Supporting Document 3-5

Surface Water Quantity Effects Assessment Report

Twin Creeks Environmental Centre Landfill Optimization Project Environmental Assessment

WM Canada

Watford, Ontario

May 2026

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Revision History

Revision	Date
1	November 2024
2	July 2025
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Executive Summary

WSP Canada Inc. was contracted by HDR Corporation on behalf of WM Canada (WM) to prepare this Surface Water Quantity Effects Assessment Report as part of the Twin Creeks Environmental Centre (TCEC) Landfill Optimization Project Environmental Assessment (EA). The EA is being carried out in accordance with the requirements of the *Environmental Assessment Act* (*EAA*) and the EA Terms of Reference (ToR), which was approved by the Ministry of Environment, Conservation and Parks (MECP) on December 13, 2022. Surface Water Quantity considers changes in runoff volumes and peak flows, changes to drainage areas on-site and off-site, and predicted occurrence and degree of off-site effects to surface water flows. Surface water quality is considered in a separate report.

The purpose of this Effects Assessment Report is to present the:

- potential environmental effects of the alternative methods on the Surface Water Quantity;
- comparison of the net effects of each alternative method;
- selection of a preferred alternative;
- assessment of the environmental effects of the preferred alternative; and
- commitments and monitoring.

There are approximately 5 years of approved landfill airspace capacity remaining at the TCEC (i.e., capacity will be reached in approximately 2031). The proposed optimization would provide additional airspace of approximately 14.3 million cubic metres (m^3), which could extend the site life by approximately 12 years (from 2031 to 2043), and may be achieved through alternative landfill configurations (alternative methods) within the existing 301-hectare TCEC site area. No changes are proposed to the size of the TCEC site area, approved service area, or annual fill rate.

Three alternative methods for carrying out the optimization were developed to a preliminary conceptual design level in the Conceptual Design Report (CDR). Alternative Method 1 includes the increase of final landfill side slopes from 4H:1V to 3H:1V between the original grade and elevation 320 masl, approximately 16 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 324.5 masl within the Expansion Landfill footprint. Alternative Method 2 includes the increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 250 masl and elevation 313 masl, about 60 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 319 masl within the Expansion Landfill footprint. Alternative Method 3 includes the increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 260 masl and elevation 360 masl, about 100 m in grade change, peaking at elevation 360 masl within the Expansion Landfill footprint.

The study areas for Surface Water Quantity are as follows:

- On-site Study Area: the existing TCEC; and
- Off-site Study Area: the lands within the vicinity of the TCEC extending approximately 1 km out from the On-site Study Area.

A net effects assessment was carried out for the three alternative methods following the methods outlined in the approved ToR incorporating the information contained in the CDR, and the Surface Water Quantity Existing Conditions Report. The results of the net effects assessment were used in a comparative evaluation of the three alternative methods. For the purposes of the net effects assessment, the alternative methods were compared against the Existing Conditions documented in the Surface Water Quantity Existing Conditions Report.

The landfill optimization will not change total runoff volume from the landfill site or overall drainage areas; however, the timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the four outlets of interest. Under all alternative methods, two outlets (Outlets A and G) show an increase, and two outlets (Outlets B and C) show a decrease in peak flow runoff when compared to Existing Conditions. Additionally, under all alternative methods, some catchment areas increased (AB, C1A, G3A and G4A) whereas some catchment areas decreased (C1B and G1B).

When compared to Existing Conditions, under Alternative Method 1, the increase in peak flows leaving the site for Outlets A and G are 6% and 11% respectively, and the decrease in peak flows leaving the site for Outlets B and C are 4% and 19% respectively. Changes in catchment areas within the landfill optimization area are between -23% and 37% when compared to Existing Conditions

When compared to Existing Conditions, under Alternative Method 2, the increase in peak flows leaving the site for Outlets A and G are 7% and 10% respectively, and the decrease in peak flows leaving the site for Outlets B and C are 4% and 19% respectively. Changes in catchment areas within the landfill optimization area are between -22% and 34% when compared to Existing Conditions

When compared to Existing Conditions, under Alternative Method 3, the increase in peak flows leaving the site for Outlets A and G are 5% and 11% respectively, and the decrease in peak flows leaving the site for Outlets B and C are 4% and 19% respectively. Changes in catchment areas within the landfill optimization area are between -24% and 36% when compared to Existing Conditions.

The overall Preferred Alternative for Surface Water Quantity based on the results of the criteria comparisons is Alternative Method 2. The maximum increase of drainage area for one catchment (G3A) is the lowest (34%) when compared to other alternative methods against Existing Conditions; however, it is noteworthy that off-site drainage areas remain unchanged for all alternative methods.

Alternative Method 2 results in the increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 250 masl and elevation 313 masl, about 60 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 319 masl within the Expansion Landfill footprint. Alternative Method 2 has the lowest peaking elevation when compared to the other alternative methods. As such, reduced runoff velocity and enhanced infiltration of the stormwater is anticipated for this method. Further, the downstream receiver of flows from Outlet A is the Auld-Redmond Drain and the downstream receiver of flows from Outlet G is the Gilliland-Geerts Drain. According to the results for Alternative Method 2, both outlets show an increase in peak flows (up to 10%). Mitigation is not recommended as the increases in peak flows are up to 10% and the off-site drainage areas are not being altered in any way due to this alternative method. Furthermore, when the catchment areas are compared between the 'Do Nothing' Alternative and Alternative Method 2, an increase for three catchments ranging from 1% to 4% and a decrease for two catchments ranging from 1% to 4% for Alternative Method 2 are observed. The peak flows leaving the landfill site for select outlets are very comparable for both alternatives (between 1% to 2%). Similarly, the peak storage used for the ponds are also comparable (between 0% to 2%). The downstream receiver of flows from Outlet A is the Auld-Redmond Drain and the downstream receiver of flows from Outlet G is the Gilliland-Geerts Drain. According to the results for both, the 'Do Nothing' Alternative and Alternative Method 2 are very comparable.

Compliance monitoring will be undertaken to confirm that the construction, operation, and maintenance of the Project are carried out in accordance with the mitigation measures and commitments identified in the effects assessment. It is recommended that inspection for erosion and sediment accumulation in stormwater (SWM) ponds as part of landfill monitoring program and annual inspection of stormwater works and maintenance to address sedimentation and excessive vegetation growth be conducted annually as part of the ongoing existing monitoring program.

In addition to the EA approval, an ECA amendment may be required in the event that modifications to the on-site stormwater management infrastructure are required.

Acronyms, Units and Glossary

Acronyms

Acronym	Definition
CDR	Conceptual Design Report
EA	Environmental Assessment
EAA	*Environmental Assessment Act*
GHG	Greenhouse Gas
IDF	Intensity-Duration-Frequency
LFG	Landfill Gas
MECP	Ministry of Environment, Conservation and Parks
TCEC	Twin Creeks Environmental Centre
ToR	Terms of Reference
WM	WM Canada

Units

Unit	Definition
km	kilometre
m	Metre
m^2/s	square metres per second
m^3	cubic metres

Glossary

Term	Definition
Approval	Permission granted by an authorized individual or organization for a project to proceed. This may be in the form of program approval, certificate of approval or provisional certificate of approval.
Capacity (Disposal Volume)	The total volume of air space available for disposal of waste at a landfill site for a particular design (typically in m^3); includes both waste and daily cover materials, but excludes the final cover.
Composting	The controlled microbial decomposition of organic matter, such as food and yard wastes, in the presence of oxygen, into finished compost (humus), a soil-like material. Humus can be used in vegetable and flower gardens, hedges, etc.
Composting facility	A facility designed to compost organic matter either in the presence of oxygen (aerobic) or absence of oxygen (anaerobic).

Term	Definition
Environment	As defined by the *Environmental Assessment Act*, environment means: • air, land or water; • plant and animal life, including human life; • the social, economic and cultural conditions that influence the life of humans or a community; • any building, structure, machine or other device or thing made by humans; • any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities; or • any part or combination of the foregoing and the interrelationships between any two or more of them (ecosystem approach).
Environmental Assessment (EA)	A systematic planning process that is conducted in accordance with applicable laws or regulations aimed at assessing the effects of a proposed project on the environment.
Evaluation criteria	Evaluation criteria are considerations or factors taken into account in assessing the advantages and disadvantages of various alternatives being considered.
Greenhouse gas (GHG)	Any of the gases whose absorption of solar radiation is responsible for the greenhouse effect, including carbon dioxide, methane, ozone, and the fluorocarbons.
Indicators	Indicators are specific characteristics of the evaluation criteria that can be measured or determined in some way, as opposed to the actual criteria, which are fairly general.
Landfill gas (LFG)	The gases produced from the wastes disposed in a landfill; the main constituents are typically carbon dioxide and methane, with small amounts of other organic and odour-causing compounds.
Landfill site	An approved engineered site/facility used for the final disposal of waste. Landfills are waste disposal sites where waste is spread in layers, compacted to the smallest practical volume, and typically covered by soil.
Leachate	Liquid that drains from solid waste in a landfill and which contains dissolved, suspended and/or microbial contaminants from the breakdown of this waste.
Mitigation	Measures taken to reduce adverse impacts on the environment.
Project	Is defined in the *Environmental Assessment Act* as: one or more enterprises or activities or a proposal, plan or program in respect of an enterprise or activity.
Proponent	A person who: • carries out or proposes to carry out a project; or • is the owner or person having charge, management or control of a project.
Receptor	The person, plant or wildlife species that may be affected due to exposure to a contaminant.
Terms of Reference (ToR)	A terms of reference is a document that sets out detailed requirements for the preparation of an Environmental Assessment.
Time of concentration	The time required for water falling on the most remote point of a drainage basin to reach the outlet where remoteness relates to time of travel rather than distance.
Waste	Refuse from places of human or animal habitation; unwanted materials left over from a manufacturing process.

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Appendix A. Hydrologic Modelling

1 Introduction

WSP Canada Inc. (WSP) was contracted by HDR Corporation on behalf of WM Canada (WM) to prepare this Surface Water Quantity Effects Assessment Report as part of the Twin Creeks Environmental Centre (TCEC) Landfill Optimization Project Environmental Assessment (EA). The EA is being carried out in accordance with the requirements of the *Environmental Assessment Act* (*EAA*) and the EA Terms of Reference (ToR), which was approved by the Ministry of Environment, Conservation and Parks (MECP) on December 13, 2022.

The *EAA* defines the environment in a broad, general sense that comprises physical, biological, and human considerations. In this EA, the environment has been separated broadly into the natural, socio-economic, cultural, and built aspects, with environmental components and evaluation criteria identified within each aspect as listed in **Table 1-1**, consistent with the approved ToR. The organization of the Effects Assessment Reports is also provided in **Table 1-1**.

Table 1-1. Environmental Aspects, Components, and Evaluation Criteria

Environmental Aspect	Environmental Component	Evaluation Criteria	Effects Assessment Report
Natural Environment	Atmospheric Environment	• Air Quality – Dust • Air Quality – Landfill Gas and Combustion By-Products • Air Quality – Blowing Litter • Odour	• Air Quality
		• Noise	• Noise
	Hydrogeology	• Groundwater Quality • Groundwater Quantity	• Hydrogeology
	Surface Water Environment	• Surface Water Quality	• Surface Water Quality
		• Surface Water Quantity	• Surface Water Quantity
	Ecological Environment	• Terrestrial Ecosystems • Aquatic Ecosystems	• Ecological Environment
Socio-Economic Environment	Social Environment	• Human Health	• Human Health
		• Effects on Local Community	• Socio-Economic Environment
	Economic Environment	• Economic Effects on Local Community	
	Visual Landscape	• Visual Impact of Facility	• Visual Landscape
Cultural Environment	Cultural Environment	• Cultural Heritage Resources	• Cultural Heritage Resources
		• Archaeological Resources	• Archaeological Resources
Built Environment	Transportation	• Traffic Operations	• Transportation
	Current and Planned Future Land Use	• Effects on Current and Future Land Uses	• Land Use

This Surface Water Quantity Effects Assessment Report assesses the effects of the Project on the surface water quantity portion of the Surface Water Environment. The effects of the Project on surface water quality are assessed in a separate report. This report covers the changes in runoff volumes and peak flows resulting from the proposed landfill expansion due to steeper and longer side slopes, changes to drainage areas on-site and off-site and the predicted occurrence and degree of off-site effects to surface water flows. The purpose of this Effects Assessment Report is to present the potential environmental effects of the alternative methods on the Surface Water Quantity, a comparison of the net effects of each alternative method, the selection of a preferred alternative, the assessment of the environmental effects of the preferred alternative, and commitments and monitoring.

This Surface Water Quantity Effects Assessment Report is one component of the EA. The EA Study Report will incorporate the information presented herein as appropriate, and this report will be included with the EA Study Report as a supporting document.

1.1 Project and Alternative Methods

There are approximately 5 years of approved landfill airspace capacity remaining at the TCEC (i.e., capacity will be reached in approximately 2031). The proposed landfill optimization would provide additional airspace of approximately 14.3 million cubic metres (m^3), which could extend the site life by approximately 12 years (from 2031 to 2043) and may be achieved through alternative landfill configurations (alternative methods) within the existing 301-hectare (ha) TCEC site area. No changes are proposed to the size of the TCEC site area, approved service area, haul route, or annual fill rate. However, there is a need for relocation of two swales as described in the following sections along with a new culvert to carry flows to the landfill outlets as a result of the landfill site optimization.

Three alternative methods for carrying out the landfill optimization were developed to a preliminary conceptual design level in the Conceptual Design Report (CDR) and are described below as they are relevant to Surface Water Quantity.

1.1.1 Alternative Method 1

Alternative Method 1 includes the increase of final landfill side slopes from 4H:1V to 3H:1V between the original grade and elevation 320 masl, approximately 16 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 324.5 masl within the Expansion Landfill footprint.

The proposed vertical landfill expansion as per Alternative Method 1 will impact the stormwater management (SWM) system in two ways:

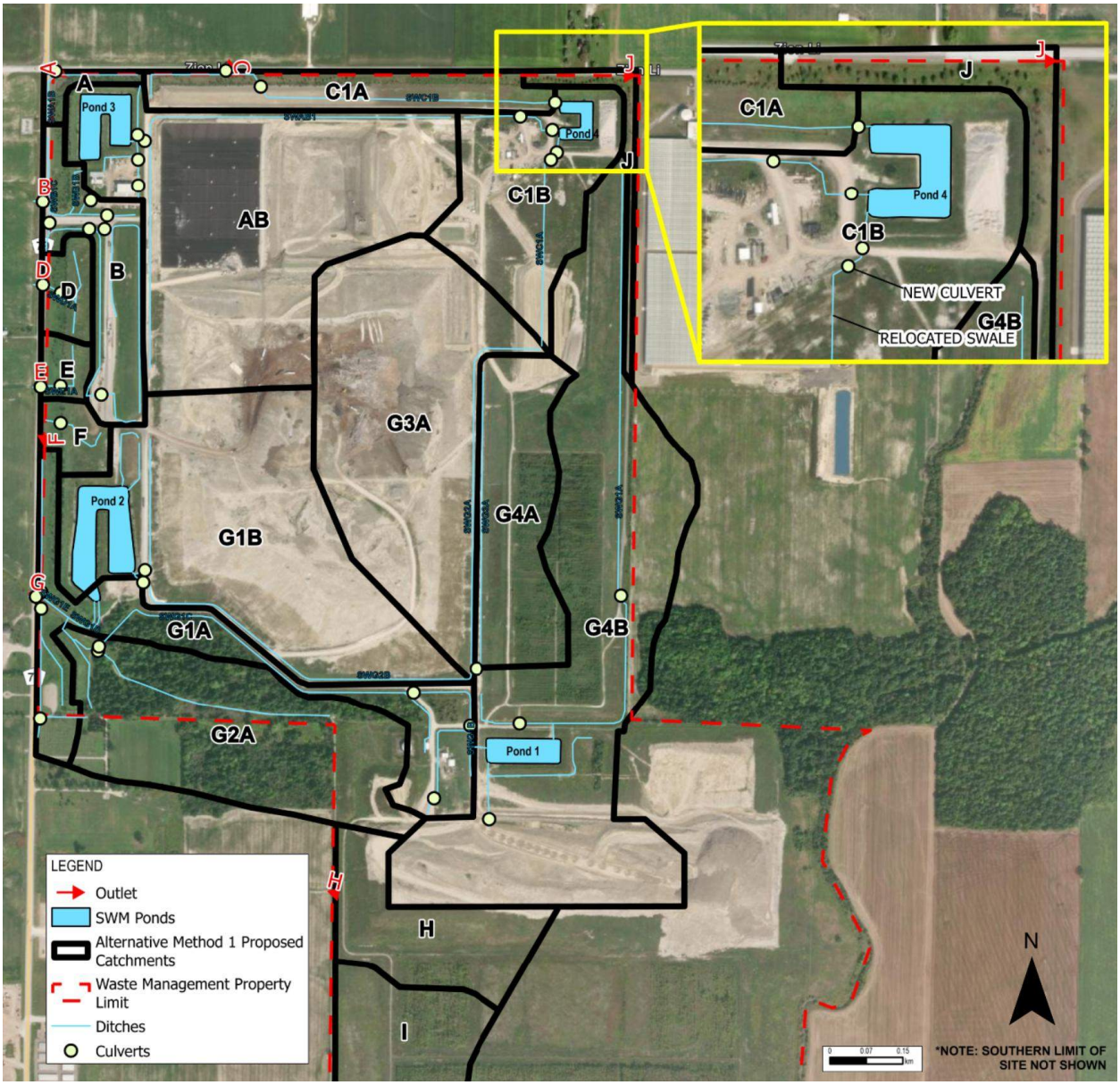
1. Altering catchment areas within the landfill site; and
2. Decreasing time of concentration.

It is noteworthy that the landfill optimization will not change total runoff volume from the landfill site; however, the timing of peak flows and the redistribution of catchment

areas is expected to increase or decrease some of the peak flows leaving through the outlets of the landfill site.

The redistributed catchment areas for Alternative Method 1 are shown in **Figure 1-1**. Under this alternative method, some catchment areas increase (AB, C1A, G3A and G4A) whereas some catchment areas decrease (C1B and G1B). **Appendix A** (**Exhibit 1-1**) provides details about the different catchment areas and their comparison with the other alternative methods.

Figure 1-1. Alternative Method 1



1.1.2 Alternative Method 2

Alternative Method 2 includes the increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 250 masl and elevation 313 masl, about 60 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 319 masl within the Expansion Landfill footprint.

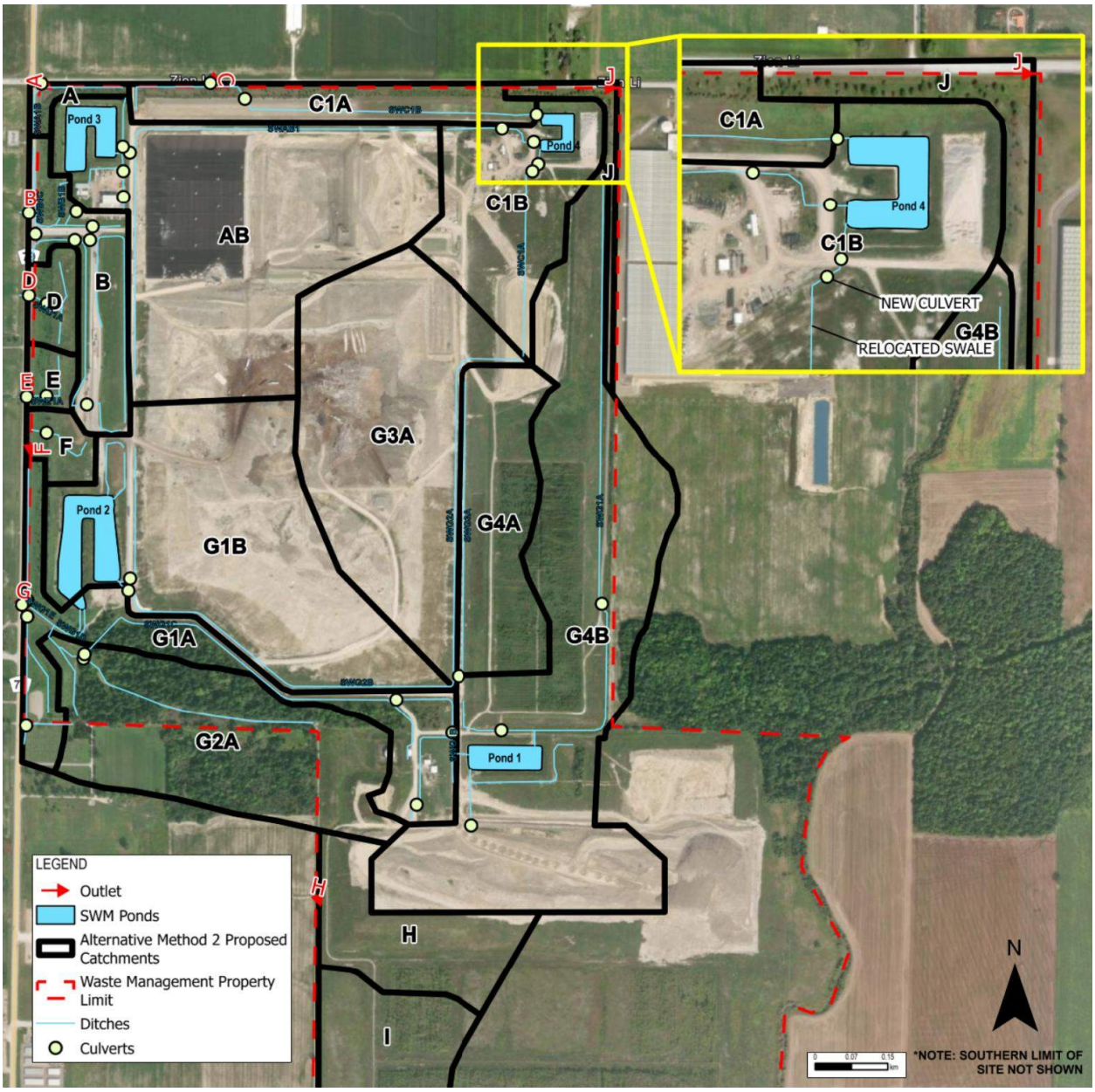
The proposed vertical landfill expansion as per Alternative Method 2 will impact the SWM system in two ways:

1. Altering catchment areas within the landfill site; and
2. Decreasing time of concentration.

It is noteworthy that the landfill optimization will not change total runoff volume from the landfill site; however, the timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets of the landfill site.

The redistributed catchment areas for Alternative Method 2 are shown in **Figure 1-2**. Under this alternative method, some catchment areas increase (AB, C1A, G3A and G4A) whereas some catchment areas decrease (C1B and G1B). **Appendix A** (**Exhibit 1-2**) provides details about the different catchment areas and their comparison with the other alternative methods.

Figure 1-2. Alternative Method 2



1.1.3 Alternative Method 3

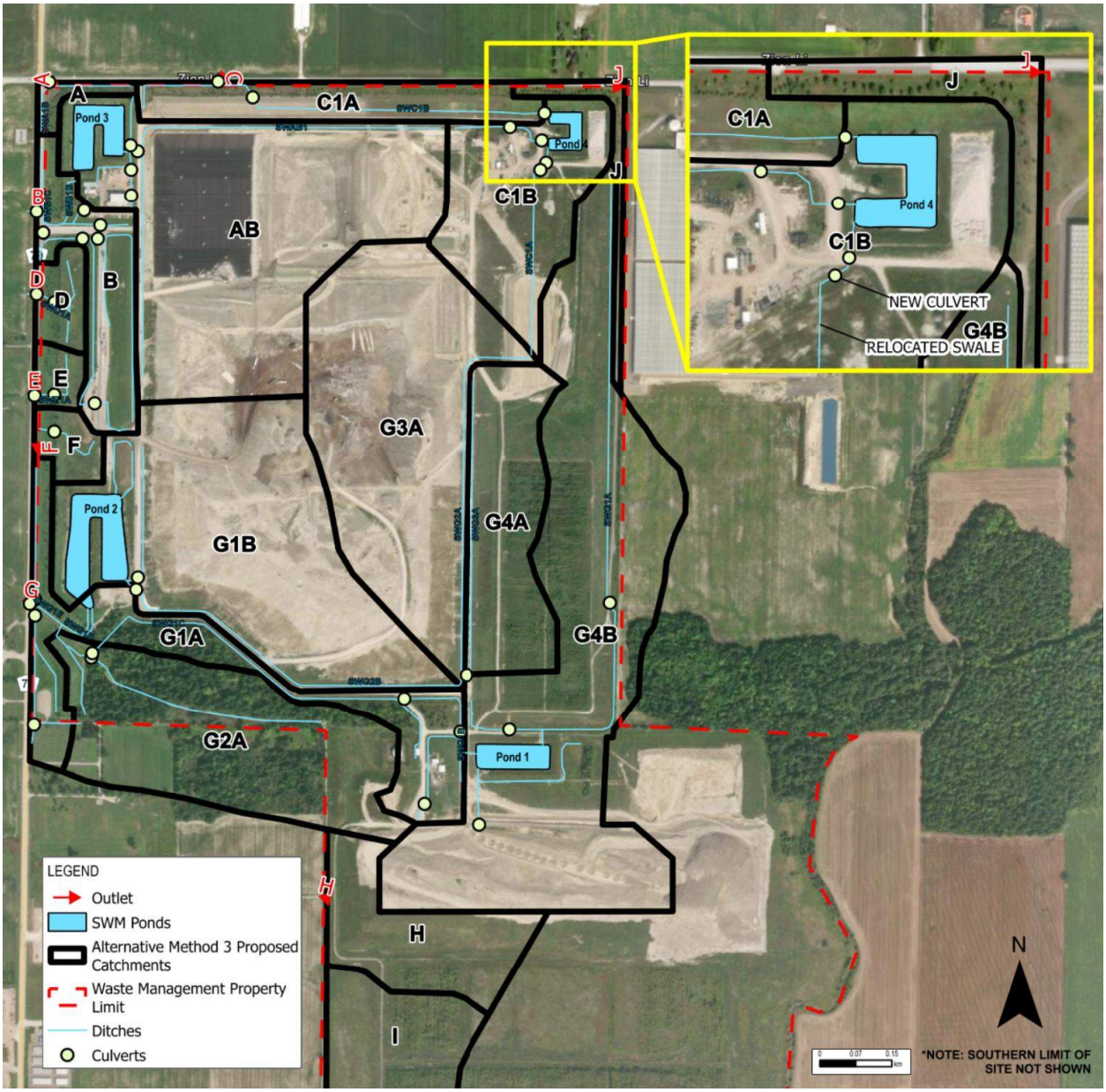
Alternative Method 3 includes the increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 260 masl and elevation 360 masl, about 100 m in grade change, peaking at elevation 360 masl within the Expansion Landfill footprint.

The proposed vertical landfill expansion as per Alternative Method 3 will impact the SWM system in two ways:

1. Altering catchment areas within the landfill site; and
2. Decreasing time of concentration.

It is noteworthy that the landfill optimization will not change total runoff volume from the landfill site; however, the timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets of the landfill site.

Figure 1-3. Alternative Method 3



The redistributed catchment areas for Alternative Method 3 are shown in **Figure 1-3.** Under this alternative method, some catchment areas increase (AB, C1A, G3A and G4A) whereas some catchment areas decrease (C1B and G1B). **Appendix A** (**Exhibit 1-3**) provides details about the different catchment areas and their comparison with the other alternative methods.

2 Effects Assessment Methods

Using the evaluation criteria, indicators, rationale and data sources from the approved ToR and the Future Baseline Conditions from the Surface Water Quantity Existing Conditions Report, the effects assessment is carried out as follows:

- predict the potential environmental effects for each alternative method (**Section 2.1**);
- identify the Preferred Alternative based on a comparative evaluation of the potential environmental effects of each alternative method (**Section 2.2**);
- conduct an effects assessment on the Preferred Alternative, including the identification of mitigation measures and monitoring programs (**Section 2.3**); and
- compare the effects of the Preferred Alternative to those of the 'Do Nothing' Alternative (i.e., the Expansion Landfill as approved) (**Section 2.4**).

2.1 Predict Potential Environmental Effects for Alternative Methods

The potential environmental effects for each alternative method are identified within the study areas based on the application of the evaluation criteria, indicators and data sources in the approved ToR and based on the maximum allowable waste receipt level for the TCEC landfill. The potential effects can be positive or negative, direct or indirect, and short- or long-term. Mitigation measures are identified to minimize or mitigate the potential effects and then the net effects are evaluated taking into consideration the application of mitigation measures. The study areas, evaluation criteria, indicators, data source, and key design considerations and assumptions for Surface Water Quantity are provided below.

