm

CALIB	
STANDHYD (0005)	Area (ha)= 0.23
ID= 1 DT= 5.0 min	Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	4.00	8.30
Length	(m)=	39.24	8.50
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

				TOTALS
Max.Eff.Inten.(mm/hr)=		191.10	69.97	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.74 (ii)	2.31 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.30	
PEAK FLOW	(cms)=	0.05	0.03	0.083 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	75.19	30.69	49.82
TOTAL RAINFALL	(mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT	=	0.99	0.40	0.65

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0033)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0005):	0.23	0.083	1.00	49.82
+	ID2= 2 (0006):	0.06	0.018	1.00	43.10
	ID = 3 (0033):	0.30	0.101	1.00	48.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)

Post-Development - Controlled - 100-Year Storm

1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0034):	5.21	0.626	1.00	35.61
+	ID2= 2 (0007):	0.20	0.045	1.00	43.06
	ID = 3 (0035):	5.42	0.671	1.00	35.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0001)	Area (ha)= 10.08
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.54	5.55
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	259.27	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	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

				TOTALS
Max.Eff.Inten.(mm/hr)=		191.10	51.60	
over (min)		5.00	15.00	
Storage Coeff. (min)=		3.49 (ii)	12.69 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.26	0.08	
PEAK FLOW	(cms)=	1.84	0.46	2.045 (iii)
TIME TO PEAK	(hrs)=	1.00	1.17	1.00
RUNOFF VOLUME	(mm)=	74.19	20.63	39.91
TOTAL RAINFALL	(mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT	=	0.97	0.27	0.52

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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(0027)		OVERFLOW IS OFF			
IN= 2---> OUT= 1					
DT= 5.0 min		OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)

Post-Development - Controlled - 100-Year Storm

1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0031):	4.92	0.526	1.00	34.84
+	ID2= 2 (0033):	0.30	0.101	1.00	48.36
	ID = 3 (0034):	5.21	0.626	1.00	35.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0007)	Area (ha)= 0.20
ID= 1 DT= 5.0 min	Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

				TOTALS
Max.Eff.Inten.(mm/hr)=		191.10	101.25	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.88 (ii)	6.28 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.15	
PEAK FLOW	(cms)=	0.02	0.03	0.045 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	75.19	35.04	43.06
TOTAL RAINFALL	(mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT	=	0.99	0.46	0.57

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)

Post-Development - Controlled - 100-Year Storm

0.0000	0.0000	0.0119	0.2754
0.0030	0.0202	0.0125	0.3093
0.0049	0.0422	0.0131	0.3441
0.0062	0.0660	0.0136	0.3798
0.0073	0.0916	0.0142	0.4162
0.0083	0.1190	0.0844	0.4536
0.0091	0.1482	0.2123	0.4917
0.0099	0.1787	0.2412	0.5308
0.0106	0.2101	0.7242	0.5706
0.0113	0.2423	1.5999	0.6113

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW :	ID= 2 (0001)	10.083	2.045	1.00	39.91
OUTFLOW:	ID= 1 (0027)	10.083	0.014	3.33	39.74

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.67
TIME SHIFT OF PEAK FLOW (min)=140.00
MAXIMUM STORAGE USED (ha.m.)= 0.3900

CALIB	
STANDHYD (0028)	Area (ha)= 1.20
ID= 1 DT= 5.0 min	Total Imp(%)= 24.00 Dir. Conn.(%)= 5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.29	0.91
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	89.37	31.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

				TOTALS
Max.Eff.Inten.(mm/hr)=		191.10	61.15	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.84 (ii)	9.22 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.32	0.12	
PEAK FLOW	(cms)=	0.03	0.11	0.118 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.08
RUNOFF VOLUME	(mm)=	74.19	22.48	25.06
TOTAL RAINFALL	(mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT	=	0.97	0.30	0.33

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0030)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0027):		10.08	0.014	3.33	39.74
+ ID2= 2 (0028):		1.20	0.118	1.08	25.06
ID = 3 (0030):		11.28	0.128	1.08	38.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0004)	Area	(ha)= 0.94		
ID= 1 DT= 5.0 min	Total Imp(%)=	41.00	Dir. Conn.(%)=	5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.38	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	0.70
Length	(m)=	79.04	300.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

Max.Eff.Inten.(mm/hr)=		191.10	40.71	
over (min)		5.00	50.00	
Storage Coeff. (min)=		1.39 (ii)	47.80 (ii)	
Unit Hyd. Tpeak (min)=		5.00	50.00	
Unit Hyd. peak (cms)=		0.33	0.02	
				TOTALS
PEAK FLOW	(cms)=	0.02	0.04	0.038 (iii)
TIME TO PEAK	(hrs)=	1.00	1.83	1.83
RUNOFF VOLUME	(mm)=	75.19	27.11	29.48
TOTAL RAINFALL	(mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT	=	0.99	0.36	0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0012)	Area	(ha)= 0.17		
ID= 1 DT= 5.0 min	Total Imp(%)=	70.00	Dir. Conn.(%)=	50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.05
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.80	1.00
Length	(m)=	33.47	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.20	0.833	47.05	1.583	14.00	2.33	6.36
0.167	5.20	0.917	191.10	1.667	14.00	2.42	5.59
0.250	6.77	1.000	191.10	1.750	10.83	2.50	5.59
0.333	6.77	1.083	63.94	1.833	10.83	2.58	4.98
0.417	9.66	1.167	63.94	1.917	8.79	2.67	4.98
0.500	9.66	1.250	30.88	2.000	8.79	2.75	4.49
0.583	16.51	1.333	30.88	2.083	7.39	2.83	4.49
0.667	16.51	1.417	19.50	2.167	7.39	2.92	4.09
0.750	47.05	1.500	19.50	2.250	6.36	3.00	4.09

Max.Eff.Inten.(mm/hr)=		191.10	104.26	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.09 (ii)	3.47 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.26	
				TOTALS
PEAK FLOW	(cms)=	0.04	0.02	0.060 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	75.19	27.76	51.47
TOTAL RAINFALL	(mm)=	76.19	76.19	76.19
RUNOFF COEFFICIENT	=	0.99	0.36	0.68

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)

ID1= 1 (0012):		0.17	0.060	1.00	51.47
+ ID2= 2 (0004):		0.94	0.038	1.83	29.48
ID = 3 (0040):		1.11	0.089	1.00	32.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0032)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0030):		11.28	0.128	1.08	38.18
+ ID2= 2 (0040):		1.11	0.089	1.00	32.83
ID = 3 (0032):		12.39	0.206	1.00	37.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0032):		12.39	0.206	1.00	37.70
+ ID2= 2 (0035):		5.42	0.671	1.00	35.89
ID = 3 (0025):		17.80	0.878	1.00	37.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
         V  V   I      SS   U   U  A   A  L
          VV    I    SSSSS  UUUU  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 6.2.2015\VO2\voin.dat
  Output  filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc
  Summary filename: C:\Users\ThinkPad\AppData\Local\Civica\VH5\83cd4a50-e3bc

DATE: 04-02-2024                          TIME: 04:21:57

USER:


COMMENTS: _____________________________________________________
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  ************************************************
  ** SIMULATION : 7 - 250yr - 3hr Chicago       **
  ************************************************

-------------------
| CHICAGO STORM    |    IDF curve parameters: A=3048.220
| Ptotal= 86.57 mm |                          B=  10.030
-------------------                          C=   0.888
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    5.83 |  0.83  212.89 |  1.67   12.40 |  2.50    5.57
                0.17    7.65 |  1.00   74.20 |  1.83   10.01 |  2.67    5.00
                0.33   11.03 |  1.17   35.98 |  2.00    8.37 |  2.83    4.54
                0.50   19.09 |  1.33   22.61 |  2.17    7.17 |
                0.67   54.67 |  1.50   16.13 |  2.33    6.27 |


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-------------------
| CALIB             |
| NASHYD   (  0041)|   Area     (ha)=   2.73   Curve Number   (CN)= 76.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.20   # of Linear Res.(N)= 3.00
                                                                  Page 1
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-------------------   U.H. Tp(hrs)=   0.48

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


                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.83 | 0.833   54.67 | 1.583   16.13 |  2.33    7.17
                0.167   5.83 | 0.917  212.89 | 1.667   16.13 |  2.42    6.27
                0.250   7.65 | 1.000  212.89 | 1.750   12.40 |  2.50    6.27
                0.333   7.65 | 1.083   74.20 | 1.833   12.40 |  2.58    5.57
                0.417  11.03 | 1.167   74.20 | 1.917   10.01 |  2.67    5.57
                0.500  11.03 | 1.250   35.98 | 2.000   10.01 |  2.75    5.00
                0.583  19.09 | 1.333   35.98 | 2.083    8.37 |  2.83    5.00
                0.667  19.09 | 1.417   22.61 | 2.167    8.37 |  2.92    4.54
                0.750  54.67 | 1.500   22.61 | 2.250    7.17 |  3.00    4.54

    Unit Hyd Qpeak  (cms)=   0.219

    PEAK FLOW       (cms)=   0.233 (i)
    TIME TO PEAK    (hrs)=   1.500
    RUNOFF VOLUME    (mm)=  40.222
    TOTAL RAINFALL   (mm)=  86.569
    RUNOFF COEFFICIENT   =   0.465

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

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-------------------
| CALIB             |
| STANDHYD (  0029)|   Area     (ha)=   2.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  40.00   Dir. Conn.(%)=  30.00
-------------------