2.1.1 Study Areas

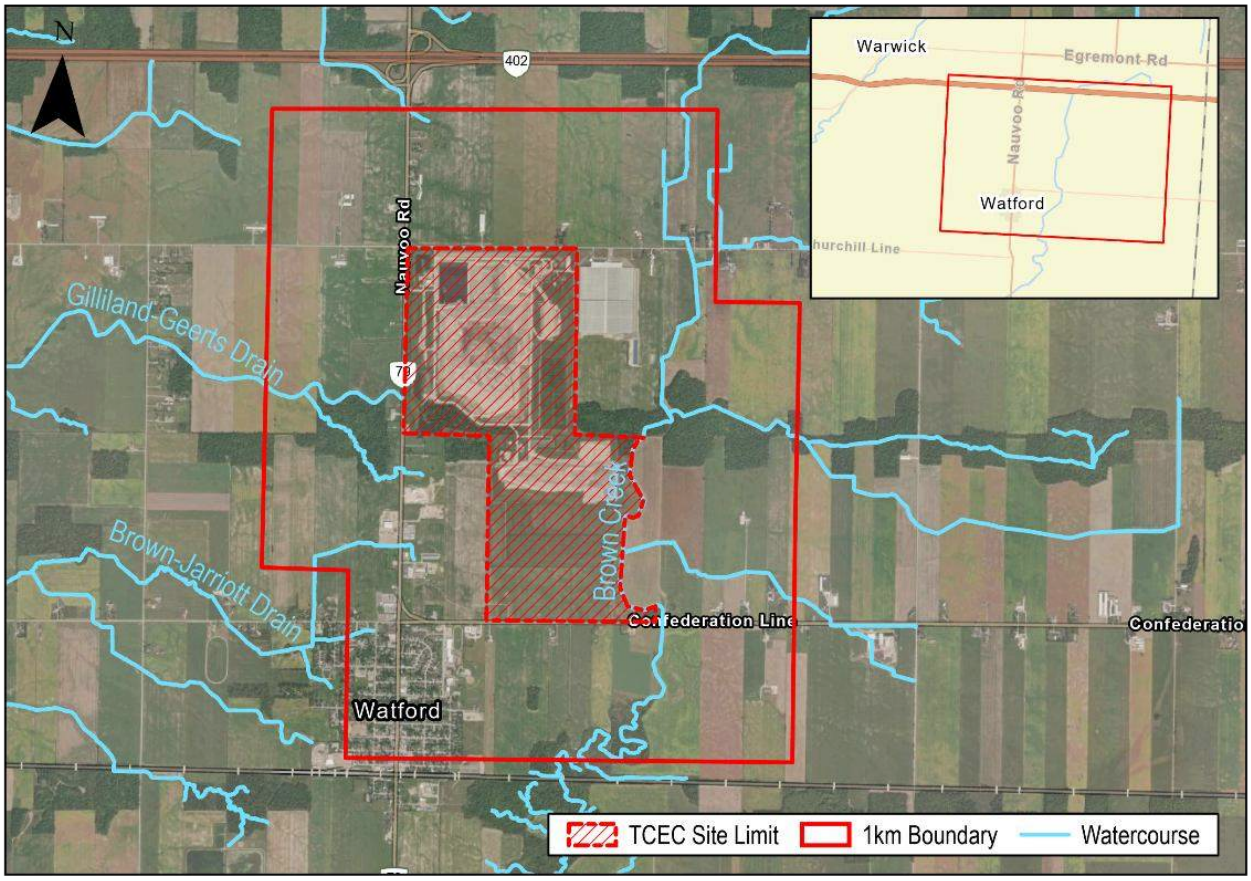
The TCEC landfill is located within the Township of Warwick, in the County of Lambton, approximately 1 km north of the Village of Watford. The TCEC is situated south of Highway 402 and southeast of the intersection of Nauvoo Road and Zion Line. The municipal street address of the TCEC is 5768 Nauvoo Road, Watford, Ontario. The area being considered for the landfill optimization is the approved Expansion Landfill footprint located within the northern portion of the 301 ha TCEC site.

The study areas include the existing TCEC site as well as the potentially-affected surrounding areas. The general On-site and Off-site Study Areas identified for the EA in the approved ToR are as follows:

- On-site Study Area: the existing TCEC;
- Off-site Study Area: the lands within the vicinity of the TCEC extending approximately 1 km out from the On-site Study Area.

These study areas shown in **Figure 2-1**, were used for the purposes of the Surface Water Quantity effects assessment.

Figure 2-1. On-site and Off-site Study Areas for Surface Water Quantity



2.1.2 Evaluation Criteria, Indicators, and Data Sources

The evaluation criteria, rationale, indicators, and data sources used for Surface Water Quantity as per the approved ToR are provided in **Table 2-1**.

Table 2-1. Evaluation Criteria, Indicators, and Data Sources for Surface Water

Evaluation Criteria	Rationale	Indicators	Data Sources
Natural Environment			
Surface Water Environment			
Surface Water Quantity	Construction of physical works may disrupt natural surface drainage patterns and may alter runoff and peak flows. The presence of the expanded landfill may also affect base flow to surface water.	• Change in runoff volumes and peak flows resulting from steeper and longer side slopes. • Changes to drainage areas on-site and off-site. • Predicted occurrence and degree of off-site effects to surface water flows.	• On-site stormwater management system design for expanded landfill. • Landfill design and operations data. • Hydrologic modelling. • Annual monitoring reports. • Published flow information and hydrology design standards from MECP, MNRF, Environment Canada and SCRCA. • Site reconnaissance. • Topographic surveys. • Air photos. • Drainage maps. • Watershed mapping areas including municipal water supply sources within the off-site study area from SCRCA. • Typical stream channel geometry within the off-site study area, to the extent accessible. • Water well survey within the off-site study area. • PTTW records. • Liaison with MECP, SCRCA, downstream riparian landowners along Gilliland-Geerts Drain between Nauvoo Road and Underpass Road, Township of Warwick.

2.1.3 Key Considerations and Assumptions

The key existing conditions elements, design considerations, and assumptions for the Surface Water Quantity effects assessment are described below.

2.1.3.1 Key Elements of Existing Conditions

The key elements from the existing conditions that are relevant for the assessment of the effects of the landfill optimization include the SWM ponds which manage the stormwater runoff through the site and the outlets through which the flows leave the landfill site. These include the four SWM ponds and their function and ten outlets A-J (ref. **Appendix A**), four of which receive water from the SWM ponds, through which the flows leave the landfill site. The existing conditions peak flows leaving the landfill site through the various outlets is shown in **Table 2-2**.

Table 2-2. Existing Conditions Peak Flows

Outlet ID	Ultimate Flow Receiver	2-year	5-year	10-year	25-year	50-year	100-year
A	Auld-Redmond Drain	0.07	0.10	0.14	0.18	0.22	0.26
B	Gilliland-Geerts Drain	0.42	0.57	0.68	0.81	0.91	1.01
C	Auld-Redmond Drain	0.15	0.25	0.32	0.43	0.52	0.64
D	Gilliland-Geerts Drain	0.08	0.13	0.17	0.23	0.28	0.33
E	Gilliland-Geerts Drain	0.07	0.12	0.16	0.21	0.26	0.30
F	Gilliland-Geerts Drain	0.05	0.09	0.12	0.16	0.20	0.23
G	Gilliland-Geerts Drain	0.41	0.70	0.90	1.18	1.39	1.63
H	Gilliland-Geerts Drain	0.17	0.3	0.4	0.54	0.65	0.77
I	Brown-Jarriott Drain Extension and Gilliland-Geerts Drain	0.21	0.35	0.45	0.58	0.69	0.81
J	Brown Creek	0.04	0.08	0.1	0.13	0.16	0.19

Table 2-3 below shows the peak inflow, peak outflow, and maximum storage used in each SWM pond during the 100 year 4-hour Chicago design storm event.

Table 2-3. SWM Pond Function During 100-year Event

Pond ID	Peak Inflow (m^3/s)	Peak Outflow (m^3/s)	Maximum Storage Used ($ha \cdot m$)
1	1.490	0.704	0.943
2	2.460	0.529	1.625
3	1.451	0.671	0.732
4	1.247	0.372	0.347

Additionally, no change is anticipated to the existing monitoring protocols for the SWM ponds. Furthermore, the 2-year design storm peak flows are considered as the average flows leaving the site to the ultimate receivers which range from 0.04 m^3/s to 1.31 m^3/s.

2.1.3.2 Key Design Considerations

The landfill optimization will impact the SWM system in two ways:

1. Change in catchment areas within the landfill site; and
2. Decrease in time of concentration.

To reflect the above, the key design considerations include changing the catchment areas for each alternative method as described in **Section 1.1** to determine the change in time of concentration leading to change in surface runoff created travelling to the SWM ponds, their function and finally, the flows leaving the system.

Additionally, no additional mitigation measures are required beyond the 'in-design mitigation measures' such as the existing stormwater management ponds, ditches and swales on the landfill site.

2.1.3.3 Key Assumptions

Key assumptions for the Surface Water Quantity effects assessment include that the four SWM ponds, existing swales and catchments D, E, F, H, I, and J will not be physically altered in any way from their existing characteristics. Additionally, existing monitoring is expected to continue for the landfill site.

2.2 Comparative Evaluation and Identification of the Preferred Alternative

The three alternative methods are comparatively assessed and evaluated using the criteria and indicators to determine the Preferred Alternative. The differences in the potential environmental effects remaining following the implementation of potential mitigation/management measures (i.e., net effects) are used to identify and compare each alternative method.

The net environmental effects are used to compare the three alternative methods to one another at the criteria and indicator level for each discipline. The following two step methodology was applied to carry out the comparative evaluation for Surface Water Quantity:

1. Identify the predicted net effect(s) associated with each alternative method for each indicator and assign a preference rating (i.e., Preferred, Not Preferred, No Substantial Difference); and
2. Rate each alternative method at the criteria level (i.e., Preferred, Not Preferred, No Substantial Difference) based on the identified preference rating for each indicator and provide a rationale.

2.3 Effects Assessment of the Preferred Alternative

An assessment of the environmental effects of the Preferred Alternative is carried out considering the same criteria, indicators, and data sources, considering potential mitigation/management measures and cumulative effects. The Preferred Alternative's contribution to reducing greenhouse gas (GHG) emissions and climate change is also examined. The effects assessment of the Preferred Alternative will be compiled and presented in the EA Study Report.

2.4 Comparison of the Preferred Alternative against the 'Do Nothing' Alternative

The effects of the Preferred Alternative are compared against the predicted effects of the currently approved Expansion Landfill based on similar environmental criteria and indicators, with the understanding that the criteria and indicators used in the current effects assessment may differ from those used for the effects assessment of the Expansion Landfill. The effects are compared against each other in terms of magnitude, extent, and duration. The advantages and disadvantages of the Preferred Alternative compared to the 'Do Nothing' Alternative are identified. The comparison of the effects of the Preferred Alternative against the 'Do Nothing' Alternative will be compiled and presented in the EA Study Report.

3 Net Effects Assessment

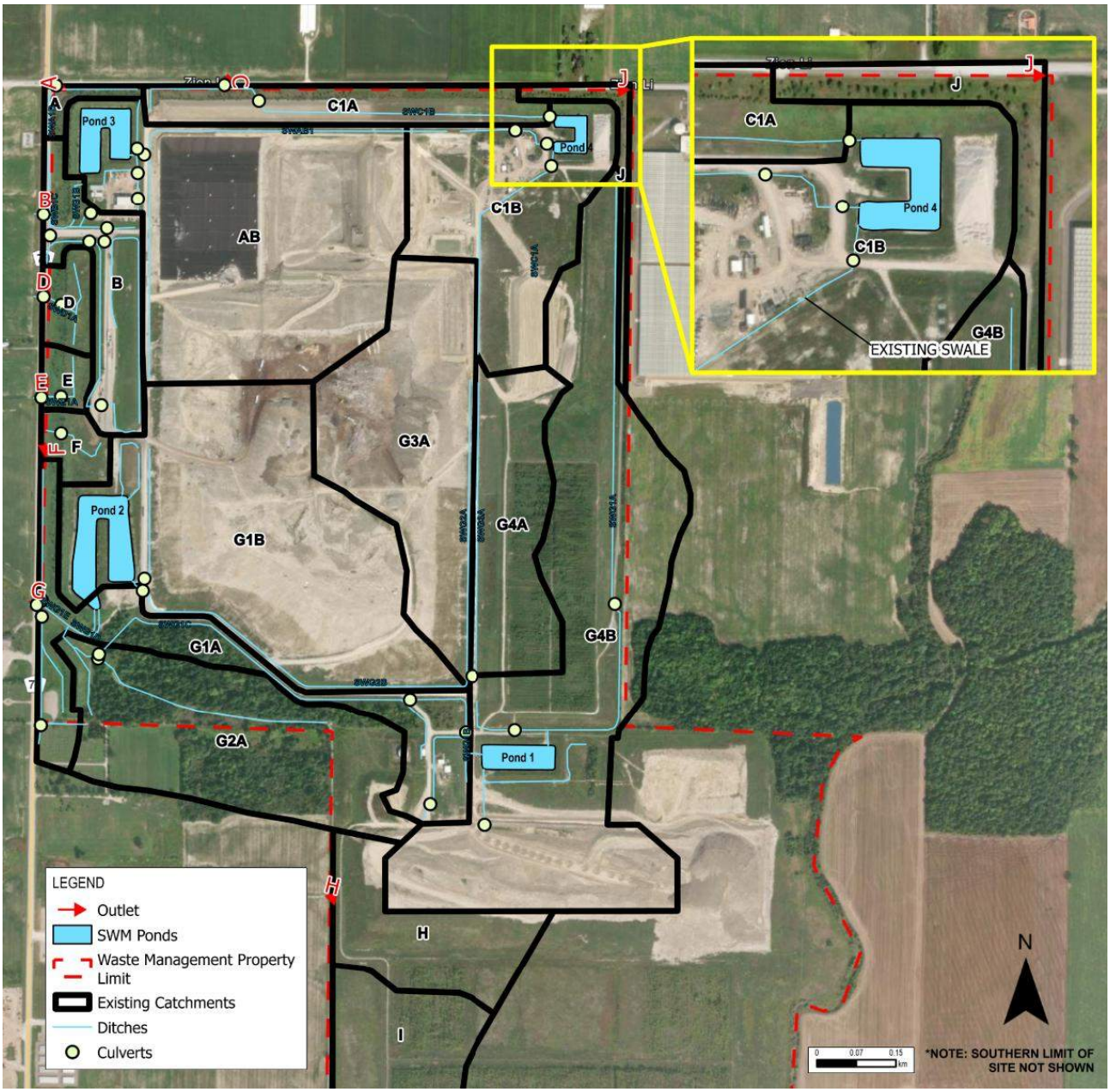
To identify the potential effects of the Project on Surface Water Quantity, the conceptual design of each alternative method for the landfill optimization is examined to determine if it will have an effect on Surface Water Quantity through changes in:

- runoff volumes and peak flows resulting from steeper and longer side slopes;
- drainage areas on-site and off-site; and/or
- predicted occurrence and degree of off-site effects to surface water flows.

The results of the net effects assessment for each alternative method are provided in **Sections 3.2** through **3.4**, below.

It is noteworthy, for the purposes of the net effects assessment, the alternative methods were compared against the Existing Conditions documented in the Surface Water Quantity Existing Conditions Report. This approach was adopted as a conservative benchmark for assessing changes in drainage areas, peak flows, and stormwater management pond function associated with the alternative methods. The Existing Conditions represent the current/present-day drainage configuration and stormwater management performance at the site and provide a suitable basis for identifying potential incremental changes resulting from the alternative methods. The Existing Conditions are shown in **Figure 3-1**.

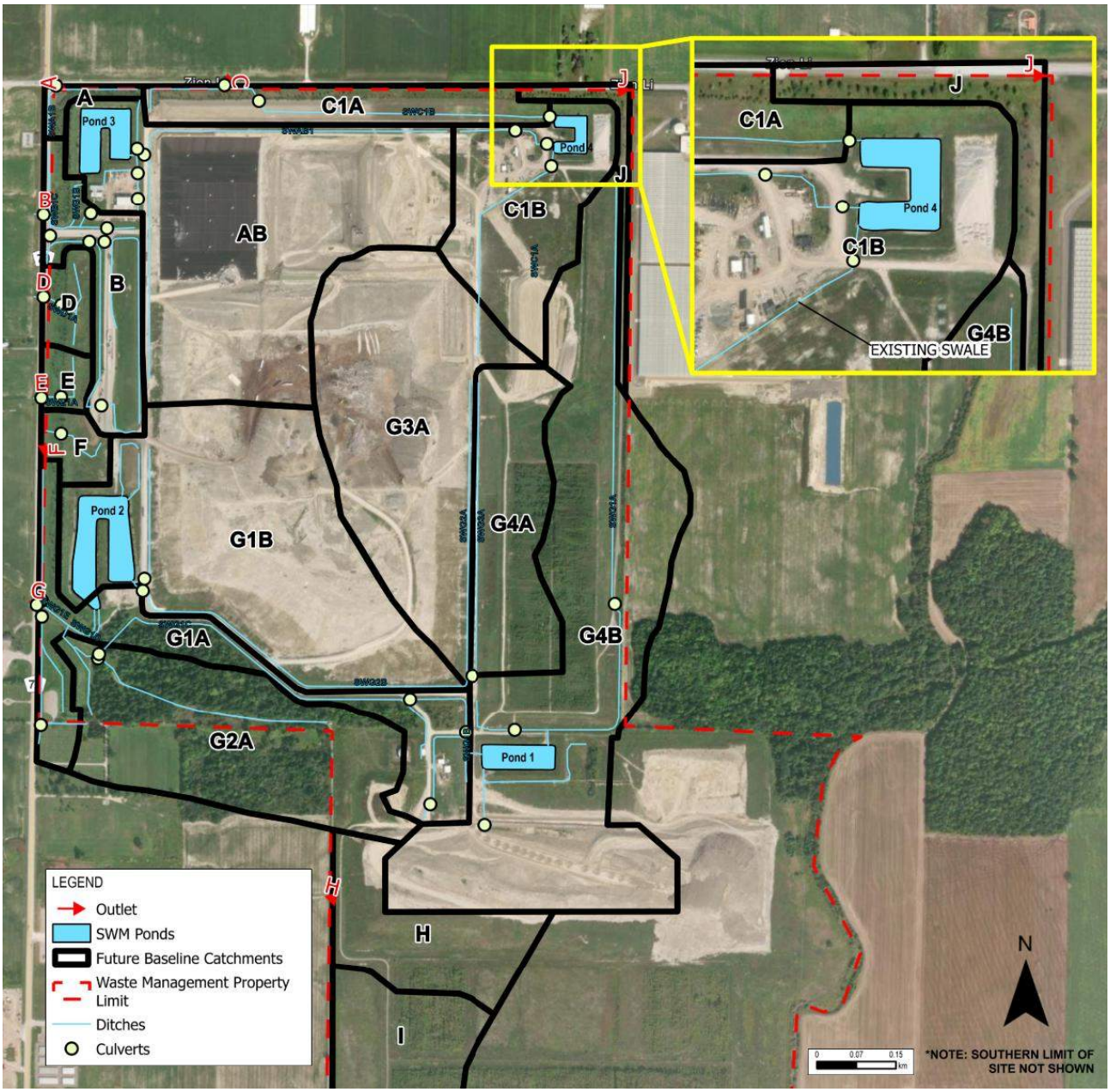
Figure 3-1. Existing Conditions



3.1 Future Baseline Conditions

When the Project starts, the Future Baseline Conditions of the landfill will prevail. As such, all comparisons in the sections that follow have been made between the three alternative methods and Future Baseline Conditions shown in **Figure 3-2** and **Appendix A** (**Exhibit 3-1**). The Future Baseline Conditions are defined as the completion of the landfill mound to the currently approved design (i.e., the approved Expansion Landfill), which is equivalent to the 'Do Nothing' Alternative for the purposes of this assessment.

Figure 3-2. Future Baseline Conditions



3.2 Alternative Method 1

The assessment of effects for Alternative Method 1 is described below for the environmental criteria and indicators of Surface Water Quantity and is summarized in **Table 3-4**.

3.2.1 Surface Water Quantity

Stormwater is currently managed on site through swales and SWM ponds. Swales direct runoff to the ponds and outlets, providing infiltration along the way. Four SWM

ponds that are situated at the corners of the Expansion Landfill footprint collect runoff from the surface of the landfill and release flows through culvert outlets (**Figure 1-1**). In this manner, they maintain peak site runoff at pre-development levels. There are ten stormwater outlets from the site as shown on **Figure 1-1**, labelled A-J, four of which receive water from the SWM ponds.

3.2.1.1 Changes in Drainage Areas On-Site and Off-Site

Alternative Method 1 includes the increase of final landfill side slopes from 4H:1V to 3H:1V between the original grade and elevation 320 masl, approximately 16 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 324.5 masl within the Expansion Landfill footprint. As a result of the new grading for this alternative method, the catchment delineation within the optimization area on the landfill site will change under Alternative Method 1 when compared to Existing Conditions as shown in **Figure 1-1.**

Changes in off-site drainage areas are not anticipated for Alternative Method 1 because the site outlets will not change and the existing drainage areas are able to accommodate the changes in peak flows from the outlets described in **Section 3.2.1.2**, below.

3.2.1.2 Change in Runoff Volumes and Peak Flows Resulting from Steeper and Longer Side Slopes

The change in side slopes described in **Section 3.2.1.1** for Alternative Method 1 will not change total runoff volume from the landfill site; however, the timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets as shown in **Table 3-1.** It is noteworthy that changes were observed only for the four outlets shown in the table below. All other outlets show exactly the same peak flows leaving the site since the change in delineation of the catchments only occurred within the optimization area of the landfill. The peak storage used for the four SWM ponds is shown in **Table 3-2**.

Full results showing all return period storms are available in **Appendix A**. The locations of the named outlets, ponds, and swales are shown in **Figure 1-1**.

Table 3-1. Changes to Site Outlet peak flows during 100-year event

Outlets	Peak Runoff (cms)		
	Existing Conditions	Alternative Method 1	% Increase from Existing Conditions
A	0.261	0.276	6%
B	1.006	0.970	-4%
C	0.643	0.520	-19%
G	1.627	1.810	11%

Table 3-2. SWM Pond function during 100-year event

Pond	Capacity (ha·m)	Peak Storage Used (ha·m)		
		Existing Conditions	Alternative Method 1	% increase from Existing Conditions
1	2.773	0.943	0.943	0%
2	5.271	1.625	1.824	12%
3	2.857	0.732	0.750	2%
4	1.099	0.347	0.282	-19%

The data presented in **Table 3-1** shows peak outflows from select outlets leaving the landfill site for the 100-year 4-hour Chicago design storm. The results for Alternative Method 1 show that Outlets A and G experience an increase in peak flow compared to existing levels, while Outlets B and C demonstrate a decrease. It is noteworthy that Stormwater Management Pond 3 discharges flows to Outlets A and B, Outlet A shows an increase in flows of approximately 6% and conversely Outlet B shows a decrease in flows of approximately 4% when compared to Existing Conditions. Outlet G shows an approximate increase of 11% in flows when compared to Existing Conditions. However, it should be noted that the swales conveying the flows to Outlet G have sufficient capacity and are able to convey the flows downstream safely.

Further, the data presented in **Table 3-2** indicates that all four stormwater management ponds on the landfill site have enough capacity to store the 100-year flows. They do not require alteration or enlargement.

The 100-year 3-hour Chicago design storm was also run for Alternative Method 1, however the 100-year 4-hour Chicago design storm led to more conservative results (i.e., higher peak flows and higher storage volumes). As such, the 4-hour Chicago design storm results were chosen to be presented within this report. Modelling output from both design storms is included in **Appendix A**.

The existing swales around the landfill site are also able to safely convey the 25-year design storm (**Table 3-3**) without overtopping. Hence, a modification to the existing cross-section geometries of the swales is not warranted. The relocated swales (SWC1A and SWG2A) and new culvert will also be able to convey these flows appropriately when constructed.

Table 3-3. Swale function during 25-year event

Swale	Existing Flow Capacity (L/s)	Peak Flow (L/s) Alternative Method 1
SWAB1A	9,384	1,594
SWA1B	6,256	193
SWB1B	23,461	215
SWB1C	120,733	773

Swale	Existing Flow Capacity (L/s)	Peak Flow (L/s) Alternative Method 1
SWC1A	3,699	570
SWC1B	191,849	484
SWD1A	28,626	233
SWE1A	100,850	213
SWG1A	3,981	1,103
SWG1B	17,669	463
SWG1C	11,847	813
SWG1D	6,229	400
SWG1E	10,909	1,211
Stream	18,095	1,211
SWG2A	1,592	691
SWG2B	12,631	2,723
SWG3A	1,246	297

In summary, Alternative Method 1 shows an increase in peak flows leaving the site for two outlets (A and G) and a decrease for two outlets (B and C).

3.2.1.3 Predicted Occurrence and Degree of Off-Site Effects

Full results showing all return period storms are available in **Appendix A**. The locations of the named outlets, ponds, and swales are shown in **Appendix A**.

The downstream receiver of flows from Outlet A is the Auld-Redmond Drain and the downstream receiver of flows from Outlet G is the Gilliland-Geerts Drain. According to the results for Alternative Method 1, both outlets show an increase in peak flows up to 11%. Mitigation is not required as the peak flows are less than 1 m^3/s for Outlets A, B and C and 1.8 m^3/s for Outlet G. The increase in peak flows for Outlet A and G is 6% and 11% respectively and the decrease in peak flows for Outlets B and C is 4% and 19%. Additionally, the overall drainage areas are not being altered in any way due to Alternative Method 1.

3.2.2 Summary

A summary of the effects assessment of Alternative Method 1 is summarized below in **Table 3-4**.

Table 3-4. Net Effects Assessment – Alternative Method 1

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Surface Water Quantity	Change in runoff volumes and peak flows resulting from steeper and longer side slopes	• Increase of final landfill side slopes from 4H:1V to 3H:1V between the original grade and elevation 320 masl, about 16 m in grade change, transitioning to a 20H:1V upper slope to a peak elevation of 324.5 masl over the Expansion Landfill footprint. • Change in catchment areas within the landfill optimization area. • Four SWM ponds, existing swales and catchments D, E, F, H, I, and J will not be physically altered. • No change in total runoff volume from the landfill site.	• The timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets. • Outlets A and G show an increase in peak flow compared to existing levels (up to 11%), while Outlets B and C demonstrate a decrease (up to 19%).	• No mitigation measures required.	• Increase in peak flows, up to 11% from Existing Conditions.
	Changes in drainage areas on-site and off-site	• Change in catchment areas within the landfill site • Four SWM ponds, existing swales and catchments D, E, F, H, I, and J will not be physically altered. • No change in off-site areas	• Changes in catchment areas within the landfill optimization area are between -23% and 37% when compared to Existing Conditions. • No change in off-site areas.	• No mitigation measures required.	• Changes in catchment areas within the landfill optimization area are between -23% and 37% when compared to Existing Conditions. • No change in off-site areas.
	Predicted occurrence and degree of off-site effects	• Change in catchment areas within the landfill optimization area. • No change in off-site areas • No change in total runoff volume from the landfill site. • Existing monitoring is expected to continue for the landfill site.	• Increase in peak flows of up to 11% from Existing Conditions. Peak flows are less than 1 m^3/s for Outlets A, B and C and 1.8 m^3/s for Outlet G.	• No mitigation measures required.	• Increase in peak flows up to 11% from Existing Conditions.

3.3 Alternative Method 2

The assessment of effects for Alternative Method 2 is described below for the environmental criteria and indicators of Surface Water Quantity and is summarized in **Table 3-8**.

3.3.1 Surface Water Quantity

Refer to **Section 3.2.1**.

3.3.1.1 Changes in drainage areas on-site and off-site

Alternative Method 2 includes the increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 250 masl and elevation 313 masl, about 60 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 319 masl over the Expansion Landfill. As a result of the new grading for this alternative method, the catchment delineation within the optimization area on the landfill site will change under Alternative Method 2 when compared to Existing Conditions as shown in **Figure 1-2.**

Changes in off-site drainage areas are not anticipated for Alternative Method 2 as catchments within the optimization area are expected to change whereas the overall drainage area of the landfill site remains the same. As such, any form of mitigation within the landfill site is not anticipated.

3.3.1.2 Changes in runoff volumes and peak flows resulting from steeper and longer side slopes

The change in side slopes described in **Section 3.3.1.1** will not change total runoff volume from the landfill site; however, the timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets as shown in **Table 3-5.** It is noteworthy that changes were observed only for the four outlets shown in the table below. All other outlets show exactly the same peak flows leaving the site since the change in delineation of the catchments only occurred within the optimization area of the landfill. The peak storage used for the four SWM ponds is shown in **Table 3-6**.

Full results showing all return period storms are available in **Appendix A**. The locations of the named outlets, ponds, and swales are shown in **Figure 1-2**.

Table 3-5. Changes to Site Outlet peak flows during 100-year event

Outlets	Peak Runoff (cms)		
	Existing Conditions	Alternative Method 2	% Increase from Existing Conditions
A	0.261	0.279	7%
B	1.006	0.970	-4%
C	0.643	0.522	-19%
G	1.627	1.794	10%

Table 3-6. SWM Pond function during 100-year event

Pond	Capacity (ha·m)	Peak Storage Used (ha·m)		
		Existing Conditions	Alternative Method 2	% increase from Existing Conditions
1	2.773	0.943	0.943	0%
2	5.271	1.625	1.808	11%
3	2.857	0.732	0.757	3%
4	1.099	0.347	0.284	-18%

Like Alternative Method 1, peak outflows for the 100-year 4-hour Chicago design storm from select outlets leaving the site under the Alternative Method 2 scenario are comparable. It is noteworthy that Stormwater Management Pond 3 discharges flows to Outlets A and B and as seen from **Table 3-5**, Outlet A shows an increase in flows of approximately 7% and conversely Outlet B shows a decrease in flows of approximately 4% when compared to Existing Conditions. Outlet G shows an approximate increase of 10% in flows when compared to Existing Conditions. However, it should be noted that the swales conveying the flows to Outlet G have sufficient capacity and are able to convey the flows downstream safely. These results are presented in greater detail in **Appendix A**.

The 100-year 3-hour Chicago design storm was also run for Alternative Method 2, and it was found that the 100-year 4-hour Chicago design storm led to more conservative results (i.e., higher peak flows and higher storage volumes). Modelling output from both design storms is included in **Appendix A**. **Table 3-6** and **Table 3-7** demonstrate that the existing stormwater management ponds and swales will have enough capacity to process their respective design storms under Alternative Method 2. The relocated swales (SWC1A and SWG2A) and new culvert will also be able to convey these flows appropriately.

Table 3-7. Swale function during 25-year event

Swale	Existing Flow Capacity (L/s)	Peak Flow (L/s) Alternative Method 2
SWAB1A	9,384	1,560
SWA1B	6,256	196
SWB1B	23,461	218
SWB1C	120,733	773
SWC1A	3,699	581
SWC1B	191,849	485
SWD1A	28,626	233
SWE1A	100,850	213
SWG1A	3,981	1,103
SWG1B	17,669	463
SWG1C	11,847	813

Swale	Existing Flow Capacity (L/s)	Peak Flow (L/s) Alternative Method 2
SWG1D	6,229	391
SWG1E	10,909	1,209
Stream	18,095	1,209
SWG2A	1,592	661
SWG2B	12,631	2,696
SWG3A	1,246	297

In summary, Alternative Method 2 shows an increase in peak flows leaving the site for two outlets (A and G) and a decrease for two outlets (B and C).

3.3.1.3 Predicted occurrence and degree and off-site effects

Full results showing all return period storms are available in **Appendix A**. The locations of the named outlets, ponds, and swales are shown in **Appendix A**.

The downstream receiver of flows from Outlet A is the Auld-Redmond Drain and the downstream receiver of flows from Outlet G is the Gilliland-Geerts Drain. According to the results for Alternative Method 2, both outlets show an increase in peak flows that is within 10%. Mitigation is not required as the peak flows are less than 1 m^3/s for Outlets A, B and C and 1.8 m^3/s for Outlet G. The increase in peak flows for Outlet A and G is 7% and 10% respectively and the decrease in peak flows for Outlets B and C is 4% and 19%. Additionally, the drainage areas are not being altered in any way due to Alternative Method 2.

3.3.2 Summary

A summary of the effects assessment of Alternative Method 2 is summarized below in **Table 3-8**.

Table 3-8. Net Effects Assessment – Alternative Method 2

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Surface Water Quantity	Change in runoff volumes and peak flows resulting from steeper and longer side slopes	• Increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 250 masl and elevation 313 masl, about 60 m in grade change, transitioning to a 20H:1V upper slope to a peak elevation of 319 masl over the Expansion Landfill footprint. • Change in catchment areas within the landfill optimization area. • Four SWM ponds, existing swales and catchments D, E, F, H, I, and J will not be physically altered. • No change in total runoff volume from the landfill site.	• The timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets. • Outlets A and G show an increase in peak flows compared to existing levels (up to 10%), while Outlets B and C demonstrate a decrease (up to 19%).	• No mitigation measures required.	• Increase in peak flows up to 10% from Existing Conditions.
	Changes in drainage areas on-site and off-site	• Change in catchment areas within the landfill site optimization area. • Four SWM ponds, existing swales and catchments D, E, F, H, I, and J will not be physically altered. • No change in off-site areas	• Changes in catchment areas within the landfill optimization area are between -22% and 34% when compared to Existing Conditions. • No change in off-site areas.	• No mitigation measures required.	• Changes in catchment areas within the landfill optimization area are between -22% and 34% when compared to Existing Conditions. • No change in off-site areas.
	Predicted occurrence and degree of off-site effects	• Change in catchment areas within the landfill optimization area. • No change in off-site areas • No change in total runoff volume from the landfill site. • Existing monitoring is expected to continue for the landfill site.	• Increase in peak flows of up to 10% from Existing Conditions. Peak flows are less than 1 m^3/s for Outlets A, B and C and 1.8 m^3/s for Outlet G.	• No mitigation measures required.	• Increase in peak flows up to 10% from Existing Conditions.

3.4 Alternative Method 3

The assessment of effects for Alternative Method 3 is described below for the environmental criteria and indicators of Surface Water Quantity and is summarized in **Table 3-12**.

3.4.1 Surface Water Quantity

Refer to **Section 3.2.1**.

3.4.1.1 Changes in drainage areas on-site and off-site

Alternative Method 3 includes the increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 260 masl and elevation 360 masl, about 100 m in grade change, peaking at elevation 360 masl over the Expansion Landfill. As a result of the new grading for this alternative method, the catchment delineation within the optimization area on the landfill site will change under Alternative Method 3 when compared to Existing Conditions as shown in **Figure 1-3.**

Changes in off-site drainage areas is not anticipated for Alternative Method 3 as catchments within the optimization area are expected to change whereas the overall drainage area of the landfill site remains the same. As such, any form of mitigation within the landfill site is not anticipated.

3.4.1.2 Change in runoff volumes and peak flows resulting from steeper and longer side slopes

The change in side slopes described in **Section 3.4.1.1** will not change total runoff volume from the landfill site; however, the timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets as shown in **Table 3-9.** It is noteworthy that changes were observed only for the four outlets shown in the table below. All other outlets show exactly the same peak flows leaving the site since the change in delineation of the catchments only occurred within the optimization area of the landfill. The peak storage used for the four SWM ponds is shown in **Table 3-10**.

Full results showing all return period storms are available in **Appendix A**. The locations of the named outlets, ponds, and swales are shown in **Figure 1-3**.

Table 3-9. Changes to Site Outlet peak flows during 100-year event

Outlets	Peak Runoff (cms)		
	Existing Conditions	Alternative Method 3	% Increase from Existing Conditions
A	0.261	0.273	5%
B	1.006	0.970	-4%
C	0.643	0.520	-19%
G	1.627	1.806	11%

Table 3-10. SWM Pond function during 100-year event

Pond	Capacity (ha·m)	Peak Storage Used (ha·m)		
		Existing Conditions	Alternative Method 3	% Increase from Existing Conditions
1	2.773	0.943	0.943	0%
2	5.271	1.625	1.823	12%
3	2.857	0.732	0.746	2%
4	1.099	0.347	0.281	-19%

The data presented in the tables above mirror those of **Sections 3.2.1** and **3.3.1**. Like Alternative Methods 1 and 2, peak outflows from select outlets leaving the site under the Alternative Method 3 scenario are comparable. It is noteworthy that Stormwater Management Pond 3 discharges flows to Outlets A and B and as seen from **Table 3-9**, Outlet A shows an increase in flows of approximately 5% and conversely Outlet B shows a decrease in flows of approximately 4% when compared to Existing Conditions. Outlet G shows an approximate increase of 11% in flows when compared to Existing Conditions. However, it should be noted that the swales conveying the flows to Outlet G have sufficient capacity and are able to convey the flows downstream safely. These results are presented in greater detail in **Appendix A**.

The 100-year 3-hour Chicago design storm was also run for Alternative Method 3, and it was found that the 100-year 4-hour Chicago design storm led to more conservative results (i.e., higher peak flows and higher storage volumes). Modelling output from both design storms is included in **Appendix A**.

Table 3-10 and **Table 3-11** demonstrate that the existing stormwater management ponds and swales will have enough capacity to process their respective design storms under Alternative Method 3. The relocated swales (SWC1A) and SWG2A) and new culvert will also be able to convey these flows appropriately.

Table 3-11. Swale function during 25-year event

Swale	Flow Capacity (L/s)	Peak Flow (L/s)
		Future Alternative Method 3
SWAB1A	9,384	1,526
SWA1B	6,256	191
SWB1B	23,461	214
SWB1C	120,733	773
SWC1A	3,699	565
SWC1B	191,849	483
SWD1A	28,626	233
SWE1A	100,850	213
SWG1A	3,981	1,103
SWG1B	17,669	463

Swale	Flow Capacity (L/s)	Peak Flow (L/s)
		Future Alternative Method 3
SWG1C	11,847	813
SWG1D	6,229	400
SWG1E	10,909	1,211
Stream	18,095	1,211
SWG2A	1,592	658
SWG2B	12,631	2,753
SWG3A	1,246	297

In summary, Alternative Method 3 shows an increase in peak flows leaving the site for two outlets (A and G) and a decrease for two outlets (B and C).

3.4.1.3 Predicted occurrence and degree of off-site effects

Full results showing all return period storms are available in **Appendix A**. The locations of the named outlets, ponds, and swales are shown in **Appendix A**.

The downstream receiver of flows from Outlet A is the Auld-Redmond Drain and the downstream receiver of flows from Outlet G is the Gilliland-Geerts Drain. According to the results for Alternative Method 3, both outlets show an increase in peak flows that is within 11%. Mitigation is not required as the peak flows are less than 1 m^3/s for Outlets A, B and C and 1.8 m^3/s for Outlet G. The increase in peak flows for Outlet A and G is 5% and 11% respectively and the decrease in peak flows for Outlets B and C is 4% and 19%. Additionally, the drainage areas are not being altered in any way due to Alternative Method 3.

3.4.2 Summary

A summary of the effects assessment of Alternative Method 3 is summarized below in **Table 3-12**.

Table 3-12. Net Effects Assessment – Alternative Method 3

Evaluation Criteria	Indicator	Key Design Considerations and Assumptions	Potential Effects	Mitigation Measures	Net Effects
Surface Water Quantity	Change in runoff volumes and peak flows resulting from steeper and longer side slopes	• Increase of final landfill side slopes from 4H:1V to 2.5H:1V between the elevation 260 masl and elevation 360 masl, about 100 m in grade change, to a peak elevation of 360 masl over the Expansion Landfill footprint. • Change in catchment areas within the landfill optimization area. • Four SWM ponds, existing swales and catchments D, E, F, H, I, and J will not be physically altered. • No change in total runoff volume from the landfill site.	• The timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets. • Outlets A and G show an increase in peak flow compared to existing levels (up to 11%), while Outlets B and C demonstrate a decrease (up to 19%).	• No mitigation measures required.	• Increase in peak flows are up to 11% from Existing Conditions.
	Changes in drainage areas on-site and off-site	• Change in catchment areas within the landfill optimization area. • Four SWM ponds, existing swales and catchments D, E, F, H, I, and J will not be physically altered. • No change in off-site areas	• Changes in catchment areas within the landfill optimization area are between -24% and 36% when compared to Existing Conditions. • No change in off-site areas.	• No mitigation measures required.	• Changes in catchment areas within the landfill optimization area are between -24% and 36% when compared to Existing Conditions. • No change in off-site areas.
	Predicted occurrence and degree of off-site effects	• Change in catchment areas within the landfill optimization area. • No change in off-site areas • No change in total runoff volume from the landfill site. • Existing monitoring is expected to continue for the landfill site.	• Increase in peak flows of up to 10% from Existing Conditions. Peak flows are less than 1 m^3/s for Outlets A, B and C and 1.8 m^3/s for Outlet G.	• No mitigation measures required.	• Increase in peak flows are up to 11% from Existing Conditions.

4 Comparative Evaluation of Net Effects and Identification of the Preferred Alternative

The comparative evaluation of the net effects of each alternative method and the identification of a Preferred Alternative are carried out in accordance with the methods described in **Section 2.2**. The three alternative methods are comparatively assessed and evaluated using the criteria and indicators to determine the Preferred Alternative. The differences in the potential environmental effects remaining following the implementation of potential mitigation/management measures (i.e., net effects) are used to identify and compare each alternative method. The comparative evaluation of the alternative methods for Surface Water Quantity is provided in **Table 4-1**, below.

The overall Preferred Alternative for Surface Water Quantity based on the results of the criteria comparisons is Alternative Method 2.

Table 4-1. Comparative Evaluation of the Net Effects of the Alternative Methods for Surface Water Quantity

Evaluation Criteria	Indicator	Net Effects of Alternative Methods		
		Alternative Method 1	Alternative Method 2	Alternative Method 3
Surface Water Quantity	Change in runoff volumes and peak flows resulting from steeper and longer side slopes	This method results in increase of final landfill side slopes from 4H:1V to 3H:1V between the original grade and elevation 320 masl, about 16 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 324.5 masl over within the Expansion Landfill footprint. The peaking elevation for Alternative Method 1 is 324.5 masl. Peak flows leaving the landfill site are up to 11% when compared to Existing Conditions. **Not Preferred**	This method results in increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 250 masl and elevation 313 masl, about 60 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 319 masl over within the Expansion Landfill footprint. Alternative Method 2 has the lowest peaking elevation when compared to the other alternative methods. Peak flows leaving the landfill site are up to 10% when compared to Existing Conditions. **Preferred due to lowest peaking elevation when compared to other alternative methods.**	This method results in increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 260 masl and elevation 360 masl, about 100 m in grade change, peaking at elevation 360 masl over within the Expansion Landfill footprint. The peaking elevation for Alternative Method 3 is 360 masl. Peak flows leaving the landfill are up to 11% when compared to Existing Conditions. **Not Preferred**

Table 4-1. Comparative Evaluation of the Net Effects of the Alternative Methods for Surface Water Quantity

Evaluation Criteria	Indicator	Net Effects of Alternative Methods		
		Alternative Method 1	**Alternative Method 2**	**Alternative Method 3**
	Changes in drainage areas on-site and off-site	Changes in catchment areas within the landfill optimization area is between -23% and 37% when compared to Existing Conditions. The timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets. **Not Preferred**	Changes in catchment areas within the landfill optimization area is between -22% and 34% when compared to Existing Conditions The timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets. The maximum increase of drainage area for one catchment (G3A) is the lowest (34%) when compared to other alternatives against Existing Conditions. **Preferred**	Changes in catchment areas within the landfill optimization area is between -24% and 36% when compared to Existing Conditions The timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets. **Not Preferred**
	Predicted occurrence and degree of off-site effects	Peak flows leaving the landfill site are less than 11% when compared to Existing Conditions. **Not Preferred**	Peak flows leaving the landfill site are approximately 10% when compared to Existing Conditions. **Preferred. No substantial difference.**	Peak flows leaving the landfill site are approximately 11% when compared to Existing Conditions. **Not Preferred**
	Criteria Rating & Rationale	***Alternative Method 2 is preferred over Alternative Methods 1 and 3.*** Although the peak flows leaving the site under Alternative Method 2 are just slightly lower than Alternative Methods 1 (11%) and 3 (11%), Alternative Method 2 has the lowest peaking elevation when compared to other alternative methods. As such, reduced runoff velocity and enhanced infiltration of the stormwater is anticipated for this method. Additionally, the maximum increase of drainage area for one catchment (G3A) is the lowest (34%) when compared to other alternative methods against Existing Conditions.		
Preferred Alternative: Alternative Method 2 is the Preferred Alternative from a Surface Water Quantity perspective.				

5 Effects Assessment of the Preferred Alternative

The overall Preferred Alternative for Surface Water Quantity based on the results of the criteria comparisons is Alternative Method 2.

5.1 Changes in drainage areas on-site and off-site

Changes in catchment areas within the landfill optimization area are between -22% and 34% when compared to Existing Conditions. The maximum increase of drainage area for one catchment (G3A) is the lowest (34%) when compared to other alternative methods against Existing Conditions. However, it is noteworthy that off-site drainage areas remain unchanged for all alternative methods.

The timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets.

5.2 Change in runoff volumes and peak flows resulting from steeper and longer side slopes

Alternative Method 2 results in increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 250 masl and elevation 313 masl, about 60 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 319 masl within the Expansion Landfill footprint. Alternative Method 2 has the lowest peaking elevation when compared to other alternative methods. As such, reduced runoff velocity and enhanced infiltration of the stormwater is anticipated for this method.

Outlets A and G show an increase in peak flows compared to existing levels (up to 10%), while Outlets B and C demonstrate a decrease (up to 19%).

5.3 Predicted occurrence and degree of off-site effects

The downstream receiver of flows from Outlet A is the Auld-Redmond Drain and the downstream receiver of flows from Outlet G is the Gilliland-Geerts Drain. According to the results for Alternative Method 2, both outlets show an increase in peak flows that is less than 10%. Mitigation is not required as the peak flows are less than 1 m^3/s for Outlets A, B and C and 1.8 m^3/s for Outlet G. The increase in peak flows for Outlet A and G is 7% and 10% respectively and the decrease in peak flows for Outlets B and C is 4% and 19%. Additionally, the drainage areas are not being altered in any way due to Alternative Method 2.

Furthermore, although Outlet A is predicted to increase from 0.261 m^3/s under Existing Conditions to 0.279 m^3/s under Alternative Method 2 during the 100-year 4-hour Chicago design storm, the magnitude of the increase is small and the resulting peak

flow remains less than 1 m³/s. The increase at Outlet A is also considered in the context of the overall stormwater management system performance, including the corresponding decrease at Outlet B and the confirmation that the existing SWM ponds and swales have sufficient capacity to convey and manage the design storm flows. Accordingly, no additional physical mitigation is proposed for Outlet A beyond the existing in-design stormwater management measures and on-going monitoring/maintenance program. Given the minor magnitude of the predicted increase and the demonstrated capacity of the existing stormwater management system, the change at Outlet A is not considered to represent a meaningful adverse effect and does not warrant additional mitigation.

5.4 Climate Change Considerations

Extreme weather events caused by climate change are relevant to the design of stormwater management systems in the diversion/control of runoff, as well as erosion and sedimentation control. Climate change will impact the stormwater management system by increasing the intensity and frequency of storms, which will cause larger peak flows, sometimes by a significant amount. It is for this reason that the future conditions were modelled for the currently approved landfill buildout and the three alternative methods using current and future climate change intensity-duration-frequency (IDF) curves. These curves were taken from the Sarnia weather station as reported/predicted by Environment and Climate Change Canada. The 2071-2100 SSP2-4.5 (moderate emissions scenario) was used, representing a 27-29% increase in peak intensity. The analysis demonstrated that despite the increase in peak flows climate change will cause, the existing ponds and swales have sufficient capacity to manage the runoff under the design storms.

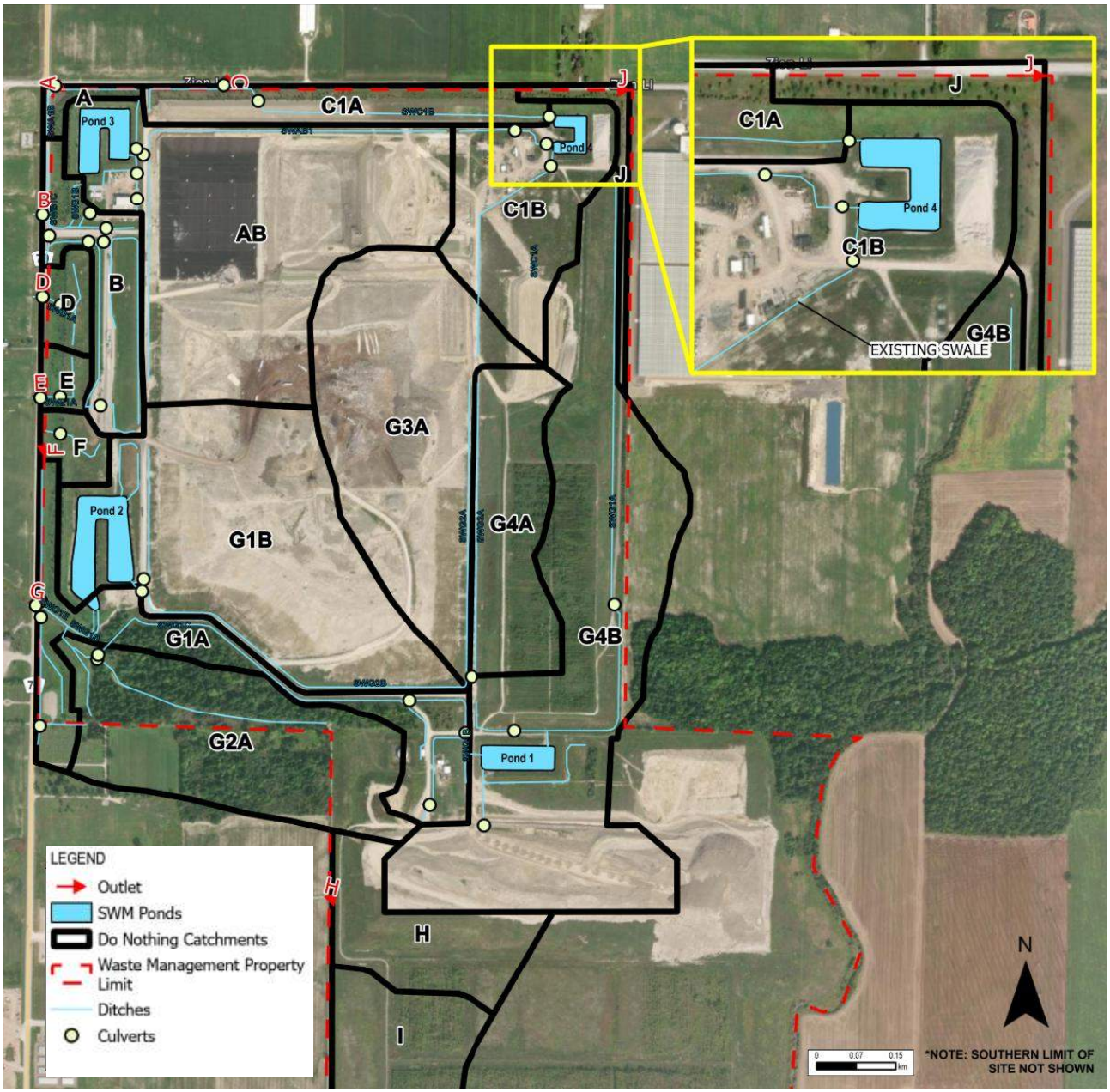
6 Comparison of the Preferred Alternative against the ‘Do Nothing’ Alternative

The effects of the Preferred Alternative are compared against the predicted effects of the currently approved Expansion Landfill based on similar environmental criteria and indicators, with the understanding that the criteria and indicators used in the current effects assessment may differ from those used for the effects assessment of the Expansion Landfill. The effects are compared against each other in terms of magnitude, extent, and duration below. The advantages and disadvantages of the Preferred Alternative compared to the ‘Do Nothing’ Alternative are identified.

6.1 Effects of the 'Do Nothing' Alternative

Should the landfill optimization not proceed, the landfill development will continue until it has reached its full horizontal footprint and currently approved height of 280 masl. This will alter the outlets' catchment areas, land cover, and time of concentration, as well as the path of the swales in the northeast corner. The 'Do Nothing' Alternative is considered to be the Future Baseline Conditions and was modelled as part of the assessment as shown in **Appendix A** (**Exhibit 6-1**).

Figure 6-1. 'Do Nothing' Alternative (Approved Stormwater Management)



6.2 Comparison of the Preferred Alternative against the 'Do Nothing' Alternative

This section compares the effects of the Preferred Alternative (Alternative Method 2) against the 'Do Nothing' Alternative.

6.2.1 Changes in drainage areas on-site and off-site

Should the landfill optimization not proceed, the landfill development will continue until it has reached its full horizontal footprint and currently approved height of 280 masl. This will alter the outlets' catchment areas, land cover, and time of concentration, as well as the path of the swales in the northeast corner. As a result of the new grading for Alternative Method 2, the catchment delineation within the optimization area on the landfill site will change.

Further, Alternative Method 2 includes the increase of final landfill side slopes from 4H:1V to 2.5H:1V between elevation 250 masl and elevation 313 masl, about 60 m in grade change, transitioning to a 20H:1V upper slope and peaking at elevation 319 masl over the Expansion Landfill.

It is noteworthy that the changes in off-site drainage areas is not anticipated for the 'Do Nothing' Alternative and Alternative Method 2 as catchments within the landfill optimization area are expected to change whereas the overall drainage area of the landfill site remains the same. As such, any form of mitigation within the landfill site is not anticipated as well.

When the catchment areas are compared between the two, there is an increase for three catchments ranging from 1% to 4% and a decrease for two catchments ranging from 1% to 4% for Alternative Method 2. Detailed comparison is shown in **Appendix A**.

6.2.2 Change in runoff volumes and peak flows resulting from steeper and longer side slopes

The change in side slopes described in **Section 6.2.1** will not change total runoff volume from the landfill site; however, the timing of peak flows and the redistribution of catchment areas is expected to increase or decrease some of the peak flows leaving through the outlets as shown in **Table 6-1**. It is noteworthy that changes were observed only for the four outlets shown in the table below. All other outlets show exactly the same peak flows leaving the site since the change in delineation of the catchments only occurred within the optimization area of the landfill. The peak storage used for the four SWM ponds is shown in **Table 6-2**.

Full results showing all return period storms are available in **Appendix A**. The locations of the named outlets, ponds, and swales are shown in **Appendix A**.

Table 6-1. Changes to Site Outlet peak flows during 100-year event.

Outlets	Peak Runoff (cms / % change from ''Do Nothing'' Alternative)		
	''Do Nothing'' Alternative	Alternative Method 2	% change from Do Nothing Alternative
A	0.275	0.279	1%
B	0.970	0.970	0%
C	0.518	0.522	1%
G	1.825	1.794	-2%

Table 6-2. SWM Pond function during 100-year event.

Pond	Capacity (ha·m)	Peak Storage Used (ha·m)		
		''Do Nothing'' Alternative	Alternative Method 2	% Increase from ''Do Nothing'' Alternative
1	2.773	0.943	0.943	0%
2	5.271	1.838	1.808	-2%
3	2.857	0.75	0.757	1%
4	1.099	0.285	0.284	0%

As seen from the results above, the peak flows leaving the landfill site for select outlets are very comparable for both alternatives. Similarly, the peak storage used for the ponds are also comparable.

6.2.3 Predicted occurrence and degree of off-site effects

The downstream receiver of flows from Outlet A is the Auld-Redmond Drain and the downstream receiver of flows from Outlet G is the Gilliland-Geerts Drain. According to the results for both, 'Do Nothing' Alternative and Alternative Method 2, the results are very comparable.

6.3 Advantages and Disadvantages of the Preferred Alternative

The differences in net effects between the Preferred Alternative and the 'Do Nothing' Alternative are used to determine the advantages and disadvantages of the Preferred Alternative. The advantages and disadvantages of the Preferred Alternative are listed in **Table 6-3**.

Table 6-3. Advantages and Disadvantages of the Preferred Alternative

Evaluation Criteria	Advantages	Disadvantages
Surface Water Quantity	• Peak storage used for SWM Ponds 2 and 4 is slightly lower for Alternative Method 2.	• No disadvantages noted.

7 Commitments and Monitoring

To confirm that the commitments related to Surface Water Quantity are carried out, and that the proposed mitigation measures will address the predicted effects for Surface Water Quantity, monitoring is proposed for construction of the Project. Monitoring for compliance will be undertaken to confirm that the Project complies with the commitments and mitigation measures identified in the effects assessment.

The commitments associated with Surface Water Quantity are listed in **Section 7.1**. The proposed environmental effects monitoring is provided in **Section 7.2**. Compliance monitoring for Surface Water Quantity is described in **Section 7.3**.

7.1 Surface Water Quantity Commitments

Additional mitigation from increased runoff of either alternative method is provided by the storage and settlement of suspended solids in the proposed SWM ponds. Periodic maintenance in the form of sediment removal to avoid the impacts on the storage capacity of the ponds will be required based on maintenance inspections. These are ‘in-design mitigation measures’ and no further mitigation measures are required. Furthermore, at the detailed design stage, the final drainage design will be reviewed to determine whether additional water quality enhancements, such as swales and/or refinements to the stormwater management system are required to enhance long-term performance.

7.2 Environmental Effects Monitoring for Surface Water Quantity

Monitoring plans are developed as part of the detailed effects assessments carried out for the Preferred Alternative to confirm:

- the net effects are as predicted;
- unanticipated negative effects are addressed; and
- the effectiveness of the proposed mitigation measures.

Table 7-1 contains the environmental effects monitoring for the Preferred Alternative.

7.3 Surface Water Quantity Compliance Monitoring

Compliance monitoring will be undertaken to confirm that the construction, operation, and maintenance of the Project are carried out in accordance with the mitigation measures and commitments identified in the effects assessment.

Should monitoring identify any exceedances of expected performance at Outlet A, appropriate maintenance or adaptive management measures would be implemented as part of the existing program.

Further, the WM Operations team handles all tasks related to cleaning and maintaining the ponds. As part of regular landfill operations, drainage ditches and stormwater management ponds are routinely monitored and maintained by WM. This includes the removal of sediment deposits to ensure the continued effectiveness and proper functioning of the stormwater management system.

Specifically, WM performs daily inspections which includes signs for erosion on side slopes, leachate seeps and sediment accumulation. Furthermore, a third party consultant (RWDI) undertakes monthly inspections which are according to the ECA A032203. These include:

a. Erosion rills;

b. General settlement areas or depressions;

c. Shear and tension cracks;

d. Condition of surface water drainage works;

e. Erosion and sedimentation in surface water drainage system;

f. Presence of any ponded water;

g. Adequacy of cover material;

h. Evidence of vegetative stress, distressed poplars or side slope plantings;

i. Condition of groundwater monitoring wells and gas wells;

j. Presence of insects, vermin, rodents and scavenging animals;

k. Condition of fence surrounding the Site; and

m. General Site appearance.

Compliance monitoring is summarized in **Table 7-1**. The results of compliance monitoring, including details of the effectiveness of mitigation measures and fulfillment of commitments, will be provided to the MECP.

Table 7-1. Environmental Effects and Compliance Monitoring for the Preferred Alternative

Evaluation Criteria	Potential Effect	Commitment for Mitigation	Commitment for Monitoring	Compliance Monitoring
Surface Water Quantity	Change in runoff volumes and peak flows resulting from steeper and longer side slopes	• No additional mitigation measures required beyond the 'in-design mitigation measures' which falls under periodic maintenance. • At the detailed design stage, the final drainage design will be reviewed to determine whether additional water quality enhancements, such as swales and/or refinements to the stormwater management system are required to enhance long-term performance.	• No additional monitoring required beyond what is included in the ECA. • Should monitoring identify any exceedances of expected performance at Outlet A, appropriate maintenance or adaptive management measures would be implemented as part of the existing program.	• Annually during current site inspection program for surface water in accordance with the relevant conditions of the Waste and Sewage ECAs.

8 Surface Water Approvals

In addition to EA approval, the following Surface Water Quantity related approvals may be required:

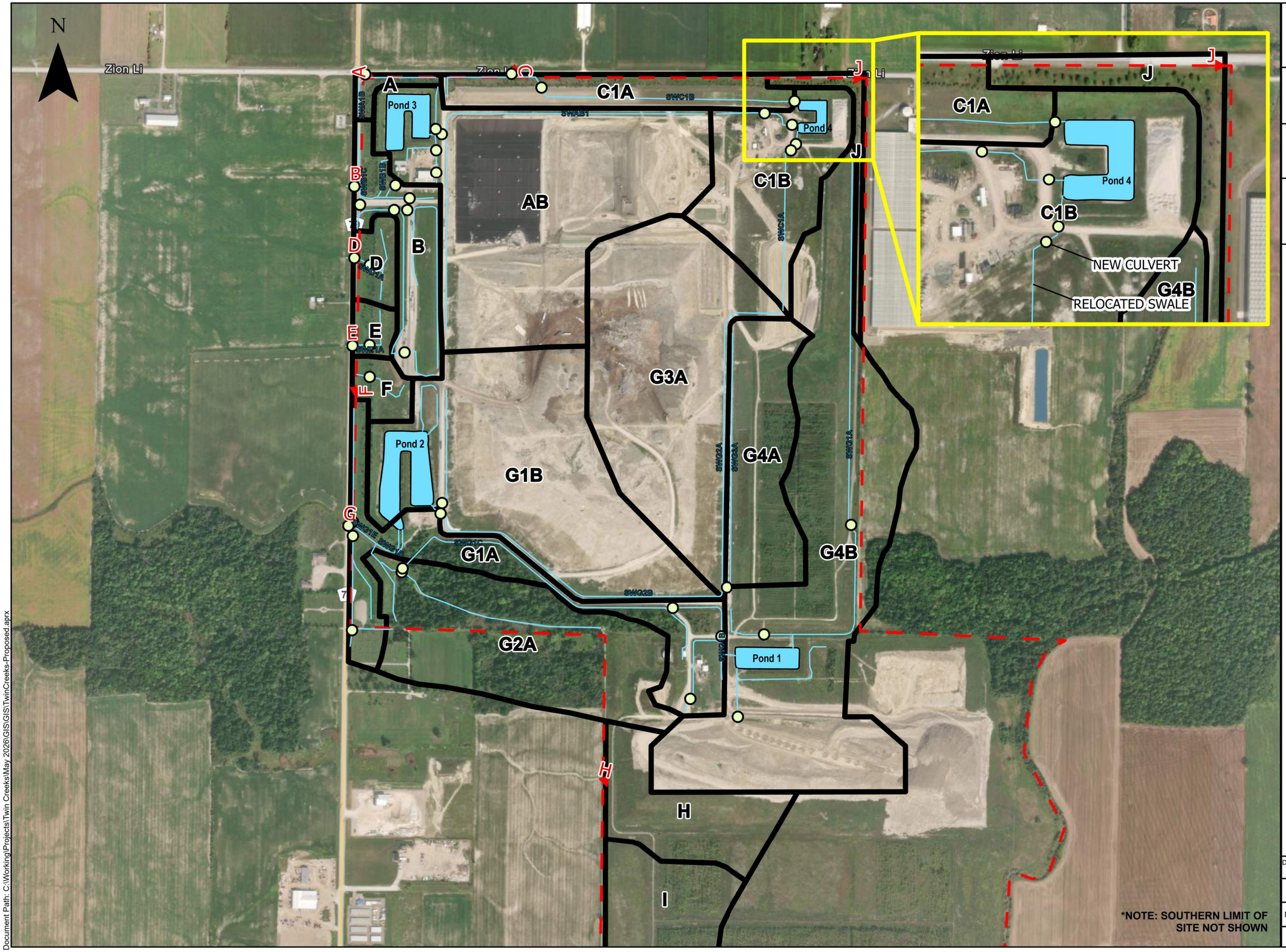
- An amendment to the Sewage ECA in the event that modifications are made to the on-site existing stormwater management infrastructure.