                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.87         1.31
    Dep. Storage     (mm)=       2.00         5.00
    Average Slope     (%)=       1.00         2.00
    Length            (m)=     120.64        30.00
    Mannings n           =      0.013        0.250

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


                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.83 | 0.833   54.67 | 1.583   16.13 |  2.33    7.17
                0.167   5.83 | 0.917  212.89 | 1.667   16.13 |  2.42    6.27
                0.250   7.65 | 1.000  212.89 | 1.750   12.40 |  2.50    6.27
                0.333   7.65 | 1.083   74.20 | 1.833   12.40 |  2.58    5.57
                0.417  11.03 | 1.167   74.20 | 1.917   10.01 |  2.67    5.57
                0.500  11.03 | 1.250   35.98 | 2.000   10.01 |  2.75    5.00
                0.583  19.09 | 1.333   35.98 | 2.083    8.37 |  2.83    5.00
                0.667  19.09 | 1.417   22.61 | 2.167    8.37 |  2.92    4.54
                0.750  54.67 | 1.500   22.61 | 2.250    7.17 |  3.00    4.54

    Max.Eff.Inten.(mm/hr)=     212.89        96.66
              over (min)        5.00        10.00
    Storage Coeff.  (min)=      2.11 (ii)    8.13 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.31         0.13
                                                          *TOTALS*
                                  Page 2
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    PEAK FLOW       (cms)=       0.38         0.25          0.578 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.08          1.00
    RUNOFF VOLUME    (mm)=      84.57        36.65         51.02
    TOTAL RAINFALL   (mm)=      86.57        86.57         86.57
    RUNOFF COEFFICIENT   =       0.98         0.42          0.59

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  68.0    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.

-------------------------------------------------------------------------------
-------------------
| CHAMBER(  0037)|  OUTFLOW: OFF,  UNDERDRAIN: OFF,  INFIL: ON
|IN= 2--> OUT= 3 |  CHAMBER:
| DT=  5.0 min   |  MAX STO VOL (cu.m.)=   94.45  Bottom Area(m2)   =  246.55
-------------------

                     DEPTH       STORAGE          |   DEPTH      STORAGE
                     (mm)        (cu.m.)          |    (mm)      (cu.m.)
                        0.00          0.00         |    381.00        56.16
                       25.00          2.50         |    406.00        60.19
                       51.00          5.01         |    432.00        64.05
                       76.00          7.51         |    457.00        67.72
                      102.00         10.02         |    483.00        71.12
                      127.00         12.52         |    508.00        74.06
                      152.00         15.03         |    533.00        76.82
                      178.00         19.90         |    559.00        79.42
                      203.00         24.72         |    584.00        81.93
                      229.00         29.47         |    610.00        84.43
                      254.00         34.16         |    635.00        86.94
                      279.00         38.76         |    660.00        89.44
                      305.00         43.27         |    686.00        91.95
                      330.00         47.68         |    711.00        94.45
                      356.00         51.99         |      0.00         0.00

                    NATIVE SOIL LAYER:
                    Infiltration (m/hr) = 0.0300

                       AREA         QPEAK            TPEAK         R.V.
                       (ha)         (cms)            (hrs)         (mm)
      INFLOW:ID= 2     2.18         0.578             1.00        51.02
    OVERFLOW:ID= 3     2.18         0.576             1.00        45.63

              Volume Reduction Rate[(RVin-RVout)/RVin](%)=       10.57
              Time to reach Max storage              (Hr)=        0.92
              Volume of water for drawdown in LID (cu.m.)=       91.87
              Volume of maximum water storage     (cu.m.)=       94.45
              Calculated Drawdown Time               (Hr)=       12.42

  --------------------------
  | Junction Command(0038) |
  --------------------------

                           AREA     QPEAK   TPEAK     R.V.
                           (ha)     (cms)    (hrs)     (mm)
  INFLOW : ID= 3(  0037)    2.18     0.58     1.00    45.63
  OUTFLOW: ID= 2(  0038)    2.18     0.58     1.00    45.63

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| ADD HYD  (  0031)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0038):     2.18    0.576     1.00    45.63
     + ID2= 2 (  0041):     2.73    0.233     1.50    40.22
       ==========================================================
       ID = 3 (  0031):     4.92    0.620     1.00    42.62

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB             |
| STANDHYD (  0006)|   Area     (ha)=   0.06
|ID= 1 DT= 5.0 min |   Total Imp(%)=  36.00   Dir. Conn.(%)=  19.00
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                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.02         0.04
    Dep. Storage     (mm)=       1.00         5.00
    Average Slope     (%)=       2.00         3.00
    Length            (m)=      20.66        15.00
    Mannings n           =      0.013        0.250

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


                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   5.83 | 0.833   54.67 | 1.583   16.13 |  2.33    7.17
                0.167   5.83 | 0.917  212.89 | 1.667   16.13 |  2.42    6.27
                0.250   7.65 | 1.000  212.89 | 1.750   12.40 |  2.50    6.27
                0.333   7.65 | 1.083   74.20 | 1.833   12.40 |  2.58    5.57
                0.417  11.03 | 1.167   74.20 | 1.917   10.01 |  2.67    5.57
                0.500  11.03 | 1.250   35.98 | 2.000   10.01 |  2.75    5.00
                0.583  19.09 | 1.333   35.98 | 2.083    8.37 |  2.83    5.00
                0.667  19.09 | 1.417   22.61 | 2.167    8.37 |  2.92    4.54
                0.750  54.67 | 1.500   22.61 | 2.250    7.17 |  3.00    4.54

    Max.Eff.Inten.(mm/hr)=     212.89       129.17
              over (min)        5.00         5.00
    Storage Coeff.  (min)=      0.60 (ii)    4.76 (ii)
    Unit Hyd. Tpeak (min)=      5.00         5.00
    Unit Hyd. peak  (cms)=      0.34         0.22
                                                          *TOTALS*
    PEAK FLOW       (cms)=       0.01         0.01          0.021 (iii)
    TIME TO PEAK    (hrs)=       1.00         1.00          1.00
    RUNOFF VOLUME    (mm)=      85.57        43.52         51.46
    TOTAL RAINFALL   (mm)=      86.57        86.57         86.57
    RUNOFF COEFFICIENT   =       0.99         0.50          0.59

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  73.0    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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Post-Development - Controlled - 250-Year Storm

CALIB	
STANDHYD (0005)	Area (ha)= 0.23
ID= 1 DT= 5.0 min	Total Imp(%)= 43.00 Dir. Conn.(%)= 43.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.10	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	4.00	8.30
Length	(m)=	39.24	8.50
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

				TOTALS
Max.Eff.Inten.(mm/hr)=		212.89	86.19	
over (min)		5.00	5.00	
Storage Coeff. (min)=		0.71 (ii)	2.22 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.30	
PEAK FLOW	(cms)=	0.06	0.04	0.095 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	85.57	37.91	58.40
TOTAL RAINFALL	(mm)=	86.57	86.57	86.57
RUNOFF COEFFICIENT	=	0.99	0.44	0.67

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0033)
1 + 2 = 3

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0005):		0.23	0.095	1.00	58.40
+ ID2= 2 (0006):		0.06	0.021	1.00	51.46
ID = 3 (0033):		0.30	0.117	1.00	56.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0034)

Post-Development - Controlled - 250-Year Storm

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	5.21	0.737	1.00	43.43
+ ID2= 2 (0007):	0.20	0.054	1.00	51.38
ID = 3 (0035):	5.42	0.791	1.00	43.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0001)	Area (ha)= 10.08
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00 Dir. Conn.(%)= 36.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.54	5.55
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	259.27	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	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

				TOTALS
Max.Eff.Inten.(mm/hr)=		212.89	64.49	
over (min)		5.00	15.00	
Storage Coeff. (min)=		3.34 (ii)	11.76 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.26	0.09	
PEAK FLOW	(cms)=	2.07	0.60	2.336 (iii)
TIME TO PEAK	(hrs)=	1.00	1.17	1.00
RUNOFF VOLUME	(mm)=	84.57	25.95	47.05
TOTAL RAINFALL	(mm)=	86.57	86.57	86.57
RUNOFF COEFFICIENT	=	0.98	0.30	0.54

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 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(0027)	OVERFLOW IS OFF
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)

Post-Development - Controlled - 250-Year Storm

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0027):	4.92	0.620	1.00	42.62
+ ID2= 2 (0033):	0.30	0.117	1.00	56.90
ID = 3 (0034):	5.21	0.737	1.00	43.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0007)	Area (ha)= 0.20
ID= 1 DT= 5.0 min	Total Imp(%)= 35.00 Dir. Conn.(%)= 20.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.07	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.70
Length	(m)=	36.88	30.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

				TOTALS
Max.Eff.Inten.(mm/hr)=		212.89	123.28	
over (min)		5.00	10.00	
Storage Coeff. (min)=		0.84 (ii)	5.83 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.15	
PEAK FLOW	(cms)=	0.02	0.04	0.054 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	85.57	42.86	51.38
TOTAL RAINFALL	(mm)=	86.57	86.57	86.57
RUNOFF COEFFICIENT	=	0.99	0.50	0.59

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 73.0 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 (0035)