9 References

WSP Canada Inc.
2026 Surface Water Quantity Existing Conditions Report

A

Hydrologic Modelling



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CLIENT
WASTE MANAGEMENT OF CANADA CORP.

PROJECT
TWIN CREEKS LANDFILL OPTIMIZATION

TITLE
EXHIBIT 1-1
CATCHMENT AREAS
ALTERNATIVE METHOD 1

LEGEND
- Outlet
- SWM Ponds
- Alternative Method 1 Proposed Catchments
- Waste Management Property Limit
- Ditches
- Culverts

0 0.07 0.15 km

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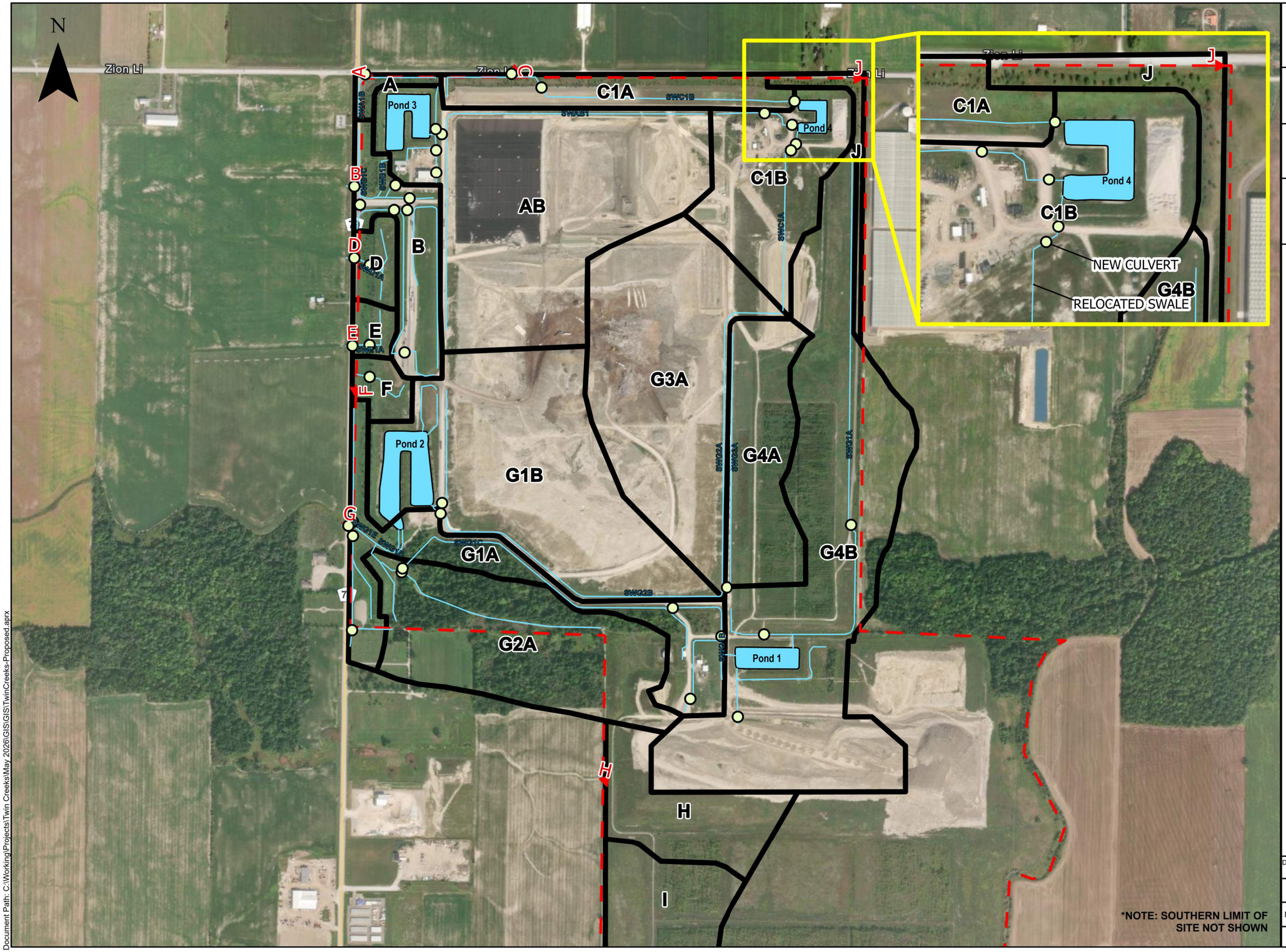

CLIENT

WASTE MANAGEMENT OF CANADA CORP.

PROJECT

TWIN CREEKS LANDFILL OPTIMIZATION

TITLE

EXHIBIT 1-2
CATCHMENT AREAS
ALTERNATIVE METHOD 2

LEGEND

- Outlet
- SWM Ponds
- Alternative Method 2 Proposed Catchments
- Waste Management Property Limit
- Ditches
- Culverts

0 0.07 0.15 km

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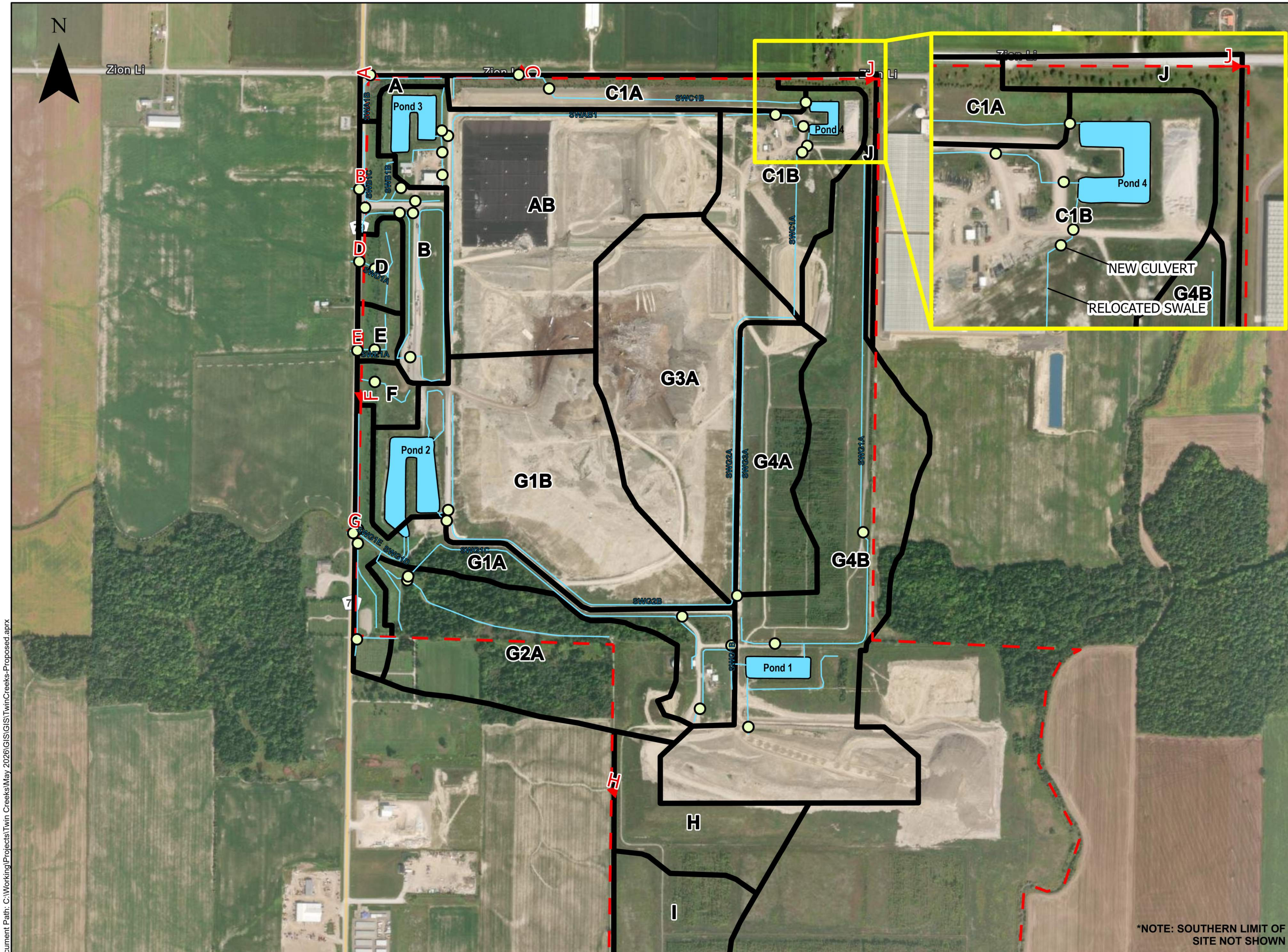

CLIENT
WASTE MANAGEMENT OF CANADA CORP.

PROJECT
TWIN CREEKS LANDFILL OPTIMIZATION

TITLE
EXHIBIT 1-3
CATCHMENT AREAS
ALTERNATIVE METHOD 3

LEGEND
- Outlet
- SWM Ponds
- Alternative Method 3 Proposed Catchments
- Waste Management Property Limit
- Ditches
- Culverts

0 0.07 0.15 km

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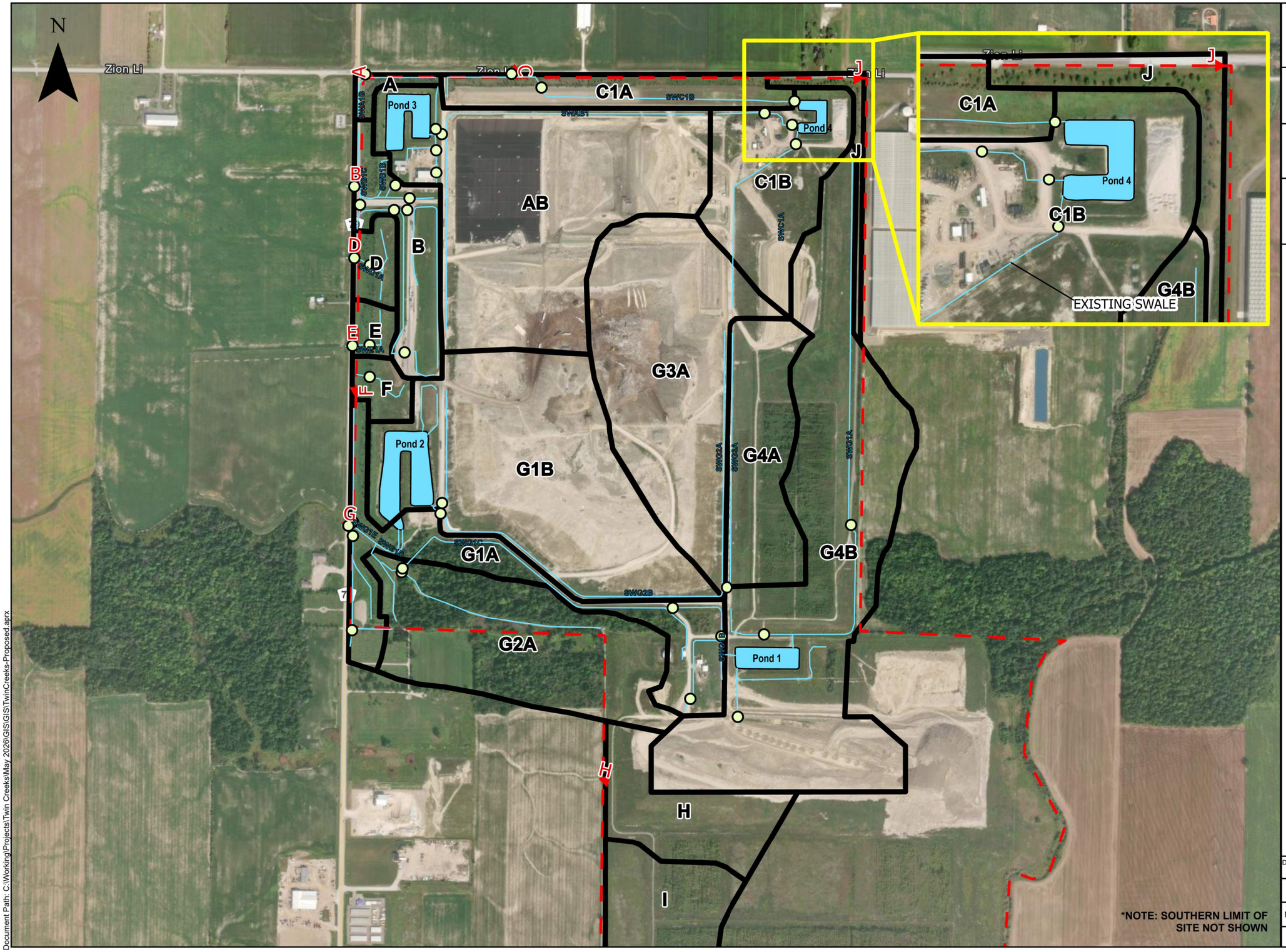

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CLIENT
WASTE MANAGEMENT OF CANADA CORP.

PROJECT
TWIN CREEKS LANDFILL OPTIMIZATION

TITLE
EXHIBIT 3-1
CATCHMENT AREAS
Future Baseline Conditions

LEGEND
- Outlet
- SWM Ponds
- Future Baseline Catchments
- Waste Management Property Limit
- Ditches
- Culverts

0 0.07 0.15 km

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Zion Li

A
B
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E
F
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H
J

Pond 3
Pond 4
Pond 2
Pond 1

C1A
C1B
AB
B
D
E
F
G3A
G1B
G4A
G4B
G1A
G2A
H
I

SWM1B
SWM1C
SWM1E
SWM1D
SWM1A
SWA1
SWC1B
SWC1A
SWC2A
SWC2B
SWC3A
SWC4A

EXISTING SWALE

*NOTE: SOUTHERN LIMIT OF SITE NOT SHOWN

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CLIENT
WASTE MANAGEMENT OF CANADA CORP.

PROJECT
TWIN CREEKS LANDFILL OPTIMIZATION

TITLE
EXHIBIT 6-1
CATCHMENT AREAS
DO NOTHING

LEGEND
- Outlet
- SWM Ponds
- Do Nothing Catchments
- Waste Management Property Limit
- Ditches
- Culverts

0 0.07 0.15 km

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Comparison of Catchment Areas (ha)

Catchment	Existing	Do Nothing	Method 1	Method 2	Method 3
A	0.94	0.94	0.94	0.94	0.94
AB	31.84	32.61	32.52	33.05	32.33
B	6.99	6.99	6.99	6.99	6.99
C1A	6.77	6.77	6.82	6.82	6.82
C1B	15.77	12.32	12.17	12.23	12.06
G1A	12.45	12.45	12.45	12.45	12.45
G1B	32.91	30.09	28.68	28.74	29.27
G2A	19.40	19.40	19.40	19.40	19.40
G3A	18.71	24.10	25.70	25.07	25.41
G4A	10.64	10.73	10.73	10.73	10.73
G4B	40.21	40.21	40.21	40.21	40.21

Comparison of Catchment Time to Peak (hrs)

Catchment	Existing	Do Nothing	Method 1	Method 2	Method 3
A	0.12	0.12	0.12	0.12	0.12
AB	0.93	0.55	0.52	0.55	0.55
B	n/a	n/a	n/a	n/a	n/a
C1A	0.50	0.50	0.50	0.50	0.50
C1B	0.42	0.55	0.55	0.54	0.55
G1A	1.03	1.03	1.03	1.03	1.03
G1B	0.60	0.40	0.41	0.41	0.40
G2A	0.66	0.66	0.66	0.66	0.66
G3A	2.44	1.12	1.11	1.14	1.17
G4A	1.12	1.12	1.12	1.12	1.12
G4B	1.20	1.20	1.20	1.20	1.20

Chicago 4-Hour Design Storm Results

Existing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0.067	0.102	0.135	0.181	0.221	0.261
B	0.417	0.573	0.676	0.808	0.907	1.006
C	0.145	0.246	0.318	0.430	0.520	0.643
D	0.075	0.132	0.174	0.233	0.281	0.329
E	0.068	0.120	0.159	0.213	0.257	0.301
F	0.054	0.094	0.124	0.164	0.197	0.230
G	0.410	0.696	0.903	1.177	1.389	1.627

Do Nothing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0.069	0.107	0.143	0.193	0.235	0.275
B	0.388	0.540	0.642	0.773	0.871	0.970
C	0.123	0.216	0.285	0.375	0.446	0.518
D	0.075	0.132	0.174	0.233	0.281	0.329
E	0.068	0.120	0.159	0.213	0.257	0.301
F	0.054	0.094	0.124	0.164	0.197	0.230
G	0.437	0.736	0.940	1.216	1.497	1.825

Future Approved Difference from Existing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	3%	5%	6%	7%	6%	5%
B	-7%	-6%	-5%	-4%	-4%	-4%
C	-15%	-12%	-10%	-13%	-14%	-19%
D	0%	0%	0%	0%	0%	0%
E	0%	0%	0%	0%	0%	0%
F	0%	0%	0%	0%	0%	0%
G	7%	6%	4%	3%	8%	12%

Alternative Method 1

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0.069	0.107	0.143	0.193	0.235	0.276
B	0.388	0.541	0.642	0.773	0.871	0.970
C	0.123	0.216	0.286	0.377	0.448	0.520
D	0.075	0.132	0.174	0.233	0.281	0.329
E	0.068	0.120	0.159	0.213	0.257	0.301
F	0.054	0.094	0.124	0.164	0.197	0.230
G	0.433	0.733	0.937	1.211	1.485	1.810

Alternative Method 1 Difference from Existing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	3%	5%	6%	7%	6%	6%
B	-7%	-6%	-5%	-4%	-4%	-4%
C	-15%	-12%	-10%	-12%	-14%	-19%
D	0%	0%	0%	0%	0%	0%
E	0%	0%	0%	0%	0%	0%
F	0%	0%	0%	0%	0%	0%
G	6%	5%	4%	3%	7%	11%

Alternative Method 2

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0.070	0.108	0.146	0.196	0.239	0.279
B	0.388	0.540	0.642	0.773	0.871	0.970
C	0.124	0.218	0.287	0.379	0.450	0.522
D	0.075	0.132	0.174	0.233	0.281	0.329
E	0.068	0.120	0.159	0.213	0.257	0.301
F	0.054	0.094	0.124	0.164	0.197	0.230
G	0.432	0.731	0.935	1.209	1.474	1.794

Alternative Method 2 Difference from Existing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	4%	6%	8%	8%	8%	7%
B	-7%	-6%	-5%	-4%	-4%	-4%
C	-14%	-11%	-10%	-12%	-13%	-19%
D	0%	0%	0%	0%	0%	0%
E	0%	0%	0%	0%	0%	0%
F	0%	0%	0%	0%	0%	0%
G	5%	5%	4%	3%	6%	10%

Alternative Method 2 Difference from Do Nothing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	1%	1%	2%	2%	2%	1%
B	0%	0%	0%	0%	0%	0%
C	1%	1%	1%	1%	1%	1%
D	0%	0%	0%	0%	0%	0%
E	0%	0%	0%	0%	0%	0%
F	0%	0%	0%	0%	0%	0%
G	-1%	-1%	-1%	-1%	-2%	-2%

Alternative Method 3

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0.069	0.106	0.142	0.191	0.233	0.273
B	0.388	0.540	0.642	0.773	0.871	0.970
C	0.123	0.216	0.285	0.377	0.448	0.520
D	0.075	0.132	0.174	0.233	0.281	0.329
E	0.068	0.120	0.159	0.213	0.257	0.301
F	0.054	0.094	0.124	0.164	0.197	0.230
G	0.433	0.734	0.937	1.211	1.483	1.806

Alternative Method 3 Difference from Existing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	3%	4%	5%	6%	5%	5%
B	-7%	-6%	-5%	-4%	-4%	-4%
C	-15%	-12%	-10%	-12%	-14%	-19%
D	0%	0%	0%	0%	0%	0%
E	0%	0%	0%	0%	0%	0%
F	0%	0%	0%	0%	0%	0%
G	6%	5%	4%	3%	7%	11%

Chicago 4-Hour Design Storm Results

Peak Pond Storage in 100-year storm (ha·m)

Pond	Available	Existing	Do Nothing	AM 1	AM 2	AM 3
1	2.773	0.943	0.943	0.943	0.943	0.943
2	5.271	1.625	1.838	1.824	1.808	1.823
3	2.857	0.732	0.750	0.750	0.757	0.746
4	1.099	0.347	0.285	0.282	0.284	0.281

Peak Swale Conveyance during 25-year Storm

		Geometry					Peak Swale Conveyance (L/s)				
Name	Contributing Catchments	Length (m)	Representative Bottom Width (m)	Representative Depth (m)	Representative Side Slope (X:1)	Average Slope (%)	Available	Future Approved	AM 1	AM 2	AM 3
SWAB1A	AB	665	1.8	0.8	4.8	0.8%	9384	1539	1594	1560	1526
SWA1B	Outlet A	105.3	1	0.77	3.9	0.9%	6256	193	193	196	191
SWB1B	Culvert 3(#2) + 3(#3)	121	2	1.15	3.7	1.1%	23461	216	215	218	214
SWB1C	Outlet B	63.2	2.7	1.7	4.7	1.7%	120733	773	773	773	773
SWC1A	C1B	380	3	0.9	3.0	0.1%	3699	577	570	581	565
SWC1B	Pond 4 + C1A	612	4	2.9	2.9	0.5%	191849	483	484	485	483
SWD1A	Outlet D	87	2.5	1	5.3	1.5%	28626	233	233	233	233
SWE1A	Outlet E	141	1	1.7	6.4	0.8%	100850	213	213	213	213
SWG1A	G4B	1280	1.5	0.62	6.9	0.3%	3981	1103	1103	1103	1103
SWG1B	Pond 1	456	1	1.3	3.8	0.4%	17669	463	463	463	463
SWG1C	Pond 1 + G1A	631	1.5	1	3.8	0.7%	11847	813	813	813	813
SWG1D	Pond 2	116	1.5	0.87	5.2	0.2%	6229	409	400	391	400
SWG1E	Outlet G	71	3	0.9	3.6	0.6%	10909	1216	1211	1209	1211
Stream	Outlet G	38	4	1.4	1.2	0.5%	18095	1216	1211	1209	1211
SWG2A	G3A	799	1	0.54	3.0	0.6%	1592	668	691	661	658
SWG2B	G3A+G4A+G1B	751	0.75	0.92	5.6	0.7%	12631	2813	2723	2696	2753
SWG3A	G4A	606	1	0.44	4.5	0.5%	1246	297	297	297	297

Chicago 3-Hour Design Storm Results

Existing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0.061	0.093	0.121	0.167	0.201	0.238
B	0.417	0.573	0.676	0.807	0.906	1.005
C	0.134	0.231	0.299	0.404	0.494	0.601
D	0.068	0.123	0.164	0.221	0.266	0.313
E	0.062	0.112	0.150	0.202	0.245	0.288
F	0.049	0.088	0.116	0.155	0.187	0.219
G	0.385	0.656	0.855	1.120	1.324	1.530

Do Nothing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0.062	0.095	0.128	0.179	0.220	0.263
B	0.388	0.540	0.642	0.772	0.870	0.969
C	0.114	0.202	0.267	0.355	0.423	0.492
D	0.068	0.123	0.164	0.221	0.266	0.313
E	0.062	0.112	0.150	0.202	0.245	0.288
F	0.049	0.088	0.116	0.155	0.187	0.219
G	0.408	0.695	0.892	1.157	1.369	1.648

Future Approved Difference from Existing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	2%	2%	6%	7%	9%	11%
B	-7%	-6%	-5%	-4%	-4%	-4%
C	-15%	-13%	-11%	-12%	-14%	-18%
D	0%	0%	0%	0%	0%	0%
E	0%	0%	0%	0%	0%	0%
F	0%	0%	0%	0%	0%	0%
G	6%	6%	4%	3%	3%	8%

Alternative Method 1

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0.062	0.096	0.129	0.181	0.222	0.263
B	0.388	0.540	0.642	0.772	0.870	0.969
C	0.115	0.202	0.268	0.356	0.425	0.495
D	0.068	0.123	0.164	0.221	0.266	0.313
E	0.062	0.112	0.150	0.202	0.245	0.288
F	0.049	0.088	0.116	0.155	0.187	0.219
G	0.405	0.692	0.888	1.152	1.363	1.634

Alternative Method 1 Difference from Existing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	2%	3%	7%	8%	10%	11%
B	-7%	-6%	-5%	-4%	-4%	-4%
C	-14%	-13%	-10%	-12%	-14%	-18%
D	0%	0%	0%	0%	0%	0%
E	0%	0%	0%	0%	0%	0%
F	0%	0%	0%	0%	0%	0%
G	5%	5%	4%	3%	3%	7%

Alternative Method 2

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0.062	0.097	0.130	0.182	0.224	0.267
B	0.388	0.540	0.642	0.772	0.870	0.969
C	0.115	0.204	0.270	0.358	0.427	0.497
D	0.068	0.123	0.164	0.221	0.266	0.313
E	0.062	0.112	0.150	0.202	0.245	0.288
F	0.049	0.088	0.116	0.155	0.187	0.219
G	0.403	0.690	0.887	1.151	1.361	1.621

Alternative Method 2 Difference from Existing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	2%	4%	7%	9%	11%	12%
B	-7%	-6%	-5%	-4%	-4%	-4%
C	-14%	-12%	-10%	-11%	-14%	-17%
D	0%	0%	0%	0%	0%	0%
E	0%	0%	0%	0%	0%	0%
F	0%	0%	0%	0%	0%	0%
G	5%	5%	4%	3%	3%	6%

Alternative Method 2 Difference from Do Nothing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0%	2%	2%	2%	2%	2%
B	0%	0%	0%	0%	0%	0%
C	1%	1%	1%	1%	1%	1%
D	0%	0%	0%	0%	0%	0%
E	0%	0%	0%	0%	0%	0%
F	0%	0%	0%	0%	0%	0%
G	-1%	-1%	-1%	-1%	-1%	-2%

Alternative Method 3

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0.061	0.094	0.126	0.177	0.217	0.261
B	0.388	0.540	0.642	0.772	0.870	0.969
C	0.115	0.202	0.268	0.356	0.425	0.494
D	0.068	0.123	0.164	0.221	0.266	0.313
E	0.062	0.112	0.150	0.202	0.245	0.288
F	0.049	0.088	0.116	0.155	0.187	0.219
G	0.405	0.692	0.889	1.153	1.364	1.629

Alternative Method 3 Difference from Existing

Outlet ID	2-year	5-year	10-year	25-year	50-year	100-year
A	0%	1%	4%	6%	8%	10%
B	-7%	-6%	-5%	-4%	-4%	-4%
C	-14%	-13%	-10%	-12%	-14%	-18%
D	0%	0%	0%	0%	0%	0%
E	0%	0%	0%	0%	0%	0%
F	0%	0%	0%	0%	0%	0%
G	5%	5%	4%	3%	3%	6%

Chicago 3-Hour Design Storm Results

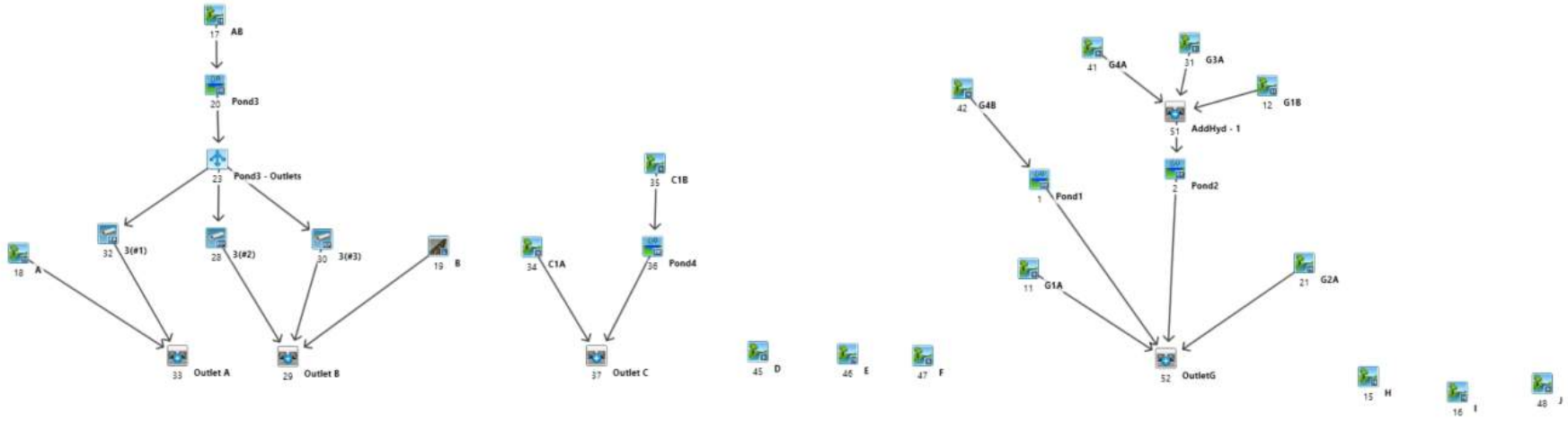
Peak Pond Storage in 100-year storm (ha·m)