Post-Development - Controlled - 250-Year Storm

0.0000	0.0000	0.0119	0.2754
0.0030	0.0202	0.0125	0.3093
0.0049	0.0422	0.0131	0.3441
0.0062	0.0660	0.0136	0.3798
0.0073	0.0916	0.0142	0.4162
0.0083	0.1190	0.0844	0.4536
0.0091	0.1482	0.2123	0.4917
0.0099	0.1787	0.2412	0.5308
0.0106	0.2101	0.7242	0.5706
0.0113	0.2423	1.5999	0.6113

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	10.083	2.336	1.00	47.05
OUTFLOW: ID= 1 (0027)	10.083	0.070	3.08	46.82

PEAK FLOW REDUCTION [Qout/Qin](%)= 2.99
TIME SHIFT OF PEAK FLOW (min)=125.00
MAXIMUM STORAGE USED (ha.m.)= 0.4461

CALIB	
STANDHYD (0028)	Area (ha)= 1.20
ID= 1 DT= 5.0 min	Total Imp(%)= 24.00 Dir. Conn.(%)= 5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.29	0.91
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	89.37	31.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

				TOTALS
Max.Eff.Inten.(mm/hr)=		212.89	76.10	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.77 (ii)	8.52 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.32	0.12	
PEAK FLOW	(cms)=	0.04	0.14	0.151 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.08
RUNOFF VOLUME	(mm)=	84.57	28.15	30.96
TOTAL RAINFALL	(mm)=	86.57	86.57	86.57
RUNOFF COEFFICIENT	=	0.98	0.33	0.36

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

Post-Development - Controlled - 250-Year Storm
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0030)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0027):		10.08	0.070	3.08	46.82
+ ID2= 2 (0028):		1.20	0.151	1.08	30.96
ID = 3 (0030):		11.28	0.161	1.08	45.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0004)	Area	(ha)= 0.94		
ID= 1 DT= 5.0 min	Total Imp(%)=	41.00	Dir. Conn.(%)=	5.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.38	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	0.70
Length	(m)=	79.04	300.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

Max.Eff.Inten.(mm/hr)=		212.89	59.19	
over (min)		5.00	45.00	
Storage Coeff. (min)=		1.33 (ii)	41.29 (ii)	
Unit Hyd. Tpeak (min)=		5.00	45.00	
Unit Hyd. peak (cms)=		0.33	0.03	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.05	0.052 (iii)
TIME TO PEAK	(hrs)=	1.00	1.75	1.67
RUNOFF VOLUME	(mm)=	85.57	33.59	36.16
TOTAL RAINFALL	(mm)=	86.57	86.57	86.57
RUNOFF COEFFICIENT	=	0.99	0.39	0.42

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

Post-Development - Controlled - 250-Year Storm
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0012)	Area	(ha)= 0.17		
ID= 1 DT= 5.0 min	Total Imp(%)=	70.00	Dir. Conn.(%)=	50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.05
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	0.80	1.00
Length	(m)=	33.47	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.83	0.833	54.67	1.583	16.13	2.33	7.17
0.167	5.83	0.917	212.89	1.667	16.13	2.42	6.27
0.250	7.65	1.000	212.89	1.750	12.40	2.50	6.27
0.333	7.65	1.083	74.20	1.833	12.40	2.58	5.57
0.417	11.03	1.167	74.20	1.917	10.01	2.67	5.57
0.500	11.03	1.250	35.98	2.000	10.01	2.75	5.00
0.583	19.09	1.333	35.98	2.083	8.37	2.83	5.00
0.667	19.09	1.417	22.61	2.167	8.37	2.92	4.54
0.750	54.67	1.500	22.61	2.250	7.17	3.00	4.54

Max.Eff.Inten.(mm/hr)=		212.89	128.14	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.05 (ii)	3.33 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.34	0.26	
				TOTALS
PEAK FLOW	(cms)=	0.05	0.02	0.069 (iii)
TIME TO PEAK	(hrs)=	1.00	1.00	1.00
RUNOFF VOLUME	(mm)=	85.57	34.35	59.95
TOTAL RAINFALL	(mm)=	86.57	86.57	86.57
RUNOFF COEFFICIENT	=	0.99	0.40	0.69

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 56.0 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 (0040)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)

Post-Development - Controlled - 250-Year Storm

ID1= 1 (0012):		0.17	0.069	1.00	59.95
+ ID2= 2 (0004):		0.94	0.052	1.67	36.16
ID = 3 (0040):		1.11	0.102	1.00	39.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0032)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0030):		11.28	0.161	1.08	45.13
+ ID2= 2 (0040):		1.11	0.102	1.00	39.78
ID = 3 (0032):		12.39	0.249	1.00	44.65

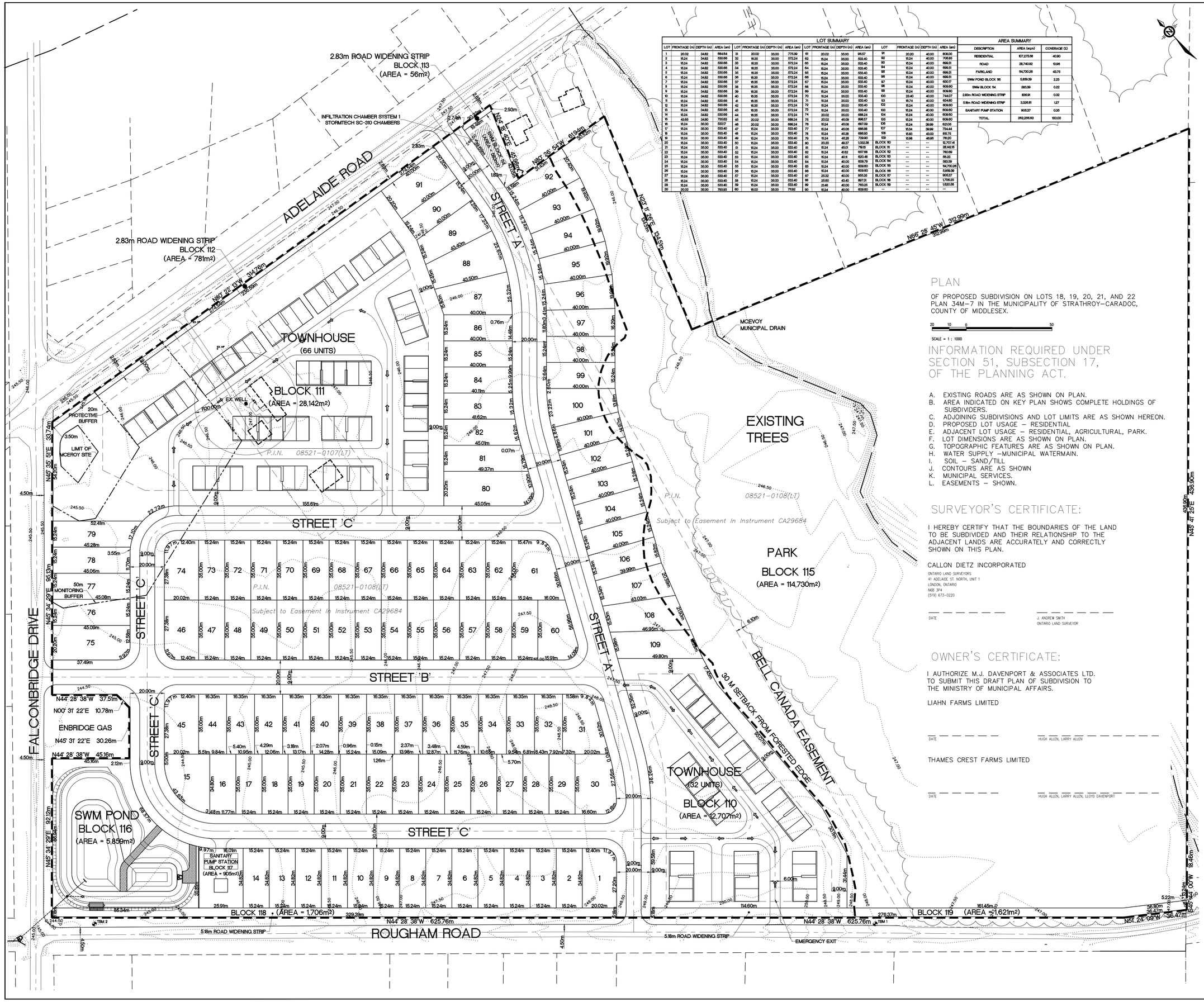
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0032):		12.39	0.249	1.00	44.65
+ ID2= 2 (0035):		5.42	0.791	1.00	43.73
ID = 3 (0025):		17.80	1.040	1.00	44.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