Pond	Available	Existing	Do Nothing	AM 1	AM 2	AM 3
1	2.773	0.896	0.896	0.896	0.896	0.896
2	5.271	1.491	1.704	1.690	1.673	1.687
3	2.857	0.709	0.731	0.731	0.737	0.727
4	1.099	0.335	0.277	0.274	0.275	0.272

Peak Swale Conveyance during 25-year Storm

		Geometry					Peak Swale Conveyance (L/s)				
Name	Contributing Catchments	Length (m)	Representative Bottom Width (m)	Representative Depth (m)	Representative Side Slope (X:1)	Average Slope (%)	Available	Future Approved	AM 1	AM 2	AM 3
SWAB1A	AB	665	1.8	0.8	4.8	0.8%	9384	1458	1513	1478	1446
SWA1B	Outlet A	105.3	1	0.77	3.9	0.9%	6256	179	181	182	177
SWB1B	Culvert 3(#2) + 3(#3)	121	2	1.15	3.7	1.1%	23461	204	204	207	202
SWB1C	Outlet B	63.2	2.7	1.7	4.7	1.7%	120733	772	772	772	772
SWC1A	C1B	380	3	0.9	3.0	0.1%	3699	547	540	550	535
SWC1B	Pond 4 + C1A	612	4	2.9	2.9	0.5%	191849	457	148	459	456
SWD1A	Outlet D	87	2.5	1	5.3	1.5%	28626	221	221	221	221
SWE1A	Outlet E	141	1	1.7	6.4	0.8%	100850	202	202	202	202
SWG1A	G4B	1280	1.5	0.62	6.9	0.3%	3981	1053	1053	1053	1053
SWG1B	Pond 1	456	1	1.3	3.8	0.4%	17669	392	392	392	392
SWG1C	Pond 1 + G1A	631	1.5	1	3.8	0.7%	11847	726	726	726	726
SWG1D	Pond 2	116	1.5	0.87	5.2	0.2%	6229	325	321	317	321
SWG1E	Outlet G	71	3	0.9	3.6	0.6%	10909	1157	1152	1151	1153
Stream	Outlet G	38	4	1.4	1.2	0.5%	18095	1157	1152	1151	1153
SWG2A	G3A	799	1	0.54	3.0	0.6%	1592	637	659	630	627
SWG2B	G3A+G4A+G1B	751	0.75	0.92	5.6	0.7%	12631	2677	2590	2565	2619
SWG3A	G4A	606	1	0.44	4.5	0.5%	1246	283	283	283	283

VO Model Schematic



Existing Conditions
100-year 4-hour Chicago

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

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

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


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DATE: 07-15-2025                          TIME: 08:40:16

USER:



COMMENTS: _____________________________________________________________

----------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 100-year-4hr-Chicago         **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1032.793
| Ptotal= 70.38 mm |                          B=   0.000
--------------------                          C=   0.743
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    5.06 |  1.00   26.53 |  2.00   10.53 |  3.00    5.93
                0.17    5.69 |  1.17  186.64 |  2.17    9.23 |  3.17    5.57
                0.33    6.55 |  1.33   33.08 |  2.33    8.25 |  3.33    5.25
                0.50    7.79 |  1.50   20.27 |  2.50    7.49 |  3.50    4.97
                0.67    9.78 |  1.67   15.20 |  2.67    6.87 |  3.67    4.72
                0.83   13.66 |  1.83   12.37 |  2.83    6.36 |  3.83    4.51


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--------------------
| CALIB            |
| NASHYD   (  0011)|   Area    (ha)=  12.45   Curve Number   (CN)= 82.0
```

|ID= 1 DT= 5.0 min | Ia (mm)= 3.10 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.462

PEAK FLOW (cms)= 0.479 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 36.792
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.523

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

| CALIB |
| NASHYD (0012)| Area (ha)= 32.91 Curve Number (CN)= 84.0
|ID= 1 DT= 5.0 min | Ia (mm)= 2.70 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.60

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 2.095

PEAK FLOW (cms)= 2.050 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 39.467
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.561

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

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| CALIB            |
| NASHYD   (  0031)|   Area    (ha)=  18.71   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   2.44

         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    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
              0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
              0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
              0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
              0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
              0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
              0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
              0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
              0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
              0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
              0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
              1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.293

     PEAK FLOW       (cms)=   0.395 (i)
     TIME TO PEAK    (hrs)=   4.333
     RUNOFF VOLUME    (mm)=  38.267
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.544

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

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--------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=  10.64   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
              0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
              0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
              0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
              0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
              0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
              0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
              0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
              0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
              0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
              0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
              1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.363

     PEAK FLOW       (cms)=   0.400 (i)
     TIME TO PEAK    (hrs)=   2.667
     RUNOFF VOLUME    (mm)=  38.105
     TOTAL RAINFALL   (mm)=  70.382
```

RUNOFF COEFFICIENT = 0.541

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

ADD HYD (0051)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0012):	32.91	2.050	2.00	39.47
	+ ID2= 2 (0031):	18.71	0.395	4.33	38.27
	ID = 3 (0051):	51.62	2.157	2.00	39.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0051)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0051):	51.62	2.157	2.00	39.03
	+ ID2= 2 (0041):	10.64	0.400	2.67	38.10
	ID = 1 (0051):	62.26	2.460	2.08	38.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0002)	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	1.3450	2.1963
	0.0302	0.2196	2.0056	2.4160
	0.1060	0.4393	2.9861	2.6356
	0.1484	0.6589	5.1073	3.0749
	0.1976	0.8785	6.4750	3.5141
	0.2620	1.0982	6.9124	3.9534
	0.3256	1.3178	7.3312	4.3927
	0.4719	1.5374	7.7329	4.8319
	0.6161	1.7571	8.1186	5.2712
	0.8070	1.9767	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0051)	62.260	2.460	2.08	38.87
OUTFLOW: ID= 1 (0002)	62.260	0.529	5.25	38.84

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.50
TIME SHIFT OF PEAK FLOW (min)=190.00
MAXIMUM STORAGE USED (ha.m.)= 1.6245

CALIB			
NASHYD (0021)	Area (ha)= 19.40	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 3.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.66		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93

0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.123

PEAK FLOW (cms)= 1.007 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 35.760
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.508

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

CALIB			
NASHYD (0042)	Area (ha)= 40.21	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 2.70	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.20		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.280

PEAK FLOW (cms)= 1.490 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 39.468
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.561

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

RESERVOIR(0001)	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	0.7119	0.9480
	0.0123	0.0780	1.9253	1.1420
	0.0329	0.1570	2.5634	1.3440
	0.0407	0.2380	2.7870	1.5530

```
                          0.0476     0.3210   |   2.9936      1.7700
                          0.0805     0.4060   |   3.1872      1.9930
                          0.1414     0.4920   |   3.3696      2.2250
                          0.1808     0.5790   |   3.6262      2.5860
                          0.2708     0.6690   |   3.7476      2.7730
                          0.4375     0.7600   |   0.0000      0.0000

                                    AREA     QPEAK     TPEAK       R.V.
                                    (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0042)     40.210      1.490      2.75      39.47
   OUTFLOW: ID= 1 (  0001)     40.210      0.704      4.67      39.43

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 47.22
                  TIME SHIFT OF PEAK FLOW         (min)=115.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.9427

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

--------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):    40.21   0.704     4.67    39.43
      + ID2= 2 (  0011):    12.45   0.479     2.50    36.79
        ================================================
        ID = 3 (  0052):    52.66   0.914     4.25    38.81

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

--------------------
| ADD HYD  (  0052)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0052):    52.66   0.914     4.25    38.81
      + ID2= 2 (  0002):    62.26   0.529     5.25    38.84
        ================================================
        ID = 1 (  0052):   114.92   1.398     4.50    38.83

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

--------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0052):   114.92   1.398     4.50    38.83
      + ID2= 2 (  0021):    19.40   1.007     2.08    35.76
        ================================================
        ID = 3 (  0052):   134.32   1.627     4.17    38.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0017)|   Area     (ha)=  31.84   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   3.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.93

         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    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
```

0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.308

PEAK FLOW (cms)= 1.451 (i)
TIME TO PEAK (hrs)= 2.417
RUNOFF VOLUME (mm)= 40.044
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.569

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

RESERVOIR(0020)	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	1.7783	1.1263
	0.0245	0.1030	1.8455	1.2511
	0.0690	0.2080	1.9113	1.3782
	0.1181	0.3152	1.9743	1.5076
	0.2257	0.4245	2.0363	1.6394
	0.3402	0.5360	2.1548	1.9101
	0.4374	0.6496	2.2669	2.1903
	0.7664	0.7654	2.3755	2.4803
	1.3220	0.8835	2.4795	2.7803
	1.6822	1.0038	2.5047	2.8569

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0017)	31.840	1.451	2.42	40.04
OUTFLOW: ID= 1 (0020)	31.840	0.671	4.08	40.01

PEAK FLOW REDUCTION [Qout/Qin](%)= 46.23
TIME SHIFT OF PEAK FLOW (min)=100.00
MAXIMUM STORAGE USED (ha.m.)= 0.7319

DIVERTHYD(0023)
IN= 1 # OUT= 5

Outflow / Inflow Relationships

Flow 1 (cms)	+ Flow 2 (cms)	+ Flow 3 (cms)	+ Flow 4 (cms)	+ Flow 5 (cms)	= Total (cms)
0.00	0.00	0.00	0.00	0.00	0.00
0.02	0.01	0.00	0.00	0.00	0.02
0.05	0.02	0.00	0.00	0.00	0.07
0.07	0.02	0.02	0.00	0.00	0.12
0.11	0.04	0.08	0.00	0.00	0.23
0.16	0.07	0.11	0.00	0.00	0.34
0.20	0.10	0.14	0.00	0.00	0.44
0.27	0.34	0.16	0.00	0.00	0.77
0.29	0.64	0.39	0.00	0.00	1.32
0.30	0.70	0.68	0.00	0.00	1.68
0.31	0.73	0.73	0.00	0.00	1.78
0.32	0.76	0.76	0.00	0.00	1.85
0.33	0.79	0.79	0.00	0.00	1.91

0.34	0.81	0.81	0.00	0.00	1.97
0.35	0.84	0.84	0.00	0.00	2.04
0.36	0.87	0.87	0.00	0.00	2.10
0.38	0.91	0.91	0.00	0.00	2.21
0.40	0.96	0.96	0.00	0.00	2.32
0.42	1.01	1.01	0.00	0.00	2.43
0.43	1.04	1.04	0.00	0.00	2.50

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	31.84	0.67	4.08	40.01
ID= 2 (3) :	15.95	0.25	4.08	40.01
ID= 3 (3) :	8.86	0.27	4.08	40.01
ID= 4 (3) :	7.04	0.15	4.08	40.01
ID= 5 (3) :	0.00	0.00	0.00	0.00
ID= 6 (3) :	0.00	0.00	0.00	0.00

ROUTEPIPE(0028)	PIPE Number = 1.00
IN= 2---> OUT= 1	Diameter (mm)=1650.00
DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	8.86	0.27	4.08	40.01	0.22	1.44
OUTFLOW: ID= 1 (0028)	8.86	0.27	4.17	40.01	0.22	1.43

ROUTEPIPE(0030)	PIPE Number = 1.00
IN= 2---> OUT= 1	Diameter (mm)=1650.00
DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67

0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0023)	7.04	0.15	4.08	40.01	0.17	1.25
OUTFLOW: ID= 1 (0030)	7.04	0.15	4.17	40.01	0.17	1.25

CALIB
STANDHYD (0019)
ID= 1 DT= 5.0 min

Area (ha)= 6.99
Total Imp(%)= 28.00 Dir. Conn.(%)= 28.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.96	5.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	2.00	1.00
Length	(m)=	215.87	712.00
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	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Max.Eff.Inten.(mm/hr)=	186.64	25.57		
over (min)	5.00	90.00		
Storage Coeff. (min)=	2.57 (ii)	86.92 (ii)		
Unit Hyd. Tpeak (min)=	5.00	90.00		
Unit Hyd. peak (cms)=	0.29	0.01		
				TOTALS
PEAK FLOW (cms)=	1.00	0.15		1.006 (iii)
TIME TO PEAK (hrs)=	1.33	2.75		1.33
RUNOFF VOLUME (mm)=	68.38	35.29		44.55
TOTAL RAINFALL (mm)=	70.38	70.38		70.38
RUNOFF COEFFICIENT =	0.97	0.50		0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 82.0 Ia = Dep. 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 (0029)|		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0019):		6.99	1.006	1.33	44.55
+ ID2= 2 (0028):		8.86	0.265	4.17	40.01
ID = 3 (0029):		15.85	1.006	1.33	42.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)|		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0029):		15.85	1.006	1.33	42.01
+ ID2= 2 (0030):		7.04	0.152	4.17	40.01
ID = 1 (0029):		22.88	1.006	1.33	41.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTEPIPE(0032)		IN= 2---> OUT= 1		DT= 5.0 min
PIPE Number	=	1.00		
Diameter	(mm)=	1650.00		
Length	(m)=	500.00		
Slope	(m/m)=	0.005		
Manning n	=	0.013		

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	15.95	0.25	4.08	40.01	0.22	1.41
OUTFLOW: ID= 1 (0032)	15.95	0.25	4.08	40.01	0.22	1.41

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--------------------------------------------------------------------------------
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| CALIB            |
| NASHYD   (  0018)|   Area    (ha)=   0.94   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
               0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
               0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
               0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
               0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
               0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
               0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
               0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
               0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
               1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.299

     PEAK FLOW       (cms)=   0.178 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  37.965
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.539

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

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--------------------
| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0018):     0.94   0.178     1.33    37.97
      + ID2= 2 (  0032):    15.95   0.252     4.08    40.01
        ================================================
        ID = 3 (  0033):    16.89   0.261     4.00    39.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0034)|   Area    (ha)=   6.77   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.10   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
               0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
```

0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.517

PEAK FLOW (cms)= 0.451 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 37.133
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.528

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

CALIB			
NASHYD (0035)	Area (ha)= 15.77	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 3.90	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.42		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.434

PEAK FLOW (cms)= 1.247 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 38.475
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.547

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

RESERVOIR(0036)	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	0.9922	0.4686
	0.0150	0.0403	1.3581	0.5239
	0.0508	0.0819	1.4554	0.5809
	0.0745	0.1250	1.5104	0.6396
	0.1065	0.1696	1.5636	0.6999
	0.1567	0.2156	1.6156	0.7620
	0.1928	0.2631	1.6657	0.8257

0.2872	0.3021	|	1.7150	0.8913
0.4020	0.3627	|	1.7631	0.9586
0.5684	0.4149	|	1.8561	1.0987

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	15.770	1.247	1.75	38.48
OUTFLOW: ID= 1 (0036)	15.770	0.372	2.83	38.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 29.84
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.3471

ADD HYD (0037)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0034):	6.77	0.451	1.83	37.13
	+ ID2= 2 (0036):	15.77	0.372	2.83	38.43
	ID = 3 (0037):	22.54	0.643	2.25	38.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0045) ID= 1 DT= 5.0 min				
	Area (ha)=	2.10	Curve Number (CN)=	82.0
	Ia (mm)=	4.30	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.14		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.573

PEAK FLOW (cms)= 0.329 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 35.572
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.505

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

CALIB NASHYD (0046) ID= 1 DT= 5.0 min				
	Area (ha)=	1.31	Curve Number (CN)=	82.0
	Ia (mm)=	4.30	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.08		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.625

PEAK FLOW (cms)= 0.301 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 33.811
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.480

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

CALIB	
NASHYD (0047)	Area (ha)= 1.89 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.10 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.22

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.328

PEAK FLOW (cms)= 0.230 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 37.086
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.527

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

Existing Conditions
100-year 3-hour Chicago

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\05ba6f71-
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d5d4-44a6-b1bd-4cde131d36ba\s


DATE: 07-15-2025                          TIME: 08:40:08

USER:



COMMENTS: _____________________________________________________


----------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 100-year-3hr-Chicago          **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1032.793
| Ptotal= 65.35 mm |                          B=   0.000
--------------------                          C=   0.743
                       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    6.55 |  0.83  186.64 |  1.67   10.53 |  2.50    6.36
                0.17    7.79 |  1.00   33.08 |  1.83    9.23 |  2.67    5.93
                0.33    9.78 |  1.17   20.27 |  2.00    8.25 |  2.83    5.57
                0.50   13.66 |  1.33   15.20 |  2.17    7.49 |
                0.67   26.53 |  1.50   12.37 |  2.33    6.87 |


------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0011)|   Area    (ha)=  12.45   Curve Number   (CN)= 82.0
```

|ID= 1 DT= 5.0 min | Ia (mm)= 3.10 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.462

PEAK FLOW (cms)= 0.458 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 32.837
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.502

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

| CALIB |
| NASHYD (0012)| Area (ha)= 32.91 Curve Number (CN)= 84.0
|ID= 1 DT= 5.0 min | Ia (mm)= 2.70 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.60

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 2.095

PEAK FLOW (cms)= 1.959 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 35.350
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.541

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

| CALIB |
| NASHYD (0031)| Area (ha)= 18.71 Curve Number (CN)= 83.0
|ID= 1 DT= 5.0 min | Ia (mm)= 2.70 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 2.44

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.293

PEAK FLOW (cms)= 0.370 (i)
TIME TO PEAK (hrs)= 3.833
RUNOFF VOLUME (mm)= 34.227
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.524

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

CALIB	
NASHYD (0041)	Area (ha)= 10.64 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 2.90 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.12

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.363

PEAK FLOW (cms)= 0.382 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 34.068
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.521

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

ADD HYD (0051)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	32.91	1.959	1.67	35.35
+ ID2= 2 (0031):	18.71	0.370	3.83	34.23

```
        ================================================
        ID = 3 (  0051):    51.62   2.058     1.67    34.94

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

--------------------
| ADD HYD  (  0051)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0051):    51.62   2.058     1.67    34.94
      + ID2= 2 (  0041):    10.64   0.382     2.33    34.07
        ================================================
        ID = 1 (  0051):    62.26   2.350     1.75    34.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   1.3450      2.1963
                           0.0302     0.2196   |   2.0056      2.4160
                           0.1060     0.4393   |   2.9861      2.6356
                           0.1484     0.6589   |   5.1073      3.0749
                           0.1976     0.8785   |   6.4750      3.5141
                           0.2620     1.0982   |   6.9124      3.9534
                           0.3256     1.3178   |   7.3312      4.3927
                           0.4719     1.5374   |   7.7329      4.8319
                           0.6161     1.7571   |   8.1186      5.2712
                           0.8070     1.9767   |   0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0051)     62.260      2.350      1.75      34.79
   OUTFLOW: ID= 1 (  0002)     62.260      0.441      4.83      34.76

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 18.76
                  TIME SHIFT OF PEAK FLOW         (min)=185.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.4909

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0021)|   Area    (ha)=  19.40   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.66

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


                            ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.123

     PEAK FLOW       (cms)=   0.960 (i)
```

```
     TIME TO PEAK    (hrs)=   1.750
     RUNOFF VOLUME    (mm)=  31.882
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.488

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

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--------------------
| CALIB            |
| NASHYD   (  0042)|   Area    (ha)=  40.21   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.20

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


                            ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.280

     PEAK FLOW       (cms)=   1.428 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=  35.350
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.541

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

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--------------------
| RESERVOIR(  0001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   0.7119      0.9480
                           0.0123     0.0780   |   1.9253      1.1420
                           0.0329     0.1570   |   2.5634      1.3440
                           0.0407     0.2380   |   2.7870      1.5530
                           0.0476     0.3210   |   2.9936      1.7700
                           0.0805     0.4060   |   3.1872      1.9930
                           0.1414     0.4920   |   3.3696      2.2250
                           0.1808     0.5790   |   3.6262      2.5860
                           0.2708     0.6690   |   3.7476      2.7730
                           0.4375     0.7600   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0042)     40.210      1.428      2.42      35.35
   OUTFLOW: ID= 1 (  0001)     40.210      0.635      4.25      35.31

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 44.51
                    TIME SHIFT OF PEAK FLOW         (min)=110.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.8958

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--------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):    40.21   0.635     4.25    35.31
      + ID2= 2 (  0011):    12.45   0.458     2.25    32.84
        ================================================
        ID = 3 (  0052):    52.66   0.830     3.67    34.73

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

--------------------
| ADD HYD  (  0052)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0052):    52.66   0.830     3.67    34.73
      + ID2= 2 (  0002):    62.26   0.441     4.83    34.76
        ================================================
        ID = 1 (  0052):   114.92   1.229     3.92    34.75

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

--------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0052):   114.92   1.229     3.92    34.75
      + ID2= 2 (  0021):    19.40   0.960     1.75    31.88
        ================================================
        ID = 3 (  0052):   134.32   1.530     1.92    34.33

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0017)|   Area    (ha)=  31.84   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.93

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.308

     PEAK FLOW       (cms)=   1.387 (i)
     TIME TO PEAK    (hrs)=   2.083
     RUNOFF VOLUME    (mm)=  35.861
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.549

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

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--------------------
| RESERVOIR(  0020)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   1.7783      1.1263
                           0.0245     0.1030   |   1.8455      1.2511
                           0.0690     0.2080   |   1.9113      1.3782
                           0.1181     0.3152   |   1.9743      1.5076
                           0.2257     0.4245   |   2.0363      1.6394
                           0.3402     0.5360   |   2.1548      1.9101
                           0.4374     0.6496   |   2.2669      2.1903
                           0.7664     0.7654   |   2.3755      2.4803
                           1.3220     0.8835   |   2.4795      2.7803
                           1.6822     1.0038   |   2.5047      2.8569

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0017)     31.840      1.387      2.08      35.86
   OUTFLOW: ID= 1 (  0020)     31.840      0.606      3.67      35.83

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 43.72
                  TIME SHIFT OF PEAK FLOW         (min)= 95.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7092

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--------------------
| DIVERTHYD(  0023)|
| IN= 1   # OUT= 5 |
--------------------
     Outflow / Inflow  Relationships

      Flow 1 + Flow 2 + Flow 3 + Flow 4 + Flow 5 = Total
      (cms)    (cms)    (cms)    (cms)    (cms)    (cms)
       0.00     0.00     0.00     0.00     0.00     0.00
       0.02     0.01     0.00     0.00     0.00     0.02
       0.05     0.02     0.00     0.00     0.00     0.07
       0.07     0.02     0.02     0.00     0.00     0.12
       0.11     0.04     0.08     0.00     0.00     0.23
       0.16     0.07     0.11     0.00     0.00     0.34
       0.20     0.10     0.14     0.00     0.00     0.44
       0.27     0.34     0.16     0.00     0.00     0.77
       0.29     0.64     0.39     0.00     0.00     1.32
       0.30     0.70     0.68     0.00     0.00     1.68
       0.31     0.73     0.73     0.00     0.00     1.78
       0.32     0.76     0.76     0.00     0.00     1.85
       0.33     0.79     0.79     0.00     0.00     1.91
       0.34     0.81     0.81     0.00     0.00     1.97
       0.35     0.84     0.84     0.00     0.00     2.04
       0.36     0.87     0.87     0.00     0.00     2.10
       0.38     0.91     0.91     0.00     0.00     2.21
       0.40     0.96     0.96     0.00     0.00     2.32
       0.42     1.01     1.01     0.00     0.00     2.43
       0.43     1.04     1.04     0.00     0.00     2.50

                           AREA     QPEAK     TPEAK     R.V.
                           (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):  31.84      0.61      3.67    35.83
     ====================================================
     ID= 2  (   3)    :  16.48      0.24      3.67    35.83
     ID= 3  (   3)    :   8.28      0.22      3.67    35.83
     ID= 4  (   3)    :   7.08      0.15      3.67    35.83
     ID= 5  (   3)    :   0.00      0.00      0.00     0.00
     ID= 6  (   3)    :   0.00      0.00      0.00     0.00
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0028)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1650.00
```

DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<-------- TRAVEL TIME TABLE -------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	8.28	0.22	3.67	35.83	0.20	1.36
OUTFLOW: ID= 1 (0028)	8.28	0.22	3.75	35.83	0.20	1.35

ROUTEPIPE(0030)	PIPE Number = 1.00
IN= 2---> OUT= 1	Diameter (mm)=1650.00
DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<-------- TRAVEL TIME TABLE -------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	7.08	0.15	3.67	35.83	0.17	1.24

```
   OUTFLOW: ID= 1 (  0030)    7.08     0.15    3.67  35.83      0.17      1.23


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--------------------
| CALIB            |
| STANDHYD (  0019)|   Area    (ha)=   6.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  28.00   Dir. Conn.(%)=  28.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.96         5.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       2.00         1.00
     Length            (m)=     215.87       712.00
     Mannings n           =      0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Max.Eff.Inten.(mm/hr)=     186.64        24.61
               over (min)         5.00        90.00
     Storage Coeff.  (min)=       2.57 (ii)   88.22 (ii)
     Unit Hyd. Tpeak (min)=       5.00        90.00
     Unit Hyd. peak  (cms)=       0.29         0.01
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.00         0.14          1.004 (iii)
     TIME TO PEAK    (hrs)=       1.00         2.50           1.00
     RUNOFF VOLUME    (mm)=      63.35        31.37          40.32
     TOTAL RAINFALL   (mm)=      65.35        65.35          65.35
     RUNOFF COEFFICIENT   =       0.97         0.48           0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  82.0    Ia = Dep. 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  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0019):     6.99   1.004     1.00    40.32
      + ID2= 2 (  0028):     8.28   0.218     3.75    35.83
        ================================================
        ID = 3 (  0029):    15.27   1.005     1.00    37.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| ADD HYD (0029)|
| 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0029):	15.27	1.005	1.00	37.88
+ ID2= 2 (0030):	7.08	0.148	3.67	35.83
ID = 1 (0029):	22.35	1.005	1.00	37.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTEPIPE(0032)| IN= 2---> OUT= 1 | DT= 5.0 min |

PIPE Number = 1.00
Diameter (mm)=1650.00
Length (m)= 500.00
Slope (m/m)= 0.005
Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	16.48	0.24	3.67	35.83	0.21	1.39
OUTFLOW: ID= 1 (0032)	16.48	0.24	3.75	35.83	0.21	1.38

| CALIB | NASHYD (0018)| ID= 1 DT= 5.0 min |

Area (ha)= 0.94 Curve Number (CN)= 84.0
Ia (mm)= 3.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.12

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57

0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.299

PEAK FLOW (cms)= 0.169 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 33.922
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.519

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

ADD HYD (0033)		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0018):		0.94	0.169	1.00	33.92
+ ID2= 2 (0032):		16.48	0.238	3.75	35.83
ID = 3 (0033):		17.42	0.238	3.75	35.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0034) ID= 1 DT= 5.0 min				
	Area (ha)=	6.77	Curve Number (CN)=	83.0
	Ia (mm)=	4.10	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.50		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.517

PEAK FLOW (cms)= 0.428 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 33.117
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.507

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

CALIB NASHYD (0035) ID= 1 DT= 5.0 min				
	Area (ha)=	15.77	Curve Number (CN)=	84.0
	Ia (mm)=	3.90	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.42		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 1.434

PEAK FLOW (cms)= 1.186 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 34.377
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.526

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

RESERVOIR(0036)	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	0.9922	0.4686
	0.0150	0.0403	1.3581	0.5239
	0.0508	0.0819	1.4554	0.5809
	0.0745	0.1250	1.5104	0.6396
	0.1065	0.1696	1.5636	0.6999
	0.1567	0.2156	1.6156	0.7620
	0.1928	0.2631	1.6657	0.8257
	0.2872	0.3021	1.7150	0.8913
	0.4020	0.3627	1.7631	0.9586
	0.5684	0.4149	1.8561	1.0987

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	15.770	1.186	1.42	34.38
OUTFLOW: ID= 1 (0036)	15.770	0.350	2.58	34.33

PEAK FLOW REDUCTION [Qout/Qin](%)= 29.51
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 0.3353

ADD HYD (0037)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0034):	6.77	0.428	1.50	33.12
	+ ID2= 2 (0036):	15.77	0.350	2.58	34.33
	ID = 3 (0037):	22.54	0.601	2.00	33.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0045)	Area (ha)= 2.10	Curve Number (CN)= 82.0	
ID= 1 DT= 5.0 min	Ia (mm)= 4.30	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.14		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.573

PEAK FLOW (cms)= 0.313 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 31.669
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.485

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

CALIB			
NASHYD (0046)	Area (ha)= 1.31	Curve Number (CN)= 82.0	
ID= 1 DT= 5.0 min	Ia (mm)= 4.30	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.08		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.625

PEAK FLOW (cms)= 0.288 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 30.101
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.461

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

CALIB			
NASHYD (0047)	Area (ha)= 1.89	Curve Number (CN)= 83.0	
ID= 1 DT= 5.0 min	Ia (mm)= 4.10	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.22		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.328

PEAK FLOW (cms)= 0.219 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 33.075
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.506

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

Future Baseline

100-year 4-hour Chicago

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\92315c14-
cd8e-48e1-929f-854439ae614b\s
  Summary filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\92315c14-
cd8e-48e1-929f-854439ae614b\s


DATE: 07-15-2025                          TIME: 09:46:44

USER:



COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : 100-year-4hr-Chicago         **
  ***********************************************

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| CHICAGO STORM    |    IDF curve parameters: A=1032.793
| Ptotal= 70.38 mm |                          B=   0.000
--------------------                          C=   0.743
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    5.06 |  1.00   26.53 |  2.00   10.53 |  3.00    5.93
                0.17    5.69 |  1.17  186.64 |  2.17    9.23 |  3.17    5.57
                0.33    6.55 |  1.33   33.08 |  2.33    8.25 |  3.33    5.25
                0.50    7.79 |  1.50   20.27 |  2.50    7.49 |  3.50    4.97
                0.67    9.78 |  1.67   15.20 |  2.67    6.87 |  3.67    4.72
                0.83   13.66 |  1.83   12.37 |  2.83    6.36 |  3.83    4.51


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| CALIB            |
| NASHYD   (  0011)|   Area    (ha)=  12.45   Curve Number   (CN)= 82.0
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|ID= 1 DT= 5.0 min | Ia (mm)= 3.10 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.462

PEAK FLOW (cms)= 0.479 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 36.792
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.523

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

CALIB	NASHYD (0012)	Area (ha)= 30.09 Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)= 2.70 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.40

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 2.873

PEAK FLOW (cms)= 2.534 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 39.464
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.561

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

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| CALIB            |
| NASHYD   (  0031)|   Area    (ha)=  24.10   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
              0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
              0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
              0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
              0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
              0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
              0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
              0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
              0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
              0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
              0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
              1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.822

     PEAK FLOW       (cms)=   0.907 (i)
     TIME TO PEAK    (hrs)=   2.667
     RUNOFF VOLUME    (mm)=  38.186
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.543

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

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--------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=  10.73   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
              0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
              0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
              0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
              0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
              0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
              0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
              0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
              0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
              0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
              0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
              1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.366

     PEAK FLOW       (cms)=   0.403 (i)
     TIME TO PEAK    (hrs)=   2.667
     RUNOFF VOLUME    (mm)=  38.105
     TOTAL RAINFALL   (mm)=  70.382
```

RUNOFF COEFFICIENT = 0.541

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

ADD HYD (0051)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0012):	30.09	2.534	1.67	39.46
	+ ID2= 2 (0031):	24.10	0.907	2.67	38.19
	ID = 3 (0051):	54.19	2.983	1.75	38.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0051)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0051):	54.19	2.983	1.75	38.90
	+ ID2= 2 (0041):	10.73	0.403	2.67	38.10
	ID = 1 (0051):	64.92	3.195	1.83	38.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0002)	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	1.3450	2.1963
	0.0302	0.2196	2.0056	2.4160
	0.1060	0.4393	2.9861	2.6356
	0.1484	0.6589	5.1073	3.0749
	0.1976	0.8785	6.4750	3.5141
	0.2620	1.0982	6.9124	3.9534
	0.3256	1.3178	7.3312	4.3927
	0.4719	1.5374	7.7329	4.8319
	0.6161	1.7571	8.1186	5.2712
	0.8070	1.9767	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0051)	64.920	3.195	1.83	38.76
OUTFLOW: ID= 1 (0002)	64.920	0.686	4.67	38.74

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.49
TIME SHIFT OF PEAK FLOW (min)=170.00
MAXIMUM STORAGE USED (ha.m.)= 1.8382

CALIB			
NASHYD (0021)	Area (ha)= 19.40	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 3.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.66		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93

0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.123

PEAK FLOW (cms)= 1.007 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 35.760
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.508

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

CALIB			
NASHYD (0042)	Area (ha)= 40.21	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 2.70	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.20		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.280

PEAK FLOW (cms)= 1.490 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 39.468
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.561

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

RESERVOIR(0001)	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	0.7119	0.9480
	0.0123	0.0780	1.9253	1.1420
	0.0329	0.1570	2.5634	1.3440
	0.0407	0.2380	2.7870	1.5530

0.0476	0.3210	|	2.9936	1.7700
0.0805	0.4060	|	3.1872	1.9930
0.1414	0.4920	|	3.3696	2.2250
0.1808	0.5790	|	3.6262	2.5860
0.2708	0.6690	|	3.7476	2.7730
0.4375	0.7600	|	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0042)	40.210	1.490	2.75	39.47
OUTFLOW: ID= 1 (0001)	40.210	0.704	4.67	39.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 47.22
TIME SHIFT OF PEAK FLOW (min)=115.00
MAXIMUM STORAGE USED (ha.m.)= 0.9427

ADD HYD (0052)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0001):	40.21	0.704	4.67	39.43
	+ ID2= 2 (0011):	12.45	0.479	2.50	36.79
	ID = 3 (0052):	52.66	0.914	4.25	38.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0052)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0052):	52.66	0.914	4.25	38.81
	+ ID2= 2 (0002):	64.92	0.686	4.67	38.74
	ID = 1 (0052):	117.58	1.587	4.42	38.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0052)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0052):	117.58	1.587	4.42	38.77
	+ ID2= 2 (0021):	19.40	1.007	2.08	35.76
	ID = 3 (0052):	136.98	1.825	4.17	38.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0017)	Area (ha)= 32.61	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 3.70	# 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	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57

0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 2.265

PEAK FLOW (cms)= 2.118 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 38.642
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.549

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

RESERVOIR(0020)	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	1.7783	1.1263
	0.0245	0.1030	1.8455	1.2511
	0.0690	0.2080	1.9113	1.3782
	0.1181	0.3152	1.9743	1.5076
	0.2257	0.4245	2.0363	1.6394
	0.3402	0.5360	2.1548	1.9101
	0.4374	0.6496	2.2669	2.1903
	0.7664	0.7654	2.3755	2.4803
	1.3220	0.8835	2.4795	2.7803
	1.6822	1.0038	2.5047	2.8569

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0017)	32.610	2.118	1.92	38.64
OUTFLOW: ID= 1 (0020)	32.610	0.722	3.25	38.61

PEAK FLOW REDUCTION [Qout/Qin](%)= 34.10
TIME SHIFT OF PEAK FLOW (min)= 80.00
MAXIMUM STORAGE USED (ha.m.)= 0.7502

DIVERTHYD(0023)
IN= 1 # OUT= 5

Outflow / Inflow Relationships

Flow 1 (cms)	+ Flow 2 (cms)	+ Flow 3 (cms)	+ Flow 4 (cms)	+ Flow 5 (cms)	= Total (cms)
0.00	0.00	0.00	0.00	0.00	0.00
0.02	0.01	0.00	0.00	0.00	0.02
0.05	0.02	0.00	0.00	0.00	0.07
0.07	0.02	0.02	0.00	0.00	0.12
0.11	0.04	0.08	0.00	0.00	0.23
0.16	0.07	0.11	0.00	0.00	0.34
0.20	0.10	0.14	0.00	0.00	0.44
0.27	0.34	0.16	0.00	0.00	0.77
0.29	0.64	0.39	0.00	0.00	1.32
0.30	0.70	0.68	0.00	0.00	1.68
0.31	0.73	0.73	0.00	0.00	1.78
0.32	0.76	0.76	0.00	0.00	1.85
0.33	0.79	0.79	0.00	0.00	1.91

0.34	0.81	0.81	0.00	0.00	1.97
0.35	0.84	0.84	0.00	0.00	2.04
0.36	0.87	0.87	0.00	0.00	2.10
0.38	0.91	0.91	0.00	0.00	2.21
0.40	0.96	0.96	0.00	0.00	2.32
0.42	1.01	1.01	0.00	0.00	2.43
0.43	1.04	1.04	0.00	0.00	2.50

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	32.61	0.72	3.25	38.61
ID= 2 (3) :	16.11	0.26	3.25	38.61
ID= 3 (3) :	9.50	0.30	3.25	38.61
ID= 4 (3) :	7.00	0.16	3.25	38.61
ID= 5 (3) :	0.00	0.00	0.00	0.00
ID= 6 (3) :	0.00	0.00	0.00	0.00

| ROUTEPIPE(0028)|	PIPE Number = 1.00
| IN= 2---> OUT= 1 |	Diameter (mm)=1650.00
| DT= 5.0 min |	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	9.50	0.30	3.25	38.61	0.24	1.51
OUTFLOW: ID= 1 (0028)	9.50	0.30	3.25	38.61	0.24	1.51

| ROUTEPIPE(0030)|	PIPE Number = 1.00
| IN= 2---> OUT= 1 |	Diameter (mm)=1650.00
| DT= 5.0 min |	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67

0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0023)	7.00	0.16	3.25	38.61	0.18	1.26
OUTFLOW: ID= 1 (0030)	7.00	0.16	3.33	38.61	0.18	1.26

CALIB	
STANDHYD (0019)	Area (ha)= 6.99
ID= 1 DT= 5.0 min	Total Imp(%)= 28.00 Dir. Conn.(%)= 28.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.96	5.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.64	1.23
Length	(m)=	215.87	712.00
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	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Max.Eff.Inten.(mm/hr)=	186.64	25.57		
over (min)	5.00	85.00		
Storage Coeff. (min)=	3.61 (ii)	82.89 (ii)		
Unit Hyd. Tpeak (min)=	5.00	85.00		
Unit Hyd. peak (cms)=	0.25	0.01		
				TOTALS
PEAK FLOW (cms)=	0.96	0.16		0.969 (iii)
TIME TO PEAK (hrs)=	1.33	2.67		1.33
RUNOFF VOLUME (mm)=	68.38	35.29		44.55
TOTAL RAINFALL (mm)=	70.38	70.38		70.38
RUNOFF COEFFICIENT =	0.97	0.50		0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 82.0 Ia = Dep. 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 (0029)			AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3			(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0019):		6.99	0.969	1.33	44.55
	+ ID2= 2 (0028):		9.50	0.303	3.25	38.61
	ID = 3 (0029):		16.49	0.970	1.33	41.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)			AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1			(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0029):		16.49	0.970	1.33	41.13
	+ ID2= 2 (0030):		7.00	0.155	3.33	38.61
	ID = 1 (0029):		23.49	0.970	1.33	40.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTEPIPE(0032)		IN= 2---> OUT= 1		DT= 5.0 min
	PIPE Number	=	1.00	
	Diameter	(mm)=	1650.00	
	Length	(m)=	500.00	
	Slope	(m/m)=	0.005	
	Manning n	=	0.013	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)		16.11	0.26	3.25	38.61	0.22	1.43
OUTFLOW: ID= 1 (0032)		16.11	0.26	3.33	38.61	0.22	1.43

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| CALIB            |
| NASHYD   (  0018)|   Area    (ha)=   0.94   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
               0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
               0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
               0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
               0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
               0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
               0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
               0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
               0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
               1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.299

     PEAK FLOW       (cms)=   0.178 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  37.965
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.539

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

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--------------------
| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0018):     0.94   0.178     1.33    37.97
      + ID2= 2 (  0032):    16.11   0.263     3.33    38.61
        ================================================
        ID = 3 (  0033):    17.05   0.275     3.25    38.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0034)|   Area    (ha)=   6.77   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.10   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
               0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
```

0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.517

PEAK FLOW (cms)= 0.451 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 37.133
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.528

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

CALIB			
NASHYD (0035)	Area (ha)= 12.32	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 3.90	# 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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.856

PEAK FLOW (cms)= 0.796 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 38.478
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.547

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

RESERVOIR(0036)	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	0.9922	0.4686
	0.0150	0.0403	1.3581	0.5239
	0.0508	0.0819	1.4554	0.5809
	0.0745	0.1250	1.5104	0.6396
	0.1065	0.1696	1.5636	0.6999
	0.1567	0.2156	1.6156	0.7620
	0.1928	0.2631	1.6657	0.8257

0.2872	0.3021	|	1.7150	0.8913
0.4020	0.3627	|	1.7631	0.9586
0.5684	0.4149	|	1.8561	1.0987

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	12.320	0.796	1.92	38.48
OUTFLOW: ID= 1 (0036)	12.320	0.245	3.33	38.42

PEAK FLOW REDUCTION [Qout/Qin](%)= 30.81
TIME SHIFT OF PEAK FLOW (min)= 85.00
MAXIMUM STORAGE USED (ha.m.)= 0.2849

ADD HYD (0037)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0034):	6.77	0.451	1.83	37.13
	+ ID2= 2 (0036):	12.32	0.245	3.33	38.42
	ID = 3 (0037):	19.09	0.518	1.92	37.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0045) | ID= 1 DT= 5.0 min			
Area (ha)= 2.10	Curve Number (CN)= 82.0		
Ia (mm)= 4.30	# of Linear Res.(N)= 3.00		
U.H. Tp(hrs)= 0.14			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.573

PEAK FLOW (cms)= 0.329 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 35.572
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.505

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

CALIB NASHYD (0046) | ID= 1 DT= 5.0 min			
Area (ha)= 1.31	Curve Number (CN)= 82.0		
Ia (mm)= 4.30	# of Linear Res.(N)= 3.00		
U.H. Tp(hrs)= 0.08			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.625

PEAK FLOW (cms)= 0.301 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 33.811
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.480

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

CALIB	
NASHYD (0047)	Area (ha)= 1.89 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.10 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.22

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.328

PEAK FLOW (cms)= 0.230 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 37.086
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.527

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

Future Baseline

100-year 3-hour Chicago

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\2c46dc20-
1882-447b-8ab8-0ad9cb7b36f7\s
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1882-447b-8ab8-0ad9cb7b36f7\s


DATE: 07-15-2025                          TIME: 09:46:38

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : 100-year-3hr-Chicago         **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1032.793
| Ptotal= 65.35 mm |                          B=   0.000
--------------------                          C=   0.743
                       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    6.55 |  0.83  186.64 |  1.67   10.53 |  2.50    6.36
                0.17    7.79 |  1.00   33.08 |  1.83    9.23 |  2.67    5.93
                0.33    9.78 |  1.17   20.27 |  2.00    8.25 |  2.83    5.57
                0.50   13.66 |  1.33   15.20 |  2.17    7.49 |
                0.67   26.53 |  1.50   12.37 |  2.33    6.87 |


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--------------------
| CALIB            |
| NASHYD   (  0011)|   Area     (ha)=  12.45   Curve Number    (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   3.10   # of Linear Res.(N)= 3.00
```

--------------------   U.H. Tp(hrs)=   1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)=   0.462

PEAK FLOW   (cms)=   0.458 (i)
TIME TO PEAK   (hrs)=   2.250
RUNOFF VOLUME   (mm)= 32.837
TOTAL RAINFALL   (mm)= 65.350
RUNOFF COEFFICIENT   =   0.502

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

CALIB			
NASHYD (0012)	Area (ha)=	30.09	Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)=	2.70	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.40	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)=   2.873

PEAK FLOW   (cms)=   2.417 (i)
TIME TO PEAK   (hrs)=   1.417
RUNOFF VOLUME   (mm)= 35.346
TOTAL RAINFALL   (mm)= 65.350
RUNOFF COEFFICIENT   =   0.541

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

CALIB			
NASHYD (0031)	Area (ha)=	24.10	Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)=	2.80	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.12	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.822

PEAK FLOW (cms)= 0.868 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 34.148
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.523

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

CALIB			
NASHYD (0041)	Area (ha)= 10.73	Curve Number (CN)= 83.0	
ID= 1 DT= 5.0 min	Ia (mm)= 2.90	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.12		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.366

PEAK FLOW (cms)= 0.386 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 34.068
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.521

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

ADD HYD (0051)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	30.09	2.417	1.42	35.35
+ ID2= 2 (0031):	24.10	0.868	2.33	34.15
	==========	==========	==========	==========

```
        ID = 3 (  0051):    54.19   2.840     1.42    34.81

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

--------------------
| ADD HYD  (  0051)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0051):    54.19   2.840     1.42    34.81
      + ID2= 2 (  0041):    10.73   0.386     2.33    34.07
        ================================================
        ID = 1 (  0051):    64.92   3.047     1.50    34.69

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   1.3450      2.1963
                           0.0302     0.2196   |   2.0056      2.4160
                           0.1060     0.4393   |   2.9861      2.6356
                           0.1484     0.6589   |   5.1073      3.0749
                           0.1976     0.8785   |   6.4750      3.5141
                           0.2620     1.0982   |   6.9124      3.9534
                           0.3256     1.3178   |   7.3312      4.3927
                           0.4719     1.5374   |   7.7329      4.8319
                           0.6161     1.7571   |   8.1186      5.2712
                           0.8070     1.9767   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0051)     64.920      3.047      1.50      34.69
   OUTFLOW: ID= 1 (  0002)     64.920      0.581      4.08      34.66

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 19.07
                  TIME SHIFT OF PEAK FLOW         (min)=155.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.7035

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0021)|   Area    (ha)=  19.40   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.66

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


                            ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.123

     PEAK FLOW       (cms)=   0.960 (i)
     TIME TO PEAK    (hrs)=   1.750
```

```
     RUNOFF VOLUME    (mm)=  31.882
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.488

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0042)|   Area    (ha)=  40.21   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.20

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.280

     PEAK FLOW       (cms)=   1.428 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=  35.350
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.541

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   0.7119      0.9480
                           0.0123     0.0780   |   1.9253      1.1420
                           0.0329     0.1570   |   2.5634      1.3440
                           0.0407     0.2380   |   2.7870      1.5530
                           0.0476     0.3210   |   2.9936      1.7700
                           0.0805     0.4060   |   3.1872      1.9930
                           0.1414     0.4920   |   3.3696      2.2250
                           0.1808     0.5790   |   3.6262      2.5860
                           0.2708     0.6690   |   3.7476      2.7730
                           0.4375     0.7600   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0042)     40.210      1.428      2.42      35.35
   OUTFLOW: ID= 1 (  0001)     40.210      0.635      4.25      35.31

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 44.51
                  TIME SHIFT OF PEAK FLOW         (min)=110.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.8958

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```
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0001):    40.21   0.635     4.25    35.31
      + ID2= 2 (  0011):    12.45   0.458     2.25    32.84
        ================================================
        ID = 3 (  0052):    52.66   0.830     3.67    34.73

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

-------------------
| ADD HYD  (  0052)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0052):    52.66   0.830     3.67    34.73
      + ID2= 2 (  0002):    64.92   0.581     4.08    34.66
        ================================================
        ID = 1 (  0052):   117.58   1.401     3.83    34.69

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

-------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0052):   117.58   1.401     3.83    34.69
      + ID2= 2 (  0021):    19.40   0.960     1.75    31.88
        ================================================
        ID = 3 (  0052):   136.98   1.648     3.33    34.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0017)|   Area    (ha)=  32.61   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.70   # 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    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   2.265

     PEAK FLOW       (cms)=   2.018 (i)
     TIME TO PEAK    (hrs)=   1.583
     RUNOFF VOLUME    (mm)=  34.541
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.529

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

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```
| RESERVOIR(  0020)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   1.7783      1.1263
                          0.0245     0.1030   |   1.8455      1.2511
                          0.0690     0.2080   |   1.9113      1.3782
                          0.1181     0.3152   |   1.9743      1.5076
                          0.2257     0.4245   |   2.0363      1.6394
                          0.3402     0.5360   |   2.1548      1.9101
                          0.4374     0.6496   |   2.2669      2.1903
                          0.7664     0.7654   |   2.3755      2.4803
                          1.3220     0.8835   |   2.4795      2.7803
                          1.6822     1.0038   |   2.5047      2.8569

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0017)     32.610      2.018      1.58      34.54
   OUTFLOW: ID= 1 (  0020)     32.610      0.667      3.00      34.51

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 33.07
                  TIME SHIFT OF PEAK FLOW         (min)= 85.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7308

--------------------------------------------------------------------------------
--------------------
| DIVERTHYD(  0023)|
| IN= 1   # OUT= 5 |
--------------------
     Outflow / Inflow  Relationships

      Flow 1 + Flow 2 + Flow 3 + Flow 4 + Flow 5 = Total
      (cms)    (cms)    (cms)    (cms)    (cms)    (cms)
       0.00     0.00     0.00     0.00     0.00     0.00
       0.02     0.01     0.00     0.00     0.00     0.02
       0.05     0.02     0.00     0.00     0.00     0.07
       0.07     0.02     0.02     0.00     0.00     0.12
       0.11     0.04     0.08     0.00     0.00     0.23
       0.16     0.07     0.11     0.00     0.00     0.34
       0.20     0.10     0.14     0.00     0.00     0.44
       0.27     0.34     0.16     0.00     0.00     0.77
       0.29     0.64     0.39     0.00     0.00     1.32
       0.30     0.70     0.68     0.00     0.00     1.68
       0.31     0.73     0.73     0.00     0.00     1.78
       0.32     0.76     0.76     0.00     0.00     1.85
       0.33     0.79     0.79     0.00     0.00     1.91
       0.34     0.81     0.81     0.00     0.00     1.97
       0.35     0.84     0.84     0.00     0.00     2.04
       0.36     0.87     0.87     0.00     0.00     2.10
       0.38     0.91     0.91     0.00     0.00     2.21
       0.40     0.96     0.96     0.00     0.00     2.32
       0.42     1.01     1.01     0.00     0.00     2.43
       0.43     1.04     1.04     0.00     0.00     2.50

                           AREA     QPEAK     TPEAK     R.V.
                           (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):  32.61      0.67      3.00    34.51
     ====================================================
     ID= 2  (   3)    :  16.62      0.25      3.00    34.51
     ID= 3  (   3)    :   8.99      0.26      3.00    34.51
     ID= 4  (   3)    :   6.99      0.15      3.00    34.51
     ID= 5  (   3)    :   0.00      0.00      0.00     0.00
     ID= 6  (   3)    :   0.00      0.00      0.00     0.00
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0028)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1650.00
| DT=  5.0 min     |     Length       (m)= 500.00
```

```
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013
```

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	8.99	0.26	3.00	34.51	0.22	1.43
OUTFLOW: ID= 1 (0028)	8.99	0.26	3.00	34.51	0.22	1.43

```
--------------------
| ROUTEPIPE(  0030)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1650.00
| DT=  5.0 min     |     Length       (m)= 500.00
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013
```

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	6.99	0.15	3.00	34.51	0.17	1.25
OUTFLOW: ID= 1 (0030)	6.99	0.15	3.08	34.51	0.17	1.25

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0019)|   Area    (ha)=   6.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  28.00   Dir. Conn.(%)=  28.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.96         5.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.64         1.23
     Length            (m)=     215.87       712.00
     Mannings n           =      0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Max.Eff.Inten.(mm/hr)=     186.64        24.61
               over (min)         5.00        85.00
     Storage Coeff.  (min)=       3.61 (ii)   84.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        85.00
     Unit Hyd. peak  (cms)=       0.25         0.01
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.96         0.15          0.968 (iii)
     TIME TO PEAK    (hrs)=       1.00         2.42           1.00
     RUNOFF VOLUME    (mm)=      63.35        31.37          40.32
     TOTAL RAINFALL   (mm)=      65.35        65.35          65.35
     RUNOFF COEFFICIENT   =       0.97         0.48           0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  82.0    Ia = Dep. 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  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0019):     6.99   0.968     1.00    40.32
      + ID2= 2 (  0028):     8.99   0.263     3.00    34.51
        ================================================
        ID = 3 (  0029):    15.98   0.969     1.00    37.05

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

--------------------
| ADD HYD  (  0029)|
```

3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0029):	15.98	0.969	1.00	37.05
+ ID2= 2 (0030):	6.99	0.152	3.08	34.51
ID = 1 (0029):	22.98	0.969	1.00	36.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTEPIPE(0032)	PIPE Number = 1.00
IN= 2---> OUT= 1	Diameter (mm)=1650.00
DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	16.62	0.25	3.00	34.51	0.22	1.41
OUTFLOW: ID= 1 (0032)	16.62	0.25	3.08	34.51	0.22	1.41

CALIB	
NASHYD (0018)	Area (ha)= 0.94 Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)= 3.90 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.12

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.299

PEAK FLOW (cms)= 0.169 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 33.922
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.519

(i) 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 (0018):		0.94	0.169	1.00	33.92
+	ID2= 2 (0032):		16.62	0.251	3.08	34.51
	ID = 3 (0033):		17.56	0.263	3.00	34.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0034)|	Area (ha)=	6.77	Curve Number (CN)=	83.0
ID= 1 DT= 5.0 min |	Ia (mm)=	4.10	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.50		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.517

PEAK FLOW (cms)= 0.428 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 33.117
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.507

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

CALIB					
NASHYD (0035)|	Area (ha)=	12.32	Curve Number (CN)=	84.0
ID= 1 DT= 5.0 min |	Ia (mm)=	3.90	# 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	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.856

PEAK FLOW (cms)= 0.758 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 34.380
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.526

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

RESERVOIR(0036)	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	0.9922	0.4686
	0.0150	0.0403	1.3581	0.5239
	0.0508	0.0819	1.4554	0.5809
	0.0745	0.1250	1.5104	0.6396
	0.1065	0.1696	1.5636	0.6999
	0.1567	0.2156	1.6156	0.7620
	0.1928	0.2631	1.6657	0.8257
	0.2872	0.3021	1.7150	0.8913
	0.4020	0.3627	1.7631	0.9586
	0.5684	0.4149	1.8561	1.0987

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	12.320	0.758	1.58	34.38
OUTFLOW: ID= 1 (0036)	12.320	0.225	3.08	34.32

PEAK FLOW REDUCTION [Qout/Qin](%)= 29.70
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.2766

ADD HYD (0037)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	6.77	0.428	1.50	33.12
+ ID2= 2 (0036):	12.32	0.225	3.08	34.32
ID = 3 (0037):	19.09	0.492	1.58	33.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0045)	Area (ha)= 2.10	Curve Number (CN)= 82.0	
ID= 1 DT= 5.0 min	Ia (mm)= 4.30	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.14		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.573

PEAK FLOW (cms)= 0.313 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 31.669
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.485

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

CALIB	
NASHYD (0046)	Area (ha)= 1.31 Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.30 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.08

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.625

PEAK FLOW (cms)= 0.288 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 30.101
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.461

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

CALIB	
NASHYD (0047)	Area (ha)= 1.89 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.10 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.22

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.328

PEAK FLOW (cms)= 0.219 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 33.075
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.506

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

Alternative Method 1
100-year 4-hour Chicago

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\fd0ed113-
301b-4971-bb0b-12742810f8a8\s
  Summary filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\fd0ed113-
301b-4971-bb0b-12742810f8a8\s


DATE: 07-15-2025                          TIME: 08:41:59

USER:



COMMENTS: _____________________________________________________________


----------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 100-year-4hr-Chicago          **
  ***********************************************

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| CHICAGO STORM    |    IDF curve parameters: A=1032.793
| Ptotal= 70.38 mm |                          B=   0.000
--------------------                          C=   0.743
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    5.06 |  1.00   26.53 |  2.00   10.53 |  3.00    5.93
                0.17    5.69 |  1.17  186.64 |  2.17    9.23 |  3.17    5.57
                0.33    6.55 |  1.33   33.08 |  2.33    8.25 |  3.33    5.25
                0.50    7.79 |  1.50   20.27 |  2.50    7.49 |  3.50    4.97
                0.67    9.78 |  1.67   15.20 |  2.67    6.87 |  3.67    4.72
                0.83   13.66 |  1.83   12.37 |  2.83    6.36 |  3.83    4.51


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| CALIB            |
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| NASHYD (0011)| Area (ha)= 12.45 Curve Number (CN)= 82.0
|ID= 1 DT= 5.0 min | Ia (mm)= 3.10 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.462

PEAK FLOW (cms)= 0.479 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 36.792
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.523

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

| CALIB |
| NASHYD (0012)| Area (ha)= 28.68 Curve Number (CN)= 84.0
|ID= 1 DT= 5.0 min | Ia (mm)= 2.70 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.41

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 2.672

PEAK FLOW (cms)= 2.374 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 39.464
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.561

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

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| CALIB            |
| NASHYD   (  0031)|   Area    (ha)=  25.70   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.11

         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    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
              0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
              0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
              0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
              0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
              0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
              0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
              0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
              0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
              0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
              0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
              1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.884

     PEAK FLOW       (cms)=   0.942 (i)
     TIME TO PEAK    (hrs)=   2.667
     RUNOFF VOLUME    (mm)=  37.031
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.526

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

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--------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=  10.73   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
              0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
              0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
              0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
              0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
              0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
              0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
              0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
              0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
              0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
              0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
              1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.366

     PEAK FLOW       (cms)=   0.403 (i)
     TIME TO PEAK    (hrs)=   2.667
     RUNOFF VOLUME    (mm)=  38.105
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TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.541

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

ADD HYD (0051)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0012):	28.68	2.374	1.75	39.46
+	ID2= 2 (0031):	25.70	0.942	2.67	37.03
	ID = 3 (0051):	54.38	2.849	1.83	38.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0051)					
3 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 3 (0051):	54.38	2.849	1.83	38.31
+	ID2= 2 (0041):	10.73	0.403	2.67	38.10
	ID = 1 (0051):	65.11	3.088	1.83	38.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0002)| IN= 2---> OUT= 1	DT= 5.0 min	OVERFLOW IS OFF			
	OUTFLOW (cms)	STORAGE (ha.m.)		OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000		1.3450	2.1963
	0.0302	0.2196		2.0056	2.4160
	0.1060	0.4393		2.9861	2.6356
	0.1484	0.6589		5.1073	3.0749
	0.1976	0.8785		6.4750	3.5141
	0.2620	1.0982		6.9124	3.9534
	0.3256	1.3178		7.3312	4.3927
	0.4719	1.5374		7.7329	4.8319
	0.6161	1.7571		8.1186	5.2712
	0.8070	1.9767		0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0051)	65.110	3.088	1.83	38.28
OUTFLOW: ID= 1 (0002)	65.110	0.674	4.67	38.25

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.84
TIME SHIFT OF PEAK FLOW (min)=170.00
MAXIMUM STORAGE USED (ha.m.)= 1.8243

CALIB	NASHYD (0021)	ID= 1 DT= 5.0 min	Area (ha)= 19.40	Curve Number (CN)= 81.0	Ia (mm)= 3.00	# of Linear Res.(N)= 3.00	U.H. Tp(hrs)= 0.66

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.123

PEAK FLOW (cms)= 1.007 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 35.760
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.508

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

CALIB			
NASHYD (0042)	Area (ha)= 40.21	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 2.70	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.20		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.280

PEAK FLOW (cms)= 1.490 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 39.468
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.561

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

RESERVOIR(0001)	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	0.7119	0.9480
	0.0123	0.0780	1.9253	1.1420
	0.0329	0.1570	2.5634	1.3440

0.0407	0.2380	|	2.7870	1.5530
0.0476	0.3210	|	2.9936	1.7700
0.0805	0.4060	|	3.1872	1.9930
0.1414	0.4920	|	3.3696	2.2250
0.1808	0.5790	|	3.6262	2.5860
0.2708	0.6690	|	3.7476	2.7730
0.4375	0.7600	|	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0042)	40.210	1.490	2.75	39.47
OUTFLOW: ID= 1 (0001)	40.210	0.704	4.67	39.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 47.22
TIME SHIFT OF PEAK FLOW (min)=115.00
MAXIMUM STORAGE USED (ha.m.)= 0.9427

ADD HYD (0052)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0001):	40.21	0.704	4.67	39.43
	+ ID2= 2 (0011):	12.45	0.479	2.50	36.79
	ID = 3 (0052):	52.66	0.914	4.25	38.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0052)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0052):	52.66	0.914	4.25	38.81
	+ ID2= 2 (0002):	65.11	0.674	4.67	38.25
	ID = 1 (0052):	117.77	1.573	4.42	38.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0052)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0052):	117.77	1.573	4.42	38.50
	+ ID2= 2 (0021):	19.40	1.007	2.08	35.76
	ID = 3 (0052):	137.17	1.810	4.17	38.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0017) | ID= 1 DT= 5.0 min				
	Area (ha)= 32.52	Curve Number (CN)= 84.0		
	Ia (mm)= 3.70	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 0.52			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93

0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 2.389

PEAK FLOW (cms)= 2.200 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 38.642
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.549

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

RESERVOIR(0020)	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	1.7783	1.1263
	0.0245	0.1030	1.8455	1.2511
	0.0690	0.2080	1.9113	1.3782
	0.1181	0.3152	1.9743	1.5076
	0.2257	0.4245	2.0363	1.6394
	0.3402	0.5360	2.1548	1.9101
	0.4374	0.6496	2.2669	2.1903
	0.7664	0.7654	2.3755	2.4803
	1.3220	0.8835	2.4795	2.7803
	1.6822	1.0038	2.5047	2.8569

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0017)	32.520	2.200	1.83	38.64
OUTFLOW: ID= 1 (0020)	32.520	0.723	3.17	38.61

PEAK FLOW REDUCTION [Qout/Qin](%)= 32.87
TIME SHIFT OF PEAK FLOW (min)= 80.00
MAXIMUM STORAGE USED (ha.m.)= 0.7504

DIVERTHYD(0023)
IN= 1 # OUT= 5

Outflow / Inflow Relationships

Flow 1 (cms)	+ Flow 2 (cms)	+ Flow 3 (cms)	+ Flow 4 (cms)	+ Flow 5 (cms)	= Total (cms)
0.00	0.00	0.00	0.00	0.00	0.00
0.02	0.01	0.00	0.00	0.00	0.02
0.05	0.02	0.00	0.00	0.00	0.07
0.07	0.02	0.02	0.00	0.00	0.12
0.11	0.04	0.08	0.00	0.00	0.23
0.16	0.07	0.11	0.00	0.00	0.34
0.20	0.10	0.14	0.00	0.00	0.44
0.27	0.34	0.16	0.00	0.00	0.77
0.29	0.64	0.39	0.00	0.00	1.32
0.30	0.70	0.68	0.00	0.00	1.68
0.31	0.73	0.73	0.00	0.00	1.78
0.32	0.76	0.76	0.00	0.00	1.85

0.33	0.79	0.79	0.00	0.00	1.91
0.34	0.81	0.81	0.00	0.00	1.97
0.35	0.84	0.84	0.00	0.00	2.04
0.36	0.87	0.87	0.00	0.00	2.10
0.38	0.91	0.91	0.00	0.00	2.21
0.40	0.96	0.96	0.00	0.00	2.32
0.42	1.01	1.01	0.00	0.00	2.43
0.43	1.04	1.04	0.00	0.00	2.50

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	32.52	0.72	3.17	38.61
ID= 2 (3) :	16.07	0.26	3.17	38.61
ID= 3 (3) :	9.48	0.30	3.17	38.61
ID= 4 (3) :	6.97	0.16	3.17	38.61
ID= 5 (3) :	0.00	0.00	0.00	0.00
ID= 6 (3) :	0.00	0.00	0.00	0.00

| ROUTEPIPE(0028)|	PIPE Number = 1.00
| IN= 2---> OUT= 1 |	Diameter (mm)=1650.00
| DT= 5.0 min |	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	9.48	0.30	3.17	38.61	0.24	1.51
OUTFLOW: ID= 1 (0028)	9.48	0.30	3.25	38.61	0.24	1.51

| ROUTEPIPE(0030)|	PIPE Number = 1.00
| IN= 2---> OUT= 1 |	Diameter (mm)=1650.00
| DT= 5.0 min |	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40

0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0023)	6.97	0.16	3.17	38.61	0.18	1.26
OUTFLOW: ID= 1 (0030)	6.97	0.16	3.25	38.61	0.18	1.26

CALIB	
STANDHYD (0019)	Area (ha)= 6.99
ID= 1 DT= 5.0 min	Total Imp(%)= 28.00 Dir. Conn.(%)= 28.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.96	5.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.64	1.23
Length	(m)=	215.87	712.00
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	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Max.Eff.Inten.(mm/hr)=	186.64	25.57		
over (min)	5.00	85.00		
Storage Coeff. (min)=	3.61 (ii)	82.89 (ii)		
Unit Hyd. Tpeak (min)=	5.00	85.00		
Unit Hyd. peak (cms)=	0.25	0.01		
				TOTALS
PEAK FLOW (cms)=	0.96	0.16		0.969 (iii)
TIME TO PEAK (hrs)=	1.33	2.67		1.33
RUNOFF VOLUME (mm)=	68.38	35.29		44.55
TOTAL RAINFALL (mm)=	70.38	70.38		70.38

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     RUNOFF COEFFICIENT   =       0.97         0.50           0.63

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  82.0    Ia = Dep. 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  (  0029)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0019):     6.99   0.969     1.33    44.55
      + ID2= 2 (  0028):     9.48   0.303     3.25    38.61
        ================================================
        ID = 3 (  0029):    16.47   0.970     1.33    41.13

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

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0029):    16.47   0.970     1.33    41.13
      + ID2= 2 (  0030):     6.97   0.155     3.25    38.61
        ================================================
        ID = 1 (  0029):    23.44   0.970     1.33    40.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0032)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1650.00
| DT=  5.0 min     |     Length       (m)= 500.00
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013

     <------------------ TRAVEL TIME TABLE ---------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)       (cms)        (m/s)         min
       0.09     .216E+02        0.0          0.80        10.40
       0.17     .600E+02        0.1          1.25         6.67
       0.26     .108E+03        0.3          1.61         5.18
       0.35     .164E+03        0.6          1.91         4.36
       0.43     .225E+03        1.0          2.18         3.83
       0.52     .290E+03        1.4          2.41         3.46
       0.61     .358E+03        1.9          2.61         3.19
       0.69     .428E+03        2.4          2.79         2.99
       0.78     .499E+03        2.9          2.95         2.83
       0.87     .570E+03        3.5          3.08         2.70
       0.96     .642E+03        4.1          3.20         2.61
       1.04     .712E+03        4.7          3.29         2.53
       1.13     .780E+03        5.2          3.36         2.48
       1.22     .844E+03        5.8          3.41         2.44
       1.30     .905E+03        6.2          3.44         2.43
       1.39     .961E+03        6.6          3.43         2.43
       1.48     .101E+04        6.9          3.40         2.45
       1.56     .105E+04        6.9          3.31         2.52
       1.65     .107E+04        6.5          3.02         2.76
                                    <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)       (m/s)
   INFLOW : ID= 2 (  0023)   16.07     0.26    3.17  38.61      0.22      1.43
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   OUTFLOW: ID= 1 (  0032)   16.07     0.26    3.25  38.61      0.22      1.43


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--------------------
| CALIB            |
| NASHYD   (  0018)|   Area    (ha)=   0.94   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
               0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
               0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
               0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
               0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
               0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
               0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
               0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
               0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
               1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.299

     PEAK FLOW       (cms)=   0.178 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  37.965
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.539

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

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--------------------
| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
        ID1= 1 (  0018):     0.94   0.178     1.33    37.97
      + ID2= 2 (  0032):    16.07   0.263     3.25    38.61
        ================================================
        ID = 3 (  0033):    17.01   0.276     3.17    38.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0034)|   Area    (ha)=   6.82   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.10   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
```