APPENDIX V

ENGINEERING DESIGN DRAWINGS



LOT SUMMARY

LOT	FRONTAGE (m)	DEPTH (m)	AREA (m²)
1	20.02	34.82	694.64
2	15.24	34.82	530.66
3	15.24	34.82	530.66
4	15.24	34.82	530.66
5	15.24	34.82	530.66
6	15.24	34.82	530.66
7	15.24	34.82	530.66
8	15.24	34.82	530.66
9	15.24	34.82	530.66
10	15.24	34.82	530.66
11	15.24	34.82	530.66
12	15.24	34.82	530.66
13	15.24	34.82	530.66
14	15.24	34.82	530.66
15	43.65	34.80	756.63
16	15.24	35.00	533.17
17	15.24	35.00	533.40
18	15.24	35.00	533.40
19	15.24	35.00	533.40
20	15.24	35.00	533.40
21	15.24	35.00	533.40
22	15.24	35.00	533.40
23	15.24	35.00	533.40
24	15.24	35.00	533.40
25	15.24	35.00	533.40
26	15.24	35.00	533.40
27	15.24	35.00	533.40
28	15.24	35.00	533.40
29	15.24	35.00	533.40
30	20.02	35.00	792.93
31	20.02	35.00	779.39
32	16.35	35.00	572.24
33	16.35	35.00	572.24
34	16.35	35.00	572.24
35	16.35	35.00	572.24
36	16.35	35.00	572.24
37	16.35	35.00	572.24
38	16.35	35.00	572.24
39	16.35	35.00	572.24
40	16.35	35.00	572.24
41	16.35	35.00	572.24
42	16.35	35.00	572.24
43	16.35	35.00	572.24
44	16.35	35.00	572.24
45	20.02	35.00	688.24
46	20.02	35.00	688.24
47	15.24	35.00	533.40
48	15.24	35.00	533.40
49	15.24	35.00	533.40
50	15.24	35.00	533.40
51	15.24	35.00	533.40
52	15.24	35.00	533.40
53	15.24	35.00	533.40
54	15.24	35.00	533.40
55	15.24	35.00	533.40
56	15.24	35.00	533.40
57	15.24	35.00	533.40
58	15.24	35.00	533.40
59	15.24	35.00	533.40
60	16.00	35.00	719.92
61	20.02	35.00	915.07
62	15.24	35.00	533.40
63	15.24	35.00	533.40
64	15.24	35.00	533.40
65	15.24	35.00	533.40
66	15.24	35.00	533.40
67	15.24	35.00	533.40
68	15.24	35.00	533.40
69	15.24	35.00	533.40
70	15.24	35.00	533.40
71	15.24	35.00	533.40
72	15.24	35.00	533.40
73	15.24	35.00	533.40
74	20.02	35.00	688.24
75	20.02	45.09	898.57
76	15.24	45.08	687.09
77	15.24	45.06	686.88
78	15.24	45.28	686.93
79	15.24	45.28	729.90
80	20.20	48.37	1,092.38
81	15.24	45.61	719.15
82	15.24	41.62	657.68
83	15.24	40.8	620.46
84	15.24	40.11	609.79
85	15.24	40.00	609.60
86	15.24	40.00	609.60
87	25.32	40.00	855.35
88	25.60	43.40	997.21
89	21.46	40.00	765.25
90	15.24	40.00	609.60
91	20.20	40.00	808.00
92	15.24	40.00	705.85
93	15.24	40.00	699.81
94	15.24	40.00	699.81
95	15.24	40.00	699.81
96	15.24	40.00	699.81
97	15.24	40.00	609.17
98	15.24	40.00	609.60
99	15.24	40.00	609.60
100	20.40	40.00	744.07
101	15.74	40.00	634.62
102	15.24	40.00	609.60
103	15.24	40.00	609.60
104	15.24	40.00	609.60
105	15.24	40.00	609.60
106	39.99	39.99	734.44
107	15.34	39.99	734.44
108	15.83	43.03	815.75
109	15.98	49.80	781.20
BLOCK 110	--	--	12,707.41
BLOCK 111	--	--	28,142.51
BLOCK 112	--	--	780.69
BLOCK 113	--	--	56.23
BLOCK 114	--	--	583.39
BLOCK 115	--	--	114,730.28
BLOCK 116	--	--	5,859.39
BLOCK 117	--	--	905.37
BLOCK 118	--	--	1,706.25
BLOCK 119	--	--	1,620.56

AREA SUMMARY

DESCRIPTION	AREA (sq.m)	COVERAGE (%)
RESIDENTIAL	107,273.58	40.90
ROAD	28,740.92	10.96
PARKLAND	114,730.26	43.75
SWM POND BLOCK 116	5,859.39	2.23
SWM BLOCK 114	583.39	0.22
2.83m ROAD WIDENING STRIP	836.91	0.32
5.18m ROAD WIDENING STRIP	3,326.81	1.27
SANITARY PUMP STATION	905.37	0.35
TOTAL	262,256.63	100.00

PLAN

OF PROPOSED SUBDIVISION ON LOTS 18, 19, 20, 21, AND 22 PLAN 34M-7 IN THE MUNICIPALITY OF STRATHROY-CARADOC, COUNTY OF MIDDLESEX.

SCALE = 1 : 1000

INFORMATION REQUIRED UNDER SECTION 51, SUBSECTION 17, OF THE PLANNING ACT.

A. EXISTING ROADS ARE AS SHOWN ON PLAN.
B. AREA INDICATED ON KEY PLAN SHOWS COMPLETE HOLDINGS OF SUBDIVIDERS.
C. ADJOINING SUBDIVISIONS AND LOT LIMITS ARE AS SHOWN HEREON.
D. PROPOSED LOT USAGE – RESIDENTIAL
E. ADJACENT LOT USAGE – RESIDENTIAL, AGRICULTURAL, PARK.
F. LOT DIMENSIONS ARE AS SHOWN ON PLAN.
G. TOPOGRAPHIC FEATURES ARE AS SHOWN ON PLAN.
H. WATER SUPPLY –MUNICIPAL WATERMAIN.
I. SOIL – SAND/TILL.
J. CONTOURS ARE AS SHOWN
K. MUNICIPAL SERVICES.
L. EASEMENTS – SHOWN.

SURVEYOR'S CERTIFICATE:

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN ON THIS PLAN.

CALLON DIETZ INCORPORATED
ONTARIO LAND SURVEYORS
41 ADELAIDE ST. NORTH, UNIT 1
LONDON, ONTARIO
N6B 3P4
(519) 673-0220

DATE _____ J. ANDREW SMITH, ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE:

I AUTHORIZE M.J. DAVENPORT & ASSOCIATES LTD. TO SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE MINISTRY OF MUNICIPAL AFFAIRS.

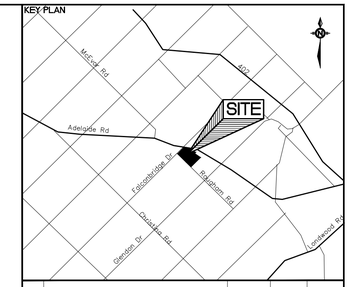
LIAHN FARMS LIMITED

DATE _____ HUGH ALLEN, LARRY ALLEN

THAMES CREST FARMS LIMITED

DATE _____ HUGH ALLEN, LARRY ALLEN, LLOYD DAVENPORT

KEY PLAN



NO.	REVISIONS	DATE	BY	APP'D
1.	REVISED PER SPRIET COMMENT (10/25/21)	02/04/24	JC	MJD

BENCHMARKS

BM 1 (U.T.M.) ELEV. 244.141

MOUNT_BRYDGES ONE STOREY BROWN INSULBRICK HOUSE (OWNED BY J. SCOTT) ON THE EAST SIDE OF HWY 81, 2.7 KM NO RTH OF THE COMMUNITY HALL IN THE HAMLET OF MOUNT BRYDGES, 0.3KM NORTH OF THE CNR TRACKS (CARADOC) AND 19.5 M EAST OF CENTERLINE OF PAVEMENT. TABLET IS SET HORIZONTALLY IN THE WEST FACE OF CONCRETE FOUNATION, 1.55 M NORTH OF THE S.W. CORNER AND 24 CM BELOW SIDING.

STATION: 00819678045

LEGEND

- PROPERTY LIMIT
- PHASE LIMIT
- NEW SANITARY SEWER
- NEW STORM SEWER
- NEW WATERMAIN
- PROPOSED DRAINAGE
- 100.00 PROPOSED LOT CORNER ELEVATION
- X 100.00 PROPOSED ELEVATION AT HOUSE
- 100.00 PROPOSED SWALE ELEVATION
- EXISTING DRAINAGE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATERMAIN
- 100.00 EXISTING LOT CORNER ELEVATION
- •100.00 EXISTING ELEVATION TO REMAIN THE SAME

M.J. DAVENPORT
& ASSOCIATES LIMITED
2010 KEENE ROAD, OTONABEE, ONTARIO K9J 6X7
TEL.: (705) 745-6676
FAX: (705) 745-7326

ADELAIDE ROAD SUBDIVISION

22805 ADELAIDE ROAD, MT BRYDGES
TOWNSHIP OF STRATHROY-CARADOC
COUNTY OF MIDDLESEX

SITE PLAN

DESIGNED BY: M.J. DAVENPORT	SCALE: 1 : 1000
DRAWN BY: J. ZHOU	
DATE: APRIL, 2018	DRWG. NO.: 5463-DP
PROJECT NO.: 17-D-5463	

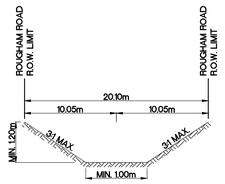
NOTES:

1. PROPOSED OVERFLOW WEIR TO BE CONSTRUCTED AS AN EARTH BERM USING NATIVE TILL AND REINFORCED WITH PERMANENT TURF REINFORCEMENT NILEX P300 OR APPROVED EQUIVALENT. NO TOPSOIL SHALL BE PLACED IN THE OVERFLOW WEIR. MAX. 3:1 SIDE SLOPES. WEIR TO TOE OF SLOPE TO BE REINFORCED WITH ONE LAYER OF 150mm RIP RAP UNDERLAID WITH TERRAFIX 200W FILTER CLOTH.