0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.521

PEAK FLOW (cms)= 0.454 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 37.133
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.528

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

CALIB			
NASHYD (0035)	Area (ha)= 12.17	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 3.90	# 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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.845

PEAK FLOW (cms)= 0.786 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 38.478
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.547

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

RESERVOIR(0036)	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	0.9922	0.4686
	0.0150	0.0403	1.3581	0.5239
	0.0508	0.0819	1.4554	0.5809
	0.0745	0.1250	1.5104	0.6396
	0.1065	0.1696	1.5636	0.6999
	0.1567	0.2156	1.6156	0.7620

0.1928	0.2631	|	1.6657	0.8257
0.2872	0.3021	|	1.7150	0.8913
0.4020	0.3627	|	1.7631	0.9586
0.5684	0.4149	|	1.8561	1.0987

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	12.170	0.786	1.92	38.48
OUTFLOW: ID= 1 (0036)	12.170	0.239	3.42	38.42

PEAK FLOW REDUCTION [Qout/Qin](%)= 30.42
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.2824

ADD HYD (0037)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	6.82	0.454	1.83	37.13
+ ID2= 2 (0036):	12.17	0.239	3.42	38.42
ID = 3 (0037):	18.99	0.520	1.92	37.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0045)	Area (ha)= 2.10	Curve Number (CN)= 82.0	
ID= 1 DT= 5.0 min	Ia (mm)= 4.30	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.14		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.573

PEAK FLOW (cms)= 0.329 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 35.572
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.505

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

CALIB			
NASHYD (0046)	Area (ha)= 1.31	Curve Number (CN)= 82.0	
ID= 1 DT= 5.0 min	Ia (mm)= 4.30	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.08		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.625

PEAK FLOW (cms)= 0.301 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 33.811
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.480

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

CALIB	
NASHYD (0047)	Area (ha)= 1.89 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.10 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.22

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.328

PEAK FLOW (cms)= 0.230 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 37.086
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.527

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

Alternative Method 1
100-year 3-hour Chicago

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\817e0409-
366f-4744-8e23-802eae9b8041\s
  Summary filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\817e0409-
366f-4744-8e23-802eae9b8041\s


DATE: 07-15-2025                          TIME: 08:41:58

USER:



COMMENTS: _____________________________________________________________


----------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 100-year-3hr-Chicago          **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1032.793
| Ptotal= 65.35 mm |                          B=   0.000
--------------------                          C=   0.743
                       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    6.55 |  0.83  186.64 |  1.67   10.53 |  2.50    6.36
                0.17    7.79 |  1.00   33.08 |  1.83    9.23 |  2.67    5.93
                0.33    9.78 |  1.17   20.27 |  2.00    8.25 |  2.83    5.57
                0.50   13.66 |  1.33   15.20 |  2.17    7.49 |
                0.67   26.53 |  1.50   12.37 |  2.33    6.87 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0011)|   Area     (ha)=  12.45   Curve Number    (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   3.10   # of Linear Res.(N)= 3.00
```

--------------------   U.H. Tp(hrs)=   1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)=   0.462

PEAK FLOW   (cms)=   0.458 (i)
TIME TO PEAK   (hrs)=   2.250
RUNOFF VOLUME   (mm)= 32.837
TOTAL RAINFALL   (mm)= 65.350
RUNOFF COEFFICIENT   =   0.502

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

CALIB			
NASHYD (0012)	Area (ha)=	28.68	Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)=	2.70	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.41	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)=   2.672

PEAK FLOW   (cms)=   2.268 (i)
TIME TO PEAK   (hrs)=   1.417
RUNOFF VOLUME   (mm)= 35.347
TOTAL RAINFALL   (mm)= 65.350
RUNOFF COEFFICIENT   =   0.541

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

CALIB			
NASHYD (0031)	Area (ha)=	25.70	Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)=	2.80	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.11	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.884

PEAK FLOW (cms)= 0.901 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 33.071
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.506

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

CALIB			
NASHYD (0041)	Area (ha)= 10.73	Curve Number (CN)= 83.0	
ID= 1 DT= 5.0 min	Ia (mm)= 2.90	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.12		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.366

PEAK FLOW (cms)= 0.386 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 34.068
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.521

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

ADD HYD (0051)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	28.68	2.268	1.42	35.35
+ ID2= 2 (0031):	25.70	0.901	2.33	33.07
	==========	==========	==========	==========

```
        ID = 3 (  0051):    54.38   2.719     1.50    34.27

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

--------------------
| ADD HYD  (  0051)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0051):    54.38   2.719     1.50    34.27
      + ID2= 2 (  0041):    10.73   0.386     2.33    34.07
        ================================================
        ID = 1 (  0051):    65.11   2.942     1.50    34.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   1.3450      2.1963
                           0.0302     0.2196   |   2.0056      2.4160
                           0.1060     0.4393   |   2.9861      2.6356
                           0.1484     0.6589   |   5.1073      3.0749
                           0.1976     0.8785   |   6.4750      3.5141
                           0.2620     1.0982   |   6.9124      3.9534
                           0.3256     1.3178   |   7.3312      4.3927
                           0.4719     1.5374   |   7.7329      4.8319
                           0.6161     1.7571   |   8.1186      5.2712
                           0.8070     1.9767   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0051)     65.110      2.942      1.50      34.24
   OUTFLOW: ID= 1 (  0002)     65.110      0.572      4.08      34.21

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 19.44
                  TIME SHIFT OF PEAK FLOW         (min)=155.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.6899

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0021)|   Area    (ha)=  19.40   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.66

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


                            ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.123

     PEAK FLOW       (cms)=   0.960 (i)
     TIME TO PEAK    (hrs)=   1.750
```

```
     RUNOFF VOLUME    (mm)=  31.882
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.488

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0042)|   Area    (ha)=  40.21   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.20

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.280

     PEAK FLOW       (cms)=   1.428 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=  35.350
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.541

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   0.7119      0.9480
                           0.0123     0.0780   |   1.9253      1.1420
                           0.0329     0.1570   |   2.5634      1.3440
                           0.0407     0.2380   |   2.7870      1.5530
                           0.0476     0.3210   |   2.9936      1.7700
                           0.0805     0.4060   |   3.1872      1.9930
                           0.1414     0.4920   |   3.3696      2.2250
                           0.1808     0.5790   |   3.6262      2.5860
                           0.2708     0.6690   |   3.7476      2.7730
                           0.4375     0.7600   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0042)     40.210      1.428      2.42      35.35
   OUTFLOW: ID= 1 (  0001)     40.210      0.635      4.25      35.31

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 44.51
                  TIME SHIFT OF PEAK FLOW         (min)=110.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.8958

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```
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0001):    40.21   0.635     4.25    35.31
      + ID2= 2 (  0011):    12.45   0.458     2.25    32.84
        ================================================
        ID = 3 (  0052):    52.66   0.830     3.67    34.73

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

--------------------
| ADD HYD  (  0052)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0052):    52.66   0.830     3.67    34.73
      + ID2= 2 (  0002):    65.11   0.572     4.08    34.21
        ================================================
        ID = 1 (  0052):   117.77   1.390     3.83    34.44

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

--------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0052):   117.77   1.390     3.83    34.44
      + ID2= 2 (  0021):    19.40   0.960     1.75    31.88
        ================================================
        ID = 3 (  0052):   137.17   1.634     3.33    34.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0017)|   Area     (ha)=  32.52   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   3.70   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.52

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   2.389

     PEAK FLOW       (cms)=   2.092 (i)
     TIME TO PEAK    (hrs)=   1.500
     RUNOFF VOLUME    (mm)=  34.541
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.529

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

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```
| RESERVOIR(  0020)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   1.7783      1.1263
                          0.0245     0.1030   |   1.8455      1.2511
                          0.0690     0.2080   |   1.9113      1.3782
                          0.1181     0.3152   |   1.9743      1.5076
                          0.2257     0.4245   |   2.0363      1.6394
                          0.3402     0.5360   |   2.1548      1.9101
                          0.4374     0.6496   |   2.2669      2.1903
                          0.7664     0.7654   |   2.3755      2.4803
                          1.3220     0.8835   |   2.4795      2.7803
                          1.6822     1.0038   |   2.5047      2.8569

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0017)     32.520      2.092      1.50       34.54
   OUTFLOW: ID= 1 (  0020)     32.520      0.668      2.92       34.51

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 31.92
                  TIME SHIFT OF PEAK FLOW         (min)= 85.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7308

--------------------------------------------------------------------------------
--------------------
| DIVERTHYD(  0023)|
| IN= 1   # OUT= 5 |
--------------------
     Outflow / Inflow  Relationships

      Flow 1 + Flow 2 + Flow 3 + Flow 4 + Flow 5 = Total
      (cms)    (cms)    (cms)    (cms)    (cms)    (cms)
       0.00     0.00     0.00     0.00     0.00     0.00
       0.02     0.01     0.00     0.00     0.00     0.02
       0.05     0.02     0.00     0.00     0.00     0.07
       0.07     0.02     0.02     0.00     0.00     0.12
       0.11     0.04     0.08     0.00     0.00     0.23
       0.16     0.07     0.11     0.00     0.00     0.34
       0.20     0.10     0.14     0.00     0.00     0.44
       0.27     0.34     0.16     0.00     0.00     0.77
       0.29     0.64     0.39     0.00     0.00     1.32
       0.30     0.70     0.68     0.00     0.00     1.68
       0.31     0.73     0.73     0.00     0.00     1.78
       0.32     0.76     0.76     0.00     0.00     1.85
       0.33     0.79     0.79     0.00     0.00     1.91
       0.34     0.81     0.81     0.00     0.00     1.97
       0.35     0.84     0.84     0.00     0.00     2.04
       0.36     0.87     0.87     0.00     0.00     2.10
       0.38     0.91     0.91     0.00     0.00     2.21
       0.40     0.96     0.96     0.00     0.00     2.32
       0.42     1.01     1.01     0.00     0.00     2.43
       0.43     1.04     1.04     0.00     0.00     2.50

                           AREA     QPEAK     TPEAK     R.V.
                           (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):  32.52      0.67      2.92    34.51
     ==================================================
     ID= 2  (   3)    :  16.57      0.25      2.92    34.51
     ID= 3  (   3)    :   8.99      0.26      2.92    34.51
     ID= 4  (   3)    :   6.96      0.15      2.92    34.51
     ID= 5  (   3)    :   0.00      0.00      0.00     0.00
     ID= 6  (   3)    :   0.00      0.00      0.00     0.00
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0028)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1650.00
| DT=  5.0 min     |     Length       (m)= 500.00
```

```
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013
```

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
	<---- hydrograph ---->				<-pipe / channel->	
INFLOW : ID= 2 (0023)	8.99	0.26	2.92	34.51	0.22	1.43
OUTFLOW: ID= 1 (0028)	8.99	0.26	3.00	34.51	0.22	1.43

```
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0030)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1650.00
| DT=  5.0 min     |     Length       (m)= 500.00
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013
```

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
	<---- hydrograph ---->				<-pipe / channel->	
INFLOW : ID= 2 (0023)	6.96	0.15	2.92	34.51	0.17	1.25
OUTFLOW: ID= 1 (0030)	6.96	0.15	3.00	34.51	0.17	1.25

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0019)|   Area    (ha)=   6.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  28.00   Dir. Conn.(%)=  28.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.96         5.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.64         1.23
     Length            (m)=     215.87       712.00
     Mannings n           =      0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Max.Eff.Inten.(mm/hr)=     186.64        24.61
               over (min)         5.00        85.00
     Storage Coeff.  (min)=       3.61 (ii)   84.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        85.00
     Unit Hyd. peak  (cms)=       0.25         0.01
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.96         0.15          0.968 (iii)
     TIME TO PEAK    (hrs)=       1.00         2.42           1.00
     RUNOFF VOLUME    (mm)=      63.35        31.37          40.32
     TOTAL RAINFALL   (mm)=      65.35        65.35          65.35
     RUNOFF COEFFICIENT   =       0.97         0.48           0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  82.0    Ia = Dep. 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  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0019):     6.99   0.968     1.00    40.32
      + ID2= 2 (  0028):     8.99   0.263     3.00    34.51
        ================================================
        ID = 3 (  0029):    15.98   0.969     1.00    37.05

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

--------------------
| ADD HYD  (  0029)|
```

3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0029):	15.98	0.969	1.00	37.05
+ ID2= 2 (0030):	6.96	0.152	3.00	34.51
ID = 1 (0029):	22.94	0.969	1.00	36.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTEPIPE(0032)	PIPE Number = 1.00
IN= 2---> OUT= 1	Diameter (mm)=1650.00
DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	16.57	0.25	2.92	34.51	0.22	1.41
OUTFLOW: ID= 1 (0032)	16.57	0.25	3.00	34.51	0.22	1.41

CALIB		
NASHYD (0018)	Area (ha)= 0.94	Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)= 3.90	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.12	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.299

PEAK FLOW (cms)= 0.169 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 33.922
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.519

(i) 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 (0018):	0.94	0.169	1.00	33.92
+	ID2= 2 (0032):	16.57	0.252	3.00	34.51
	ID = 3 (0033):	17.51	0.263	2.92	34.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0034)	Area (ha)=	6.82	Curve Number (CN)=	83.0	
ID= 1 DT= 5.0 min	Ia (mm)=	4.10	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.50			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.521

PEAK FLOW (cms)= 0.431 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 33.117
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.507

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

CALIB					
NASHYD (0035)	Area (ha)=	12.17	Curve Number (CN)=	84.0	
ID= 1 DT= 5.0 min	Ia (mm)=	3.90	# 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	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.845

PEAK FLOW (cms)= 0.749 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 34.380
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.526

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

RESERVOIR(0036)	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	0.9922	0.4686
	0.0150	0.0403	1.3581	0.5239
	0.0508	0.0819	1.4554	0.5809
	0.0745	0.1250	1.5104	0.6396
	0.1065	0.1696	1.5636	0.6999
	0.1567	0.2156	1.6156	0.7620
	0.1928	0.2631	1.6657	0.8257
	0.2872	0.3021	1.7150	0.8913
	0.4020	0.3627	1.7631	0.9586
	0.5684	0.4149	1.8561	1.0987

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	12.170	0.749	1.58	34.38
OUTFLOW: ID= 1 (0036)	12.170	0.219	3.08	34.32

PEAK FLOW REDUCTION [Qout/Qin](%)= 29.25
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.2741

ADD HYD (0037)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0034):	6.82	0.431	1.50	33.12
	+ ID2= 2 (0036):	12.17	0.219	3.08	34.32
	ID = 3 (0037):	18.99	0.495	1.58	33.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0045)	Area (ha)= 2.10	Curve Number (CN)= 82.0	
ID= 1 DT= 5.0 min	Ia (mm)= 4.30	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.14		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.573

PEAK FLOW (cms)= 0.313 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 31.669
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.485

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

CALIB	
NASHYD (0046)	Area (ha)= 1.31 Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.30 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.08

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.625

PEAK FLOW (cms)= 0.288 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 30.101
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.461

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

CALIB	
NASHYD (0047)	Area (ha)= 1.89 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.10 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.22

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.328

PEAK FLOW (cms)= 0.219 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 33.075
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.506

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

Alternative Method 2
100-year 4-hour Chicago

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\8d8bd1e4-
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de99-4c23-afa2-3b0e4eafb146\s


DATE: 07-15-2025                          TIME: 09:58:34

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : 100-year-4hr-Chicago          **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1032.793
| Ptotal= 70.38 mm |                          B=   0.000
--------------------                          C=   0.743
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    5.06 |  1.00   26.53 |  2.00   10.53 |  3.00    5.93
                0.17    5.69 |  1.17  186.64 |  2.17    9.23 |  3.17    5.57
                0.33    6.55 |  1.33   33.08 |  2.33    8.25 |  3.33    5.25
                0.50    7.79 |  1.50   20.27 |  2.50    7.49 |  3.50    4.97
                0.67    9.78 |  1.67   15.20 |  2.67    6.87 |  3.67    4.72
                0.83   13.66 |  1.83   12.37 |  2.83    6.36 |  3.83    4.51


------------------------------------------------------------------------------
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| CALIB            |
| NASHYD   (  0011)|   Area    (ha)=  12.45   Curve Number   (CN)= 82.0
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|ID= 1 DT= 5.0 min | Ia (mm)= 3.10 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.462

PEAK FLOW (cms)= 0.479 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 36.792
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.523

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

| CALIB |
| NASHYD (0012)| Area (ha)= 28.74 Curve Number (CN)= 84.0
|ID= 1 DT= 5.0 min | Ia (mm)= 2.70 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.41

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 2.677

PEAK FLOW (cms)= 2.379 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 39.464
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.561

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

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| CALIB            |
| NASHYD   (  0031)|   Area    (ha)=  25.07   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.14

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
              0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
              0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
              0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
              0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
              0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
              0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
              0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
              0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
              0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
              0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
              1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.840

     PEAK FLOW       (cms)=   0.901 (i)
     TIME TO PEAK    (hrs)=   2.667
     RUNOFF VOLUME    (mm)=  37.031
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.526

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

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--------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=  10.73   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
              0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
              0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
              0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
              0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
              0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
              0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
              0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
              0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
              0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
              0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
              1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.366

     PEAK FLOW       (cms)=   0.403 (i)
     TIME TO PEAK    (hrs)=   2.667
     RUNOFF VOLUME    (mm)=  38.105
     TOTAL RAINFALL   (mm)=  70.382
```

RUNOFF COEFFICIENT = 0.541

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

ADD HYD (0051)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0012):	28.74	2.379	1.75	39.46
	+ ID2= 2 (0031):	25.07	0.901	2.67	37.03
	ID = 3 (0051):	53.81	2.818	1.75	38.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0051)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0051):	53.81	2.818	1.75	38.33
	+ ID2= 2 (0041):	10.73	0.403	2.67	38.10
	ID = 1 (0051):	64.54	3.051	1.83	38.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0002)	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	1.3450	2.1963
	0.0302	0.2196	2.0056	2.4160
	0.1060	0.4393	2.9861	2.6356
	0.1484	0.6589	5.1073	3.0749
	0.1976	0.8785	6.4750	3.5141
	0.2620	1.0982	6.9124	3.9534
	0.3256	1.3178	7.3312	4.3927
	0.4719	1.5374	7.7329	4.8319
	0.6161	1.7571	8.1186	5.2712
	0.8070	1.9767	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0051)	64.540	3.051	1.83	38.29
OUTFLOW: ID= 1 (0002)	64.540	0.660	4.67	38.26

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.64
TIME SHIFT OF PEAK FLOW (min)=170.00
MAXIMUM STORAGE USED (ha.m.)= 1.8084

CALIB			
NASHYD (0021)	Area (ha)= 19.40	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 3.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.66		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93

0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.123

PEAK FLOW (cms)= 1.007 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 35.760
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.508

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

CALIB			
NASHYD (0042)	Area (ha)= 40.21	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 2.70	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.20		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.280

PEAK FLOW (cms)= 1.490 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 39.468
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.561

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

RESERVOIR(0001)	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	0.7119	0.9480
	0.0123	0.0780	1.9253	1.1420
	0.0329	0.1570	2.5634	1.3440
	0.0407	0.2380	2.7870	1.5530

```
                          0.0476     0.3210   |   2.9936      1.7700
                          0.0805     0.4060   |   3.1872      1.9930
                          0.1414     0.4920   |   3.3696      2.2250
                          0.1808     0.5790   |   3.6262      2.5860
                          0.2708     0.6690   |   3.7476      2.7730
                          0.4375     0.7600   |   0.0000      0.0000

                                    AREA     QPEAK     TPEAK       R.V.
                                    (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0042)     40.210      1.490      2.75      39.47
   OUTFLOW: ID= 1 (  0001)     40.210      0.704      4.67      39.43

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 47.22
                  TIME SHIFT OF PEAK FLOW         (min)=115.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.9427

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

--------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):    40.21   0.704     4.67    39.43
      + ID2= 2 (  0011):    12.45   0.479     2.50    36.79
        ================================================
        ID = 3 (  0052):    52.66   0.914     4.25    38.81

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

--------------------
| ADD HYD  (  0052)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0052):    52.66   0.914     4.25    38.81
      + ID2= 2 (  0002):    64.54   0.660     4.67    38.26
        ================================================
        ID = 1 (  0052):   117.20   1.558     4.42    38.51