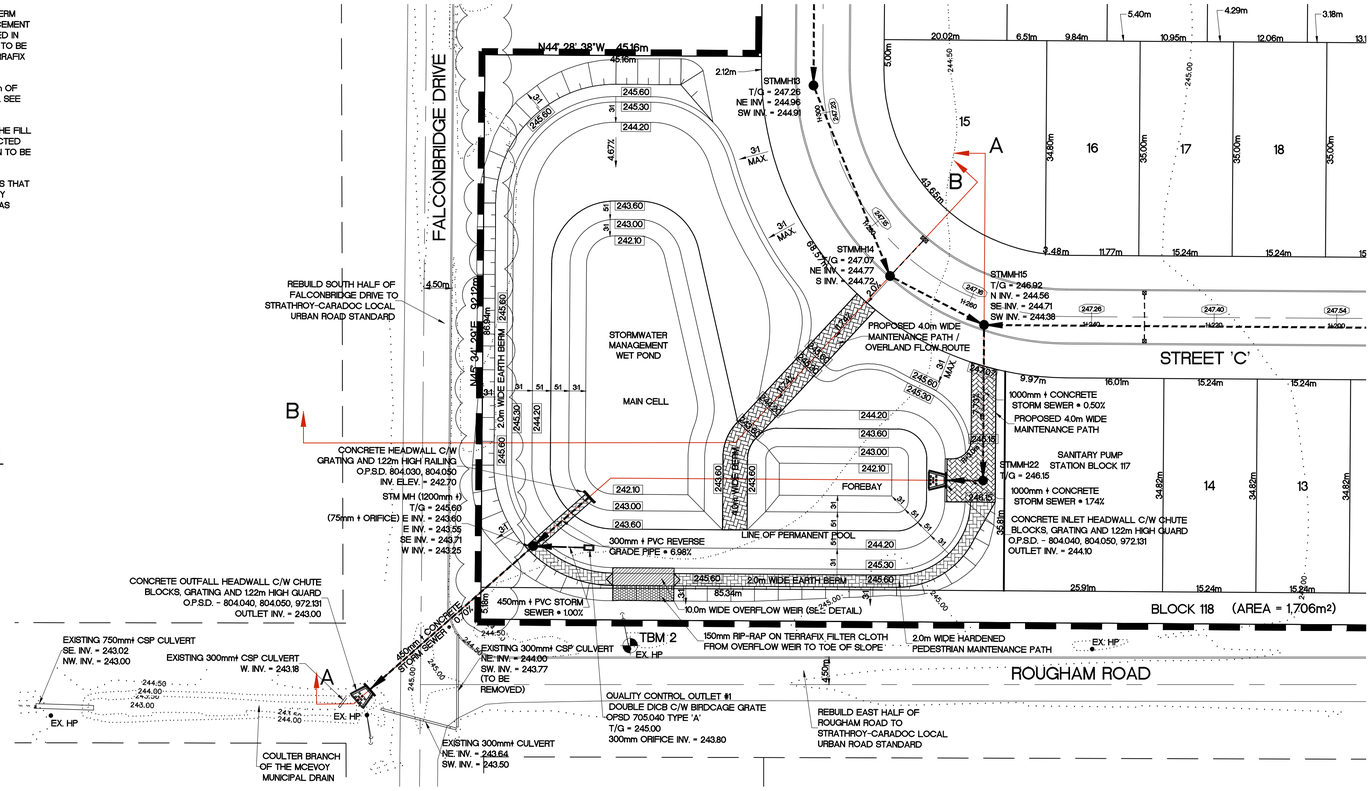
2. ALL BERMS AND SIDE SLOPES SHALL BE TOP DRESSED WITH 150mm OF TOPSOIL AND SEEDED, WITH THE EXCEPTION OF THE OVERFLOW WEIR. SEE LANDSCAPE ARCHITECT DRAWINGS FOR GRASS SPECIES.

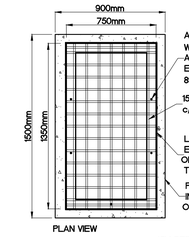
3. WHERE FILL IS REQUIRED FOR THE CONSTRUCTION OF THE BERM, THE FILL SHALL BE PLACED IN 300mm LIFTS AND EACH LIFT SHALL BE COMPACTED TO 95% STANDARD PROCTOR MAX. DRY DENSITY. BERM CONSTRUCTION TO BE REVIEWED AND APPROVED BY A GEOTECHNICAL ENGINEER.

4. THE GEOTECHNICAL REPORT PREPARED BY GEO-LOGIC INC. ADVISES THAT SUITABLE SOIL EXISTS ON-SITE WITH SUFFICIENTLY HIGH SILT AND CLAY CONTENT TO CREATE BERMS WITH HYDRAULIC PERMEABILITY AS LOW AS 10^{-5} cm/sec.

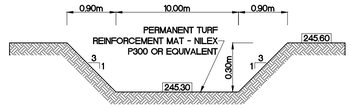


PROPOSED COULTER BRANCH DRAIN SECTION
N.T.S.

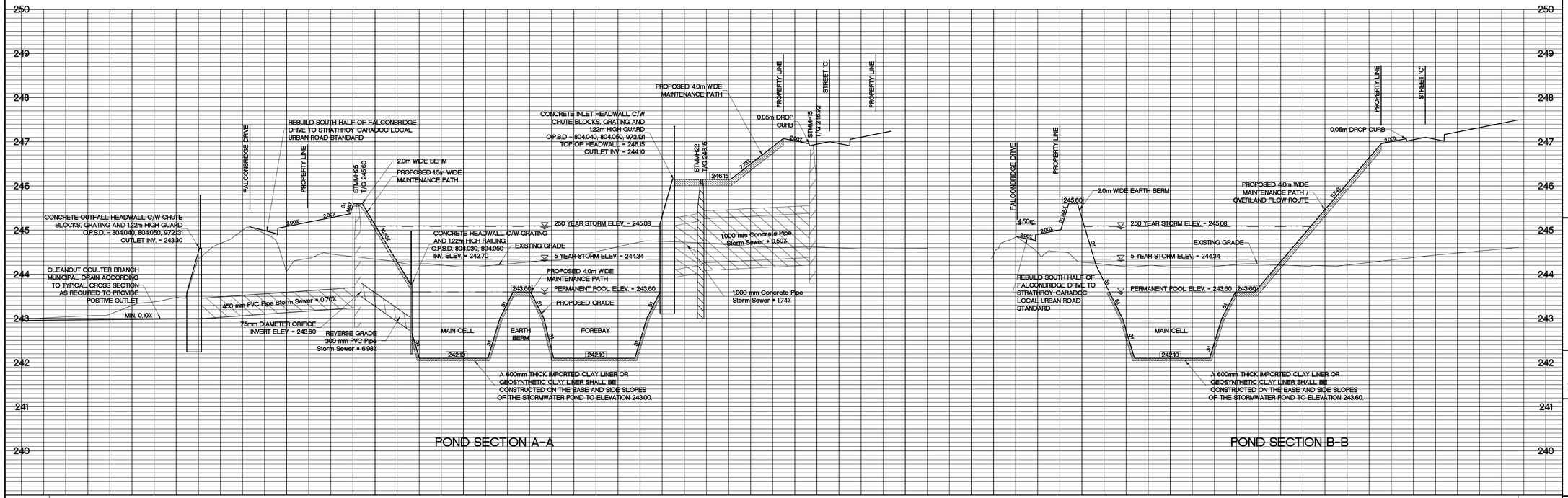




PRECAST DOUBLE DITCH INLET CATCHBASIN BIRD CAGE GRATE DETAIL
SCALE: 1 : 25



PROPOSED OVERFLOW WEIR (SECTION)
N.T.S.



PROPOSED ROAD GRADE /EXISTING GRADE	243.10	244.33	244.07	245.12 244.34	242.10 244.16	242.28 244.32	242.50 244.73	246.15 244.67	246.94 244.62	244.58	244.43	245.27 244.27	242.10 244.16	247.70 244.23	246.05 244.21	247.06 244.43	PROPOSED ROAD GRADE /EXISTING GRADE
PROPOSED STORM SEWER		E 243.00	35.53m - 450 mm PVC Pipe Storm Sewer @ 0.70%	E 243.55 SE 243.71 W 243.25	12.17m - 300 mm PVC Pipe Storm Sewer @ 6.98% W 242.70		6.05m - 1.000 mm Concrete Pipe Storm Sewer @ 1.74% SE 244.10	NE 244.26 NW 244.21	25.38m - 1.000 mm Concrete Pipe Storm Sewer @ 0.50% N 244.56 SE 244.71 SW 244.38								PROPOSED STORM SEWER
CHAINAGE	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+020	0+040	0+060	0+080	0+100	0+120	CHAINAGE

NO.	REVISIONS	DATE	BY	APP'D
1.	REVISED PER SPRIET COMMENT (10/25/21)	02/04/24	JC	MJD

BENCHMARKS

BM 1 (U.T.M.) ELEV. 244.881 (CGVD - 28 : 78)

TOWNSHIP: MOUNT...BRYDGES FROM JCT OF HWY #81 AND MIDDLESEX RD 14 IN THE TOWN OF MOUNT BRYDGES, DRIVE W ON HWY #81 FO R 185 KM, TURN RIGHT JUST BEFORE A LARGE OVERPASS OVER RAILWAY TRACKS (THIS IS OLD HWY #81) DRIVE 0.35 KM ON OLD HWY TO THE END OF PAVEMENT. MKD BY BR CAP SET ON IRON PIPE AND BETWEEN TRACKS AND PAVEMENT. NEAR CARADOC RAILWAY STATION. 2.1 KM N OF COMMUNITY HALL AND 10.7 M SE OF R AILWAY TRACKS. AN ORANGE CYL WITNESS SIGN WAS SET 7.76 M AWAY AT A MAG BRG OF 262 DEG TO THE STA.

STATION: 0011933U2123

TBM 1 ELEV. 248.16

NAIL SET ON NORTHEAST FACE OF EXISTING HP, ABOUT 0.20m ABOVE GRADE, OPPOSITE TO #22931 ROUGHAM ROAD.

TBM 2 ELEV. 245.07

NAIL SET ON NORTHEAST FACE OF EXISTING HP, ABOUT 0.20m ABOVE GRADE, OPPOSITE TO #23019 ROUGHAM ROAD.

LEGEND

- PROPERTY LIMIT
- PHASE LIMIT
- NEW SANITARY SEWER
- NEW STORM SEWER
- NEW WATERMAIN
- PROPOSED DRAINAGE
- 100.00 PROPOSED LOT CORNER ELEVATION
- 100.00 PROPOSED ELEVATION AT HOUSE
- 100.00 PROPOSED SWALE ELEVATION
- EXISTING DRAINAGE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATERMAIN
- 100.00 EXISTING LOT CORNER ELEVATION
- •100.00 EXISTING ELEVATION TO REMAIN THE SAME

LICENSED PROFESSIONAL ENGINEER J. D. CLARK 100226373 APR. 5, 2024 PROVINCE OF ONTARIO

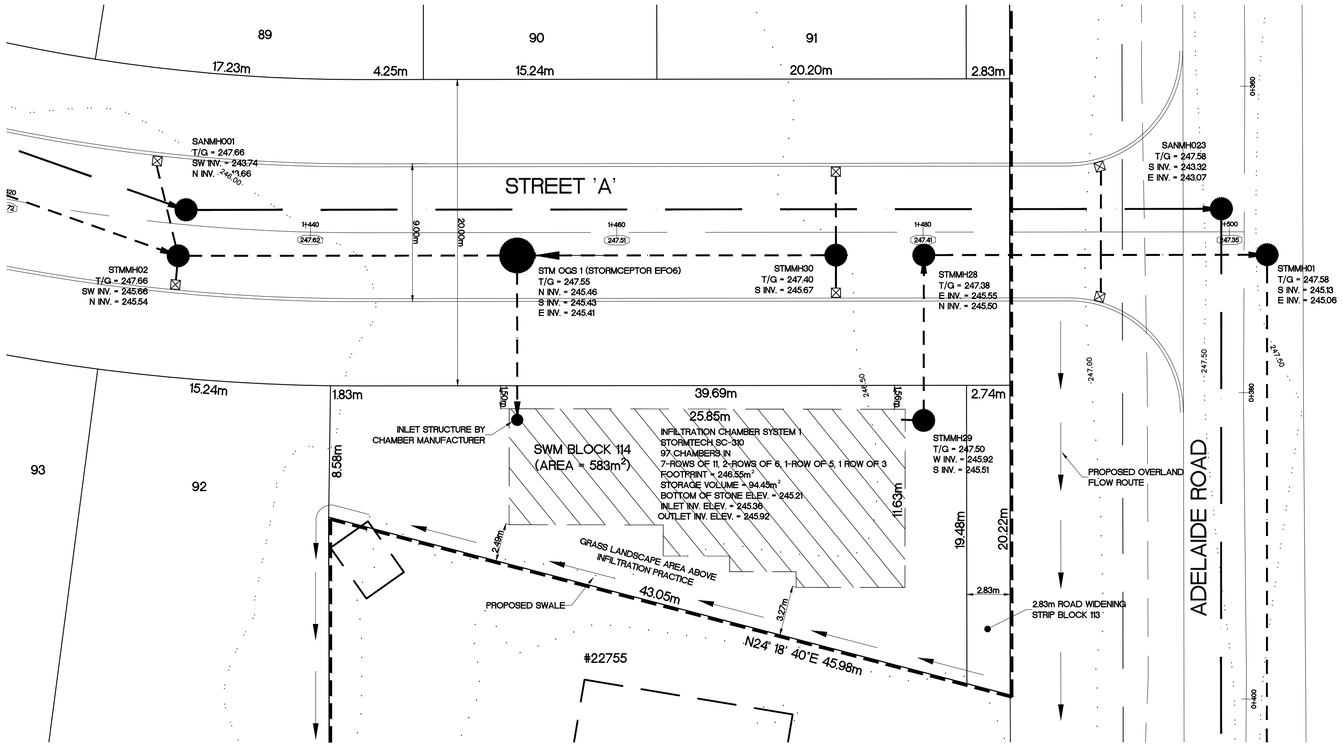
M.J. DAVENPORT
& ASSOCIATES LIMITED
2010 KEENE ROAD, OTONABEE, ONTARIO K9J 6X7
TEL. : (705) 745-6676
FAX : (705) 745-7326

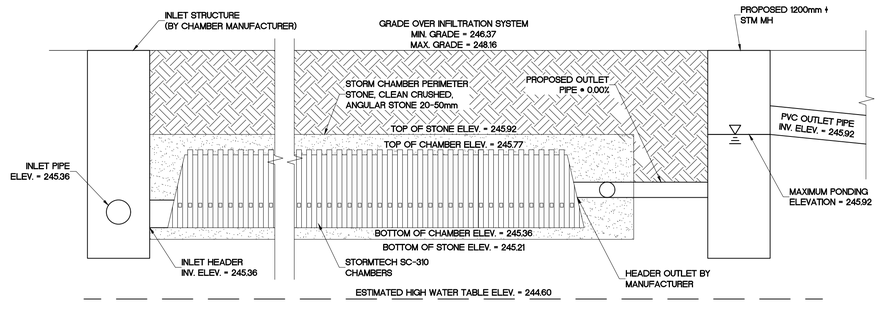
ADELAIDE ROAD SUBDIVISION

22805 ADELAIDE ROAD, MT BRYDGES
TOWNSHIP OF STRATHROY-CARADOC
COUNTY OF MIDDLESEX

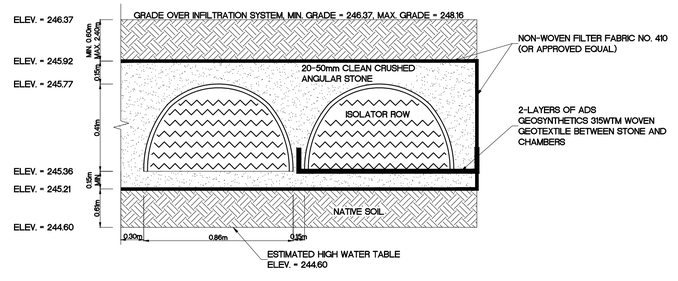
STORMWATER MANAGEMENT POND PLAN AND SECTIONS

DESIGNED BY: M. J. DAVENPORT	SCALE: HORIZ. 1 : 500, VERT. 1 : 50
DRAWN BY: J. ZHOU	
DATE: MARCH, 2021	DRWG. NO.: 5463-19
PROJECT NO.: 17-D-5463	

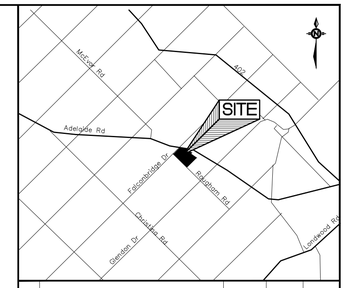




INFILTRATION CHAMBER SYSTEM SECTION
N.T.S.



STORMTECH SC-310 SYSTEM
N.T.S.



NO.	REVISIONS	DATE	BY	APP'D

BENCHMARKS

BM 1 (U.T.M.) ELEV. 244.881 (CGVD - 28 - 78)

TOWNSHIP: MOUNT_BRYDGES FROM JCT OF HWY #81 AND MIDDLESEX RD 14 IN THE TOWN OF MOUNT BRYDGES, DRIVE W ON HWY #81 FO R 1.85 KM, TURN RIGHT JUST BEFORE A LARGE OVERPASS OVER RAILWAY TRACKS (THIS IS OLD HWY #81) DRIVE 0.35 KM ON OLD HWY TO THE END OF PAVEMENT. MKD BY BR CAP SET ON IRON PIPE AND BETWEEN TRACKS AND PAVEMENT. NEAR CARADOC RAILWAY STATION, 2.1 KM N OF COMMUNITY HALL, AND 10.7 M SE OF R AILWAY TRACKS, AN ORANGE CYL WITNESS SIGN WAS SET 7.76 M AWAY AT A MAG BRG OF 262 DEG TO THE STA.

STATION: 0011933U2123

TBM 1 ELEV. 248.16

NAIL SET ON NORTHEAST FACE OF EXISTING HP, ABOUT 0.20m ABOVE GRADE, OPPOSITE TO #22931 ROUGHAM ROAD.

TBM 2 ELEV. 245.07

NAIL SET ON NORTHEAST FACE OF EXISTING HP, ABOUT 0.20m ABOVE GRADE, OPPOSITE TO #23019 ROUGHAM ROAD.

LEGEND

- PROPERTY LIMIT
- PHASE LIMIT
- NEW SANITARY SEWER
- NEW STORM SEWER
- NEW WATERMAIN
- PROPOSED DRAINAGE
- 100.00 PROPOSED LOT CORNER ELEVATION
- (100.00) PROPOSED ELEVATION AT HOUSE
- (100.00) PROPOSED SWALE ELEVATION
- EXISTING DRAINAGE
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATERMAIN
- 100.00 EXISTING LOT CORNER ELEVATION
- •100.00 EXISTING ELEVATION TO REMAIN THE SAME

LICENSED PROFESSIONAL ENGINEER
J. D. CLARK
100226373
APR. 5, 2024
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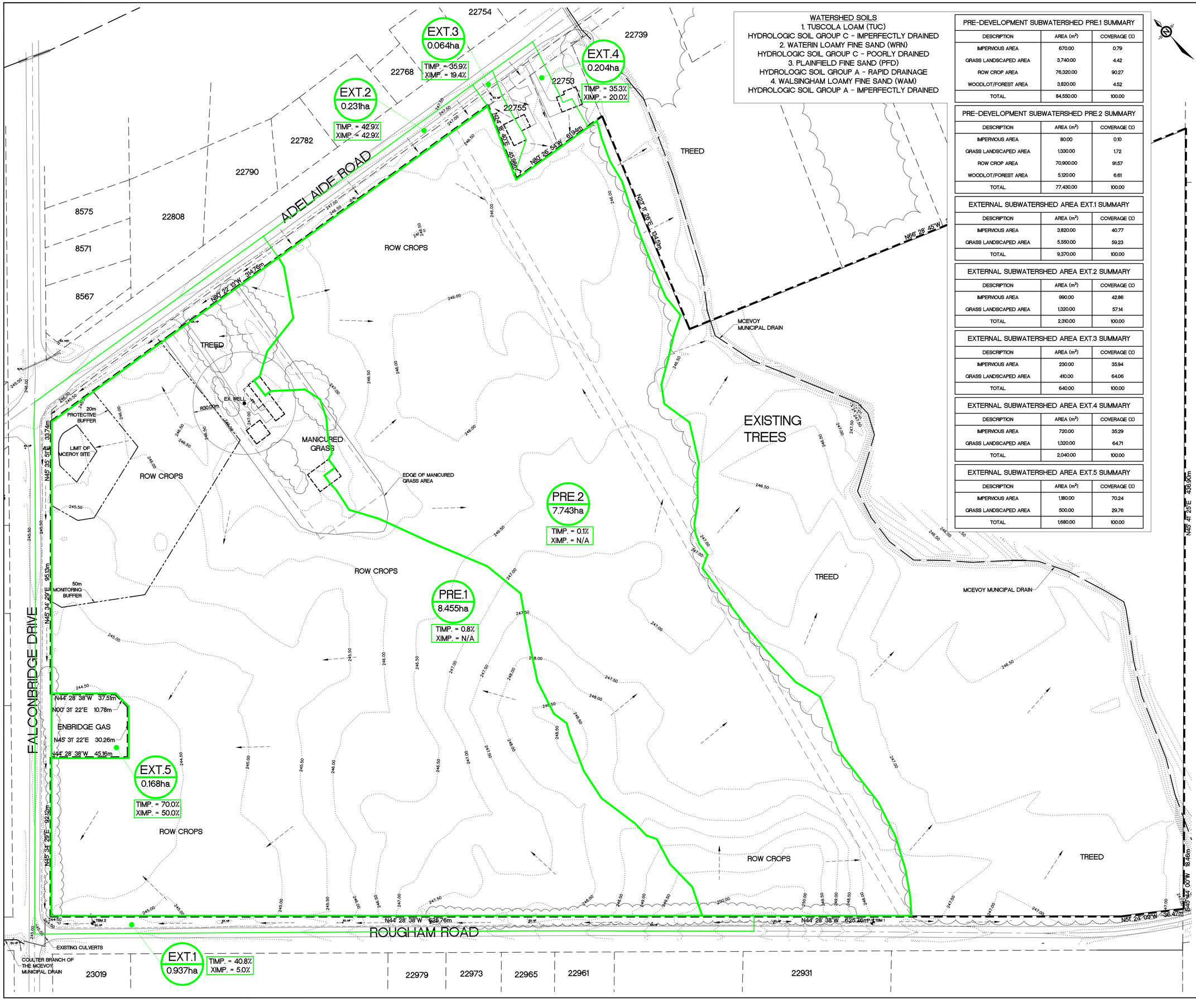
ADELAIDE ROAD SUBDIVISION

22805 ADELAIDE ROAD, MT BRYDGES
TOWNSHIP OF STRATHROY-CARADOC
COUNTY OF MIDDLESEX

SWM BLOCK 114
INFILTRATION CHAMBER SYSTEM

DESIGNED BY: M. J. DAVENPORT	SCALE: 1 : 200
DRAWN BY: J. ZHOU	
DATE: MARCH, 2021	DRWG. NO.: 5463-20
PROJECT NO.: 17-D-5463	



WATERSHED SOILS
1. TUSCOLA LOAM (TUC)
HYDROLOGIC SOIL GROUP C - IMPERFECTLY DRAINED
2. WATERIN LOAMY FINE SAND (WRN)
HYDROLOGIC SOIL GROUP C - POORLY DRAINED
3. PLAINFIELD FINE SAND (PFD)
HYDROLOGIC SOIL GROUP A - RAPID DRAINAGE
4. WALSINGHAM LOAMY FINE SAND (WAM)
HYDROLOGIC SOIL GROUP A - IMPERFECTLY DRAINED

PRE-DEVELOPMENT SUBWATERSHED PRE.1 SUMMARY		
DESCRIPTION	AREA (m^2)	COVERAGE (%)
IMPERVIOUS AREA	670.00	0.79
GRASS LANDSCAPED AREA	3,740.00	4.42
ROW CROP AREA	76,320.00	90.27
WOODLOT/FOREST AREA	3,820.00	4.52
TOTAL	84,550.00	100.00

PRE-DEVELOPMENT SUBWATERSHED PRE.2 SUMMARY		
DESCRIPTION	AREA (m^2)	COVERAGE (%)
IMPERVIOUS AREA	80.00	0.10
GRASS LANDSCAPED AREA	1,330.00	1.72
ROW CROP AREA	70,900.00	91.57
WOODLOT/FOREST AREA	5,120.00	6.61
TOTAL	77,430.00	100.00

EXTERNAL SUBWATERSHED AREA EXT.1 SUMMARY		
DESCRIPTION	AREA (m^2)	COVERAGE (%)
IMPERVIOUS AREA	3,820.00	40.77
GRASS LANDSCAPED AREA	5,550.00	59.23
TOTAL	9,370.00	100.00

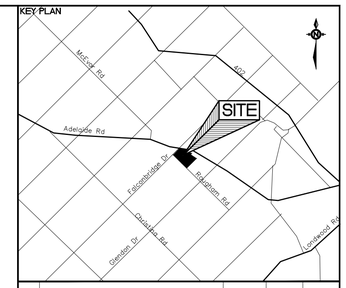
EXTERNAL SUBWATERSHED AREA EXT.2 SUMMARY		
DESCRIPTION	AREA (m^2)	COVERAGE (%)
IMPERVIOUS AREA	990.00	42.86
GRASS LANDSCAPED AREA	1,320.00	57.14
TOTAL	2,310.00	100.00

EXTERNAL SUBWATERSHED AREA EXT.3 SUMMARY		
DESCRIPTION	AREA (m^2)	COVERAGE (%)
IMPERVIOUS AREA	230.00	35.94
GRASS LANDSCAPED AREA	410.00	64.06
TOTAL	640.00	100.00

EXTERNAL SUBWATERSHED AREA EXT.4 SUMMARY		
DESCRIPTION	AREA (m^2)	COVERAGE (%)
IMPERVIOUS AREA	720.00	35.29
GRASS LANDSCAPED AREA	1,320.00	64.71
TOTAL	2,040.00	100.00

EXTERNAL SUBWATERSHED AREA EXT.5 SUMMARY		
DESCRIPTION	AREA (m^2)	COVERAGE (%)
IMPERVIOUS AREA	1,180.00	70.24
GRASS LANDSCAPED AREA	500.00	29.76
TOTAL	1,680.00	100.00

KEY PLAN



NO.	REVISIONS	DATE	BY	APP'D
1.	REVISED PER SPRIET COMMENT (25/10/21)	02/04/24	JC	MJD

BENCHMARKS

BM 1 (U.T.M.) ELEV. 244.141

MOUNT_BRYDGES ONE STOREY BROWN INSULBRICK HOUSE (OWNED BY J. SCOTT) ON THE EAST SIDE OF HWY 81. 2.7 KM NO RTH OF THE COMMUNITY HALL IN THE HAMLET OF MOUNT BRYDGES, 0.3KM NORTH OF THE CNR TRACKS (CARADOC) AND 19.5 M EAST OF CENTERLINE OF PAVEMENT. TABLET IS SET HORIZONTALLY IN THE WEST FACE OF CONCRETE FOUNATION, 1.55 M NORTH OF THE S.W. CORNER AND 24 CM BELOW SIDING.

STATION: 0081967B045

LEGEND

- PROPERTY LIMIT
- PHASE LIMIT
- NEW SANITARY SEWER
- NEW STORM SEWER
- NEW WATERMAIN
- PROPOSED DRAINAGE
- 100.00 PROPOSED LOT CORNER ELEVATION
- X 100.00 PROPOSED ELEVATION AT HOUSE
- 100.00 PROPOSED SWALE ELEVATION
- EXISTING DRAINAGE
- EXISTING SANITARY SEWER
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- 100.00 EXISTING LOT CORNER ELEVATION
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LICENSED PROFESSIONAL ENGINEER
J. D. CLARK
100226373
APR. 5, 2024
PROVINCE OF ONTARIO

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2010 KEENE ROAD
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ADELAIDE ROAD SUBDIVISION

22805 ADELAIDE ROAD, MT BRYDGES
TOWNSHIP OF STRATHROY-CARADOC
COUNTY OF MIDDLESEX

PRE-DEVELOPMENT SUBWATERSHED AREA PLAN

DESIGNED BY: J. CLARK	SCALE: 1 : 1000
DRAWN BY: J. CLARK	
DATE: MARCH, 2021	DRWG. NO.: 5463-SW1
PROJECT NO.: 17-D-5463	

WATERSHED SOILS
1. TUSCOLA LOAM (TUC)
HYDROLOGIC SOIL GROUP C - IMPERFECTLY DRAINED
2. WATERIN LOAMY FINE SAND (WRN)
HYDROLOGIC SOIL GROUP C - POORLY DRAINED
3. PLAINFIELD FINE SAND (PFD)
HYDROLOGIC SOIL GROUP A - RAPID DRAINAGE
4. WALSINGHAM LOAMY FINE SAND (WAM)
HYDROLOGIC SOIL GROUP A - IMPERFECTLY DRAINED

EXT.3
0.064ha
TIMP. = 35.9%
XIMP. = 19.4%

EXT.4
0.204ha
TIMP. = 35.3%
XIMP. = 20.0%

EXT.2
0.231ha
TIMP. = 42.9%
XIMP. = 42.9%

PR.4
2.183ha
TIMP. = 40.0%
XIMP. = 30.0%

PR.1
10.083ha
TIMP. = 45.1%
XIMP. = 36.0%

PR.2
2.735ha
TIMP. = 18.9%
XIMP. = 5.0%

PR.3
1.198ha
TIMP. = 23.9%
XIMP. = 5.0%

EXT.1
0.937ha
TIMP. = 40.8%
XIMP. = 5.0%

EXT.5
0.168ha
TIMP. = 70.0%
XIMP. = 50.0%

INFILTRATION CHAMBER SYSTEM 1
STORMTECH SC-310 CHAMBERS

INFILTRATION CHAMBER SYSTEM 1
STORMTECH SC-310
97 CHAMBERS
FOOTPRINT = 246.55m²
STORAGE VOLUME = 94.45m³

ADELAIDE ROAD
STREET 'A'
STREET 'B'
STREET 'C'
FALCONBRIDGE DRIVE
ROUGHAM ROAD

TOWNHOUSE
(66 UNITS)
BLOCK 111
(AREA = 28,142m²)

TOWNHOUSE
(32 UNITS)
BLOCK 110
(AREA = 12,707m²)

PARK
BLOCK 115
(AREA = 114,730m²)

BLOCK 116
(AREA = 5,859m²)
SWM POND

BLOCK 118
(AREA = 1,706m²)

BLOCK 119
(AREA = 16,621m²)

2.83m ROAD WIDENING STRIP
BLOCK 112
(AREA = 781m²)

PROPOSED OGS TO PROVIDE QUALITY CONTROL FOR SUBWATERSHED AREA PR.4

PROPOSED DRAINAGE SWALE

SANITARY PUMP STATION BLOCK 117 (AREA = 105m²)

ENBRIDGE GAS

20m PROTECTIVE BUFFER

50m MONITORING BUFFER

LIMIT OF MCEVOY SITE

PART OF SUBWAT. PR.3

EXISTING TREES

TREED

TREED AREA

MCEVOY MUNICIPAL DRAIN

COULTER BRANCH OF THE MCEVOY MUNICIPAL DRAIN

5.18m ROAD WIDENING STRIP

EMERGENCY EXIT

BH-1 BH-2 BH-3 BH-4 BH-5 BH-6 BH-7

22754 22739 22768 22753 22774 22755 22782 22790 8575 22808 8571 8567 22805 23019 22979 22973 22965 22961 22931

EXTERNAL SUBWATERSHED AREA EXT.1 SUMMARY

DESCRIPTION	AREA (m²)	COVERAGE (%)
IMPERVIOUS AREA	3,820.00	40.77
GRASS LANDSCAPED AREA	5,550.00	59.23
TOTAL	9,370.00	100.00

EXTERNAL SUBWATERSHED AREA EXT.2 SUMMARY

DESCRIPTION	AREA (m²)	COVERAGE (%)
IMPERVIOUS AREA	990.00	42.86
GRASS LANDSCAPED AREA	1,320.00	57.14
TOTAL	2,310.00	100.00

EXTERNAL SUBWATERSHED AREA EXT.3 SUMMARY

DESCRIPTION	AREA (m²)	COVERAGE (%)
IMPERVIOUS AREA	230.00	35.94
GRASS LANDSCAPED AREA	410.00	64.06
TOTAL	640.00	100.00

EXTERNAL SUBWATERSHED AREA EXT.4 SUMMARY

DESCRIPTION	AREA (m²)	COVERAGE (%)
IMPERVIOUS AREA	720.00	35.29
GRASS LANDSCAPED AREA	1,320.00	64.71
TOTAL	2,040.00	100.00

EXTERNAL SUBWATERSHED AREA EXT.5 SUMMARY

DESCRIPTION	AREA (m²)	COVERAGE (%)
IMPERVIOUS AREA	1,180.00	70.24
GRASS LANDSCAPED AREA	500.00	29.76
TOTAL	1,680.00	100.00

POST-DEVELOPMENT SUBWATERSHED AREA 1 SUMMARY

DESCRIPTION	AREA (m²)	COVERAGE (%)
IMPERVIOUS AREA	45,440.00	45.07
GRASS LANDSCAPED AREA	55,390.00	54.93
PASTURE/UNIMPROVED LAND	0.00	0.00
WOODLOT/FOREST AREA	0.00	0.00
TOTAL	100,830.00	100.00

POST-DEVELOPMENT SUBWATERSHED AREA 2 SUMMARY

DESCRIPTION	AREA (m²)	COVERAGE (%)
IMPERVIOUS AREA	5,170.00	18.90
GRASS LANDSCAPED AREA	5,680.00	20.77
PASTURE/UNIMPROVED LAND	11,380.00	41.61
WOODLOT/FOREST AREA	5,120.00	18.72
TOTAL	27,350.00	100.00

POST-DEVELOPMENT SUBWATERSHED AREA 3 SUMMARY

DESCRIPTION	AREA (m²)	COVERAGE (%)
IMPERVIOUS AREA	2,860.00	23.87
GRASS LANDSCAPED AREA	9,120.00	76.13
PASTURE/UNIMPROVED LAND	0.00	0.00
WOODLOT/FOREST AREA	0.00	0.00
TOTAL	11,980.00	100.00

POST-DEVELOPMENT SUBWATERSHED AREA 4 SUMMARY

DESCRIPTION	AREA (m²)	COVERAGE (%)
IMPERVIOUS AREA	8,734.00	40.00
GRASS LANDSCAPED AREA	13,099.00	60.00
PASTURE/UNIMPROVED LAND	0.00	0.00
WOODLOT/FOREST AREA	0.00	0.00
TOTAL	21,833.00	100.00

NOTE:

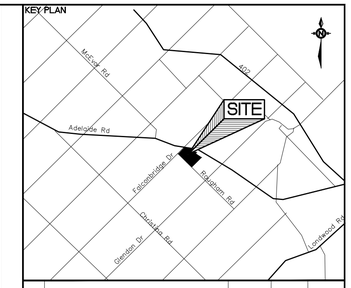
TOTAL IMPERVIOUS AREA (TIMP) AND DIRECTLY CONNECTED IMPERVIOUS AREA (XIMP) FOR THE VARIOUS LAND USES ON SITE WERE CALCULATED USING THE STRATHROY-CARADOC SERVICING STANDARDS (OCTOBER 2021) AS FOLLOWS:

SINGLE FAMILY RESIDENTIAL (LOTS 375m² TO 550m²) - TIMP = 40%, XIMP = 30%
MULTI-FAMILY RESIDENTIAL - TIMP = 60%, XIMP = 50%
ENBRIDGE PROPERTY - TIMP = 70%, XIMP = 50%
PARKLAND, TREED, UNIMPROVED LAND - TIMP = 0%, XIMP = 0%
PERMANENT POOL OF WET POND - TIMP = 100%, XIMP = 100%

THE IMPERVIOUS PERCENTAGES USED FOR SINGLE FAMILY LOTS IS A CONSERVATIVE ASSUMPTION. MANY OF THE PROPOSED LOTS ARE LARGER THAN 550m²

XIMP FOR SUBWATERSHED PR.2 AND PR.3 WAS REDUCED TO ACCOUNT FOR THE ROOFTOP IMPERVIOUS AREAS BEING FIRST DIRECTED ONTO PERVIOUS BACK YARD AREAS WITH A MINIMUM PERVIOUS FLOW LENGTH OF 5 METRES.

KEY PLAN



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STATION: 0081967804S

LEGEND

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POST-DEVELOPMENT SUBWATERSHED AREA PLAN

DESIGNED BY: J. CLARK	SCALE: 1 : 1000
DRAWN BY: J. CLARK	
DATE: MARCH, 2021	DRWG. NO.: 5463-SW2
PROJECT NO.: 17-D-5463	