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

--------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0052):   117.20   1.558     4.42    38.51
      + ID2= 2 (  0021):    19.40   1.007     2.08    35.76
        ================================================
        ID = 3 (  0052):   136.60   1.794     4.08    38.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0017)|   Area    (ha)=  33.05   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.70   # 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    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
```

0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 2.295

PEAK FLOW (cms)= 2.147 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 38.642
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.549

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

RESERVOIR(0020)	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	1.7783	1.1263
	0.0245	0.1030	1.8455	1.2511
	0.0690	0.2080	1.9113	1.3782
	0.1181	0.3152	1.9743	1.5076
	0.2257	0.4245	2.0363	1.6394
	0.3402	0.5360	2.1548	1.9101
	0.4374	0.6496	2.2669	2.1903
	0.7664	0.7654	2.3755	2.4803
	1.3220	0.8835	2.4795	2.7803
	1.6822	1.0038	2.5047	2.8569

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0017)	33.050	2.147	1.92	38.64
OUTFLOW: ID= 1 (0020)	33.050	0.740	3.25	38.61

PEAK FLOW REDUCTION [Qout/Qin](%)= 34.47
TIME SHIFT OF PEAK FLOW (min)= 80.00
MAXIMUM STORAGE USED (ha.m.)= 0.7565

DIVERTHYD(0023)
IN= 1 # OUT= 5

Outflow / Inflow Relationships

Flow 1 (cms)	+ Flow 2 (cms)	+ Flow 3 (cms)	+ Flow 4 (cms)	+ Flow 5 (cms)	= Total (cms)
0.00	0.00	0.00	0.00	0.00	0.00
0.02	0.01	0.00	0.00	0.00	0.02
0.05	0.02	0.00	0.00	0.00	0.07
0.07	0.02	0.02	0.00	0.00	0.12
0.11	0.04	0.08	0.00	0.00	0.23
0.16	0.07	0.11	0.00	0.00	0.34
0.20	0.10	0.14	0.00	0.00	0.44
0.27	0.34	0.16	0.00	0.00	0.77
0.29	0.64	0.39	0.00	0.00	1.32
0.30	0.70	0.68	0.00	0.00	1.68
0.31	0.73	0.73	0.00	0.00	1.78
0.32	0.76	0.76	0.00	0.00	1.85
0.33	0.79	0.79	0.00	0.00	1.91

0.34	0.81	0.81	0.00	0.00	1.97
0.35	0.84	0.84	0.00	0.00	2.04
0.36	0.87	0.87	0.00	0.00	2.10
0.38	0.91	0.91	0.00	0.00	2.21
0.40	0.96	0.96	0.00	0.00	2.32
0.42	1.01	1.01	0.00	0.00	2.43
0.43	1.04	1.04	0.00	0.00	2.50

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	33.05	0.74	3.25	38.61
ID= 2 (3) :	16.24	0.27	3.25	38.61
ID= 3 (3) :	9.76	0.32	3.25	38.61
ID= 4 (3) :	7.05	0.16	3.25	38.61
ID= 5 (3) :	0.00	0.00	0.00	0.00
ID= 6 (3) :	0.00	0.00	0.00	0.00

| ROUTEPIPE(0028)|	PIPE Number = 1.00
| IN= 2---> OUT= 1 |	Diameter (mm)=1650.00
| DT= 5.0 min |	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	9.76	0.32	3.25	38.61	0.25	1.54
OUTFLOW: ID= 1 (0028)	9.76	0.32	3.25	38.61	0.25	1.53

| ROUTEPIPE(0030)|	PIPE Number = 1.00
| IN= 2---> OUT= 1 |	Diameter (mm)=1650.00
| DT= 5.0 min |	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67

0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0023)	7.05	0.16	3.25	38.61	0.18	1.26
OUTFLOW: ID= 1 (0030)	7.05	0.16	3.33	38.61	0.18	1.26

CALIB	
STANDHYD (0019)	Area (ha)= 6.99
ID= 1 DT= 5.0 min	Total Imp(%)= 28.00 Dir. Conn.(%)= 28.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.96	5.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.64	1.23
Length	(m)=	215.87	712.00
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	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Max.Eff.Inten.(mm/hr)=	186.64	25.57		
over (min)	5.00	85.00		
Storage Coeff. (min)=	3.61 (ii)	82.89 (ii)		
Unit Hyd. Tpeak (min)=	5.00	85.00		
Unit Hyd. peak (cms)=	0.25	0.01		
				TOTALS
PEAK FLOW (cms)=	0.96	0.16		0.969 (iii)
TIME TO PEAK (hrs)=	1.33	2.67		1.33
RUNOFF VOLUME (mm)=	68.38	35.29		44.55
TOTAL RAINFALL (mm)=	70.38	70.38		70.38
RUNOFF COEFFICIENT =	0.97	0.50		0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 82.0 Ia = Dep. 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 (0029)|	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0019):		6.99	0.969	1.33	44.55
+ ID2= 2 (0028):		9.76	0.316	3.25	38.61
ID = 3 (0029):		16.75	0.970	1.33	41.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)|	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0029):		16.75	0.970	1.33	41.09
+ ID2= 2 (0030):		7.05	0.157	3.33	38.61
ID = 1 (0029):		23.80	0.970	1.33	40.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTEPIPE(0032)| | IN= 2---> OUT= 1 | | DT= 5.0 min |

PIPE Number = 1.00
Diameter (mm)=1650.00
Length (m)= 500.00
Slope (m/m)= 0.005
Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	16.24	0.27	3.25	38.61	0.22	1.44
OUTFLOW: ID= 1 (0032)	16.24	0.27	3.25	38.61	0.22	1.44

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--------------------------------------------------------------------------------
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| CALIB            |
| NASHYD   (  0018)|   Area    (ha)=   0.94   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
               0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
               0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
               0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
               0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
               0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
               0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
               0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
               0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
               1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.299

     PEAK FLOW       (cms)=   0.178 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  37.965
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.539

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

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--------------------
| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0018):     0.94   0.178     1.33    37.97
      + ID2= 2 (  0032):    16.24   0.267     3.25    38.61
        ================================================
        ID = 3 (  0033):    17.18   0.279     3.25    38.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0034)|   Area    (ha)=   6.82   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.10   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
               0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
```

0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.521

PEAK FLOW (cms)= 0.454 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 37.133
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.528

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

CALIB			
NASHYD (0035)	Area (ha)= 12.23	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 3.90	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.54		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.865

PEAK FLOW (cms)= 0.800 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 38.478
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.547

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

RESERVOIR(0036)	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	0.9922	0.4686
	0.0150	0.0403	1.3581	0.5239
	0.0508	0.0819	1.4554	0.5809
	0.0745	0.1250	1.5104	0.6396
	0.1065	0.1696	1.5636	0.6999
	0.1567	0.2156	1.6156	0.7620
	0.1928	0.2631	1.6657	0.8257

```
                          0.2872     0.3021   |   1.7150      0.8913
                          0.4020     0.3627   |   1.7631      0.9586
                          0.5684     0.4149   |   1.8561      1.0987

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0035)     12.230      0.800      1.92      38.48
   OUTFLOW: ID= 1 (  0036)     12.230      0.242      3.33      38.42

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 30.28
                  TIME SHIFT OF PEAK FLOW         (min)= 85.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2836

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

--------------------
| ADD HYD  (  0037)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0034):     6.82   0.454     1.83    37.13
      + ID2= 2 (  0036):    12.23   0.242     3.33    38.42
        ================================================
        ID = 3 (  0037):    19.05   0.522     1.92    37.96

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0045)|   Area    (ha)=   2.10   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.30   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.14

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
               0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
               0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
               0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
               0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
               0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
               0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
               0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
               0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
               1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.573

     PEAK FLOW       (cms)=   0.329 (i)
     TIME TO PEAK    (hrs)=   1.417
     RUNOFF VOLUME    (mm)=  35.572
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.505

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0046)|   Area    (ha)=   1.31   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.30   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.08
```

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.625

PEAK FLOW (cms)= 0.301 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 33.811
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.480

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

CALIB	
NASHYD (0047)	Area (ha)= 1.89 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.10 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.22

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.328

PEAK FLOW (cms)= 0.230 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 37.086
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.527

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

Alternative Method 2
100-year 3-hour Chicago

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\24ff2439-
96ac-483e-8fee-940e8134ba3d\s
  Summary filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\24ff2439-
96ac-483e-8fee-940e8134ba3d\s


DATE: 07-15-2025                          TIME: 09:58:33

USER:



COMMENTS: _____________________________________________________________


----------------------------------------------------------------------------------------------------------------
  ********************************************
  ** SIMULATION : 100-year-3hr-Chicago         **
  ********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1032.793
| Ptotal= 65.35 mm |                          B=   0.000
--------------------                          C=   0.743
                       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    6.55 |  0.83  186.64 |  1.67   10.53 |  2.50    6.36
                0.17    7.79 |  1.00   33.08 |  1.83    9.23 |  2.67    5.93
                0.33    9.78 |  1.17   20.27 |  2.00    8.25 |  2.83    5.57
                0.50   13.66 |  1.33   15.20 |  2.17    7.49 |
                0.67   26.53 |  1.50   12.37 |  2.33    6.87 |


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--------------------
| CALIB            |
| NASHYD   (  0011)|   Area    (ha)=  12.45   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.10   # of Linear Res.(N)= 3.00
```

--------------------   U.H. Tp(hrs)=   1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)=   0.462

PEAK FLOW   (cms)=   0.458 (i)
TIME TO PEAK   (hrs)=   2.250
RUNOFF VOLUME   (mm)= 32.837
TOTAL RAINFALL   (mm)= 65.350
RUNOFF COEFFICIENT   =   0.502

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

CALIB			
NASHYD (0012)	Area (ha)=	28.74	Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)=	2.70	# of Linear Res.(N)= 3.00
U.H. Tp(hrs)=	0.41		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)=   2.677

PEAK FLOW   (cms)=   2.273 (i)
TIME TO PEAK   (hrs)=   1.417
RUNOFF VOLUME   (mm)= 35.347
TOTAL RAINFALL   (mm)= 65.350
RUNOFF COEFFICIENT   =   0.541

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

CALIB			
NASHYD (0031)	Area (ha)=	25.07	Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)=	2.80	# of Linear Res.(N)= 3.00
U.H. Tp(hrs)=	1.14		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.840

PEAK FLOW (cms)= 0.861 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 33.071
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.506

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

CALIB			
NASHYD (0041)	Area (ha)= 10.73	Curve Number (CN)= 83.0	
ID= 1 DT= 5.0 min	Ia (mm)= 2.90	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.12		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.366

PEAK FLOW (cms)= 0.386 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 34.068
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.521

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

ADD HYD (0051)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	28.74	2.273	1.42	35.35
+ ID2= 2 (0031):	25.07	0.861	2.33	33.07
	==========	==========	==========	==========

```
        ID = 3 (  0051):    53.81   2.685     1.50    34.29

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

--------------------
| ADD HYD  (  0051)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0051):    53.81   2.685     1.50    34.29
      + ID2= 2 (  0041):    10.73   0.386     2.33    34.07
        ================================================
        ID = 1 (  0051):    64.54   2.908     1.50    34.25

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   1.3450      2.1963
                           0.0302     0.2196   |   2.0056      2.4160
                           0.1060     0.4393   |   2.9861      2.6356
                           0.1484     0.6589   |   5.1073      3.0749
                           0.1976     0.8785   |   6.4750      3.5141
                           0.2620     1.0982   |   6.9124      3.9534
                           0.3256     1.3178   |   7.3312      4.3927
                           0.4719     1.5374   |   7.7329      4.8319
                           0.6161     1.7571   |   8.1186      5.2712
                           0.8070     1.9767   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0051)     64.540      2.908      1.50      34.25
   OUTFLOW: ID= 1 (  0002)     64.540      0.561      4.17      34.22

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 19.29
                  TIME SHIFT OF PEAK FLOW         (min)=160.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.6733

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0021)|   Area    (ha)=  19.40   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.66

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


                            ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.123

     PEAK FLOW       (cms)=   0.960 (i)
     TIME TO PEAK    (hrs)=   1.750
```

```
     RUNOFF VOLUME    (mm)=  31.882
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.488

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0042)|   Area    (ha)=  40.21   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.20

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.280

     PEAK FLOW       (cms)=   1.428 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=  35.350
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.541

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   0.7119      0.9480
                           0.0123     0.0780   |   1.9253      1.1420
                           0.0329     0.1570   |   2.5634      1.3440
                           0.0407     0.2380   |   2.7870      1.5530
                           0.0476     0.3210   |   2.9936      1.7700
                           0.0805     0.4060   |   3.1872      1.9930
                           0.1414     0.4920   |   3.3696      2.2250
                           0.1808     0.5790   |   3.6262      2.5860
                           0.2708     0.6690   |   3.7476      2.7730
                           0.4375     0.7600   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0042)     40.210      1.428      2.42      35.35
   OUTFLOW: ID= 1 (  0001)     40.210      0.635      4.25      35.31

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 44.51
                  TIME SHIFT OF PEAK FLOW         (min)=110.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.8958

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```
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):    40.21   0.635     4.25    35.31
      + ID2= 2 (  0011):    12.45   0.458     2.25    32.84
        ================================================
        ID = 3 (  0052):    52.66   0.830     3.67    34.73

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

--------------------
| ADD HYD  (  0052)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0052):    52.66   0.830     3.67    34.73
      + ID2= 2 (  0002):    64.54   0.561     4.17    34.22
        ================================================
        ID = 1 (  0052):   117.20   1.378     3.83    34.45

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

--------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0052):   117.20   1.378     3.83    34.45
      + ID2= 2 (  0021):    19.40   0.960     1.75    31.88
        ================================================
        ID = 3 (  0052):   136.60   1.621     3.33    34.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0017)|   Area     (ha)=  33.05   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   3.70   # 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    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   2.295

     PEAK FLOW       (cms)=   2.045 (i)
     TIME TO PEAK    (hrs)=   1.583
     RUNOFF VOLUME    (mm)=  34.541
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.529

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

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```
| RESERVOIR(  0020)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   1.7783      1.1263
                          0.0245     0.1030   |   1.8455      1.2511
                          0.0690     0.2080   |   1.9113      1.3782
                          0.1181     0.3152   |   1.9743      1.5076
                          0.2257     0.4245   |   2.0363      1.6394
                          0.3402     0.5360   |   2.1548      1.9101
                          0.4374     0.6496   |   2.2669      2.1903
                          0.7664     0.7654   |   2.3755      2.4803
                          1.3220     0.8835   |   2.4795      2.7803
                          1.6822     1.0038   |   2.5047      2.8569

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0017)     33.050      2.045      1.58      34.54
   OUTFLOW: ID= 1 (  0020)     33.050      0.685      2.92      34.51

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 33.48
                  TIME SHIFT OF PEAK FLOW         (min)= 80.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7370

--------------------------------------------------------------------------------
--------------------
| DIVERTHYD(  0023)|
| IN= 1   # OUT= 5 |
--------------------
     Outflow / Inflow  Relationships

      Flow 1 + Flow 2 + Flow 3 + Flow 4 + Flow 5 = Total
      (cms)    (cms)    (cms)    (cms)    (cms)    (cms)
       0.00     0.00     0.00     0.00     0.00     0.00
       0.02     0.01     0.00     0.00     0.00     0.02
       0.05     0.02     0.00     0.00     0.00     0.07
       0.07     0.02     0.02     0.00     0.00     0.12
       0.11     0.04     0.08     0.00     0.00     0.23
       0.16     0.07     0.11     0.00     0.00     0.34
       0.20     0.10     0.14     0.00     0.00     0.44
       0.27     0.34     0.16     0.00     0.00     0.77
       0.29     0.64     0.39     0.00     0.00     1.32
       0.30     0.70     0.68     0.00     0.00     1.68
       0.31     0.73     0.73     0.00     0.00     1.78
       0.32     0.76     0.76     0.00     0.00     1.85
       0.33     0.79     0.79     0.00     0.00     1.91
       0.34     0.81     0.81     0.00     0.00     1.97
       0.35     0.84     0.84     0.00     0.00     2.04
       0.36     0.87     0.87     0.00     0.00     2.10
       0.38     0.91     0.91     0.00     0.00     2.21
       0.40     0.96     0.96     0.00     0.00     2.32
       0.42     1.01     1.01     0.00     0.00     2.43
       0.43     1.04     1.04     0.00     0.00     2.50

                           AREA     QPEAK     TPEAK     R.V.
                           (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):  33.05      0.68      2.92    34.51
     ==================================================
     ID= 2  (   3)    :  16.75      0.26      2.92    34.51
     ID= 3  (   3)    :   9.24      0.28      2.92    34.51
     ID= 4  (   3)    :   7.06      0.15      2.92    34.51
     ID= 5  (   3)    :   0.00      0.00      0.00     0.00
     ID= 6  (   3)    :   0.00      0.00      0.00     0.00
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0028)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1650.00
| DT=  5.0 min     |     Length       (m)= 500.00
```

```
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013
```

<-------------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	9.24	0.28	2.92	34.51	0.23	1.46
OUTFLOW: ID= 1 (0028)	9.24	0.28	3.00	34.51	0.23	1.45

```
| ROUTEPIPE(  0030)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1650.00
| DT=  5.0 min     |     Length       (m)= 500.00
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013
```

<-------------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	7.06	0.15	2.92	34.51	0.18	1.25
OUTFLOW: ID= 1 (0030)	7.06	0.15	3.00	34.51	0.17	1.25

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0019)|   Area    (ha)=   6.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  28.00   Dir. Conn.(%)=  28.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.96         5.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.64         1.23
     Length            (m)=     215.87       712.00
     Mannings n           =      0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Max.Eff.Inten.(mm/hr)=     186.64        24.61
               over (min)         5.00        85.00
     Storage Coeff.  (min)=       3.61 (ii)   84.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        85.00
     Unit Hyd. peak  (cms)=       0.25         0.01
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.96         0.15          0.968 (iii)
     TIME TO PEAK    (hrs)=       1.00         2.42           1.00
     RUNOFF VOLUME    (mm)=      63.35        31.37          40.32
     TOTAL RAINFALL   (mm)=      65.35        65.35          65.35
     RUNOFF COEFFICIENT   =       0.97         0.48           0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  82.0    Ia = Dep. 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  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0019):     6.99   0.968     1.00    40.32
      + ID2= 2 (  0028):     9.24   0.276     3.00    34.51
        ================================================
        ID = 3 (  0029):    16.23   0.969     1.00    37.01

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

--------------------
| ADD HYD  (  0029)|
```

3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0029):	16.23	0.969	1.00	37.01
+ ID2= 2 (0030):	7.06	0.153	3.00	34.51
ID = 1 (0029):	23.29	0.969	1.00	36.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTEPIPE(0032)	PIPE Number = 1.00
IN= 2---> OUT= 1	Diameter (mm)=1650.00
DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	16.75	0.26	2.92	34.51	0.22	1.42
OUTFLOW: ID= 1 (0032)	16.75	0.25	3.00	34.51	0.22	1.41

CALIB	
NASHYD (0018)	Area (ha)= 0.94 Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)= 3.90 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.12

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.299

PEAK FLOW (cms)= 0.169 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 33.922
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.519

(i) 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 (0018):		0.94	0.169	1.00	33.92
+ ID2= 2 (0032):		16.75	0.255	3.00	34.51
ID = 3 (0033):		17.69	0.267	3.00	34.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0034)| ID= 1 DT= 5.0 min	Area (ha)= 6.82	Curve Number (CN)= 83.0	
	Ia (mm)= 4.10	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.50		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.521

PEAK FLOW (cms)= 0.431 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 33.117
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.507

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

CALIB			
NASHYD (0035)| ID= 1 DT= 5.0 min	Area (ha)= 12.23	Curve Number (CN)= 84.0	
	Ia (mm)= 3.90	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.54		

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.865

PEAK FLOW (cms)= 0.762 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 34.380
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.526

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

RESERVOIR(0036)| IN= 2---> OUT= 1 | DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.9922	0.4686
	0.0150	0.0403	1.3581	0.5239
	0.0508	0.0819	1.4554	0.5809
	0.0745	0.1250	1.5104	0.6396
	0.1065	0.1696	1.5636	0.6999
	0.1567	0.2156	1.6156	0.7620
	0.1928	0.2631	1.6657	0.8257
	0.2872	0.3021	1.7150	0.8913
	0.4020	0.3627	1.7631	0.9586
	0.5684	0.4149	1.8561	1.0987

OVERFLOW IS OFF

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	12.230	0.762	1.58	34.38
OUTFLOW: ID= 1 (0036)	12.230	0.222	3.08	34.32

PEAK FLOW REDUCTION [Qout/Qin](%)= 29.14
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.2753

ADD HYD (0037)| 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	6.82	0.431	1.50	33.12
+ ID2= 2 (0036):	12.23	0.222	3.08	34.32
ID = 3 (0037):	19.05	0.497	1.58	33.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB | NASHYD (0045)|ID= 1 DT= 5.0 min				
	Area (ha)=	2.10	Curve Number (CN)=	82.0
	Ia (mm)=	4.30	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.14		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.573

PEAK FLOW (cms)= 0.313 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 31.669
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.485

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

CALIB	
NASHYD (0046)	Area (ha)= 1.31 Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.30 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.08

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.625

PEAK FLOW (cms)= 0.288 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 30.101
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.461

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

CALIB	
NASHYD (0047)	Area (ha)= 1.89 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.10 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.22

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.328

PEAK FLOW (cms)= 0.219 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 33.075
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.506

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

Alternative Method 3
100-year 4-hour Chicago

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\6b665f1c-
f49f-4b45-b43e-935b6c3980b7\s
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f49f-4b45-b43e-935b6c3980b7\s


DATE: 07-15-2025                          TIME: 10:17:31

USER:



COMMENTS: _____________________________________________________________

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  ***********************************************
  ** SIMULATION : 100-year-4hr-Chicago         **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1032.793
| Ptotal= 70.38 mm |                          B=   0.000
--------------------                          C=   0.743
                       used in:   INTENSITY =  A / (t + B)^C

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

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    5.06 |  1.00   26.53 |  2.00   10.53 |  3.00    5.93
                0.17    5.69 |  1.17  186.64 |  2.17    9.23 |  3.17    5.57
                0.33    6.55 |  1.33   33.08 |  2.33    8.25 |  3.33    5.25
                0.50    7.79 |  1.50   20.27 |  2.50    7.49 |  3.50    4.97
                0.67    9.78 |  1.67   15.20 |  2.67    6.87 |  3.67    4.72
                0.83   13.66 |  1.83   12.37 |  2.83    6.36 |  3.83    4.51


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| CALIB            |
| NASHYD   (  0011)|   Area    (ha)=  12.45   Curve Number   (CN)= 82.0
```

|ID= 1 DT= 5.0 min | Ia (mm)= 3.10 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.462

PEAK FLOW (cms)= 0.479 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 36.792
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.523

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

| CALIB |
| NASHYD (0012)| Area (ha)= 29.27 Curve Number (CN)= 84.0
|ID= 1 DT= 5.0 min | Ia (mm)= 2.70 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.40

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 2.795

PEAK FLOW (cms)= 2.465 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 39.464
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.561

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

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| CALIB            |
| NASHYD   (  0031)|   Area    (ha)=  25.41   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.17

         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    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
              0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
              0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
              0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
              0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
              0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
              0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
              0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
              0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
              0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
              0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
              1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.830

     PEAK FLOW       (cms)=   0.895 (i)
     TIME TO PEAK    (hrs)=   2.750
     RUNOFF VOLUME    (mm)=  37.031
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.526

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

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--------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=  10.73   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
              0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
              0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
              0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
              0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
              0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
              0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
              0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
              0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
              0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
              0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
              1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.366

     PEAK FLOW       (cms)=   0.403 (i)
     TIME TO PEAK    (hrs)=   2.667
     RUNOFF VOLUME    (mm)=  38.105
     TOTAL RAINFALL   (mm)=  70.382
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RUNOFF COEFFICIENT = 0.541

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

ADD HYD (0051)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0012):	29.27	2.465	1.67	39.46
	+ ID2= 2 (0031):	25.41	0.895	2.75	37.03
	ID = 3 (0051):	54.68	2.881	1.75	38.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0051)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0051):	54.68	2.881	1.75	38.33
	+ ID2= 2 (0041):	10.73	0.403	2.67	38.10
	ID = 1 (0051):	65.41	3.092	1.83	38.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0002)	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	1.3450	2.1963
	0.0302	0.2196	2.0056	2.4160
	0.1060	0.4393	2.9861	2.6356
	0.1484	0.6589	5.1073	3.0749
	0.1976	0.8785	6.4750	3.5141
	0.2620	1.0982	6.9124	3.9534
	0.3256	1.3178	7.3312	4.3927
	0.4719	1.5374	7.7329	4.8319
	0.6161	1.7571	8.1186	5.2712
	0.8070	1.9767	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0051)	65.410	3.092	1.83	38.30
OUTFLOW: ID= 1 (0002)	65.410	0.673	4.67	38.27

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.78
TIME SHIFT OF PEAK FLOW (min)=170.00
MAXIMUM STORAGE USED (ha.m.)= 1.8234

CALIB			
NASHYD (0021)	Area (ha)= 19.40	Curve Number (CN)= 81.0	
ID= 1 DT= 5.0 min	Ia (mm)= 3.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.66		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93

0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.123

PEAK FLOW (cms)= 1.007 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 35.760
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.508

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

CALIB			
NASHYD (0042)	Area (ha)= 40.21	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 2.70	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.20		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 1.280

PEAK FLOW (cms)= 1.490 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 39.468
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.561

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

RESERVOIR(0001)	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	0.7119	0.9480
	0.0123	0.0780	1.9253	1.1420
	0.0329	0.1570	2.5634	1.3440
	0.0407	0.2380	2.7870	1.5530

0.0476	0.3210	|	2.9936	1.7700
0.0805	0.4060	|	3.1872	1.9930
0.1414	0.4920	|	3.3696	2.2250
0.1808	0.5790	|	3.6262	2.5860
0.2708	0.6690	|	3.7476	2.7730
0.4375	0.7600	|	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0042)	40.210	1.490	2.75	39.47
OUTFLOW: ID= 1 (0001)	40.210	0.704	4.67	39.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 47.22
TIME SHIFT OF PEAK FLOW (min)=115.00
MAXIMUM STORAGE USED (ha.m.)= 0.9427

ADD HYD (0052)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0001):	40.21	0.704	4.67	39.43
	+ ID2= 2 (0011):	12.45	0.479	2.50	36.79
	ID = 3 (0052):	52.66	0.914	4.25	38.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0052)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0052):	52.66	0.914	4.25	38.81
	+ ID2= 2 (0002):	65.41	0.673	4.67	38.27
	ID = 1 (0052):	118.07	1.571	4.42	38.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0052)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0052):	118.07	1.571	4.42	38.51
	+ ID2= 2 (0021):	19.40	1.007	2.08	35.76
	ID = 3 (0052):	137.47	1.806	4.17	38.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0017)	Area (ha)= 32.33	Curve Number (CN)= 84.0		
ID= 1 DT= 5.0 min	Ia (mm)= 3.70	# 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	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57

0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 2.245

PEAK FLOW (cms)= 2.100 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 38.642
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.549

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

RESERVOIR(0020)	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	1.7783	1.1263
	0.0245	0.1030	1.8455	1.2511
	0.0690	0.2080	1.9113	1.3782
	0.1181	0.3152	1.9743	1.5076
	0.2257	0.4245	2.0363	1.6394
	0.3402	0.5360	2.1548	1.9101
	0.4374	0.6496	2.2669	2.1903
	0.7664	0.7654	2.3755	2.4803
	1.3220	0.8835	2.4795	2.7803
	1.6822	1.0038	2.5047	2.8569

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0017)	32.330	2.100	1.92	38.64
OUTFLOW: ID= 1 (0020)	32.330	0.711	3.25	38.61

PEAK FLOW REDUCTION [Qout/Qin](%)= 33.85
TIME SHIFT OF PEAK FLOW (min)= 80.00
MAXIMUM STORAGE USED (ha.m.)= 0.7460

DIVERTHYD(0023)
IN= 1 # OUT= 5

Outflow / Inflow Relationships

Flow 1 (cms)	+ Flow 2 (cms)	+ Flow 3 (cms)	+ Flow 4 (cms)	+ Flow 5 (cms)	= Total (cms)
0.00	0.00	0.00	0.00	0.00	0.00
0.02	0.01	0.00	0.00	0.00	0.02
0.05	0.02	0.00	0.00	0.00	0.07
0.07	0.02	0.02	0.00	0.00	0.12
0.11	0.04	0.08	0.00	0.00	0.23
0.16	0.07	0.11	0.00	0.00	0.34
0.20	0.10	0.14	0.00	0.00	0.44
0.27	0.34	0.16	0.00	0.00	0.77
0.29	0.64	0.39	0.00	0.00	1.32
0.30	0.70	0.68	0.00	0.00	1.68
0.31	0.73	0.73	0.00	0.00	1.78
0.32	0.76	0.76	0.00	0.00	1.85
0.33	0.79	0.79	0.00	0.00	1.91

0.34	0.81	0.81	0.00	0.00	1.97
0.35	0.84	0.84	0.00	0.00	2.04
0.36	0.87	0.87	0.00	0.00	2.10
0.38	0.91	0.91	0.00	0.00	2.21
0.40	0.96	0.96	0.00	0.00	2.32
0.42	1.01	1.01	0.00	0.00	2.43
0.43	1.04	1.04	0.00	0.00	2.50

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	32.33	0.71	3.25	38.61
ID= 2 (3) :	16.04	0.26	3.25	38.61
ID= 3 (3) :	9.33	0.30	3.25	38.61
ID= 4 (3) :	6.96	0.15	3.25	38.61
ID= 5 (3) :	0.00	0.00	0.00	0.00
ID= 6 (3) :	0.00	0.00	0.00	0.00

| ROUTEPIPE(0028)|	PIPE Number = 1.00
| IN= 2---> OUT= 1 |	Diameter (mm)=1650.00
| DT= 5.0 min |	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	9.33	0.30	3.25	38.61	0.24	1.49
OUTFLOW: ID= 1 (0028)	9.33	0.29	3.33	38.61	0.24	1.49

| ROUTEPIPE(0030)|	PIPE Number = 1.00
| IN= 2---> OUT= 1 |	Diameter (mm)=1650.00
| DT= 5.0 min |	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67

0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0023)	6.96	0.15	3.25	38.61	0.18	1.26
OUTFLOW: ID= 1 (0030)	6.96	0.15	3.33	38.61	0.18	1.25

CALIB	
STANDHYD (0019)	Area (ha)= 6.99
ID= 1 DT= 5.0 min	Total Imp(%)= 28.00 Dir. Conn.(%)= 28.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.96	5.03
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.64	1.23
Length	(m)=	215.87	712.00
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	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Max.Eff.Inten.(mm/hr)=	186.64	25.57		
over (min)	5.00	85.00		
Storage Coeff. (min)=	3.61 (ii)	82.89 (ii)		
Unit Hyd. Tpeak (min)=	5.00	85.00		
Unit Hyd. peak (cms)=	0.25	0.01		
			TOTALS	
PEAK FLOW (cms)=	0.96	0.16	0.969 (iii)	
TIME TO PEAK (hrs)=	1.33	2.67	1.33	
RUNOFF VOLUME (mm)=	68.38	35.29	44.55	
TOTAL RAINFALL (mm)=	70.38	70.38	70.38	
RUNOFF COEFFICIENT =	0.97	0.50	0.63	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 82.0 Ia = Dep. 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 (0029)|		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0019):	6.99	0.969	1.33	44.55
	+ ID2= 2 (0028):	9.33	0.294	3.33	38.61
	ID = 3 (0029):	16.32	0.970	1.33	41.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)|		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0029):	16.32	0.970	1.33	41.15
	+ ID2= 2 (0030):	6.96	0.155	3.33	38.61
	ID = 1 (0029):	23.28	0.970	1.33	40.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTEPIPE(0032)			
IN= 2---> OUT= 1	PIPE Number	=	1.00
DT= 5.0 min	Diameter	(mm)=	1650.00
	Length	(m)=	500.00
	Slope	(m/m)=	0.005
	Manning n	=	0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	16.04	0.26	3.25	38.61	0.22	1.43
OUTFLOW: ID= 1 (0032)	16.04	0.26	3.33	38.61	0.22	1.43

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| CALIB            |
| NASHYD   (  0018)|   Area    (ha)=   0.94   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
               0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
               0.417    6.55 | 1.417   33.08 | 2.417    8.25 |  3.42    5.25
               0.500    6.55 | 1.500   33.08 | 2.500    8.25 |  3.50    5.25
               0.583    7.79 | 1.583   20.27 | 2.583    7.49 |  3.58    4.97
               0.667    7.79 | 1.667   20.27 | 2.667    7.49 |  3.67    4.97
               0.750    9.78 | 1.750   15.20 | 2.750    6.87 |  3.75    4.72
               0.833    9.78 | 1.833   15.20 | 2.833    6.87 |  3.83    4.72
               0.917   13.66 | 1.917   12.37 | 2.917    6.36 |  3.92    4.51
               1.000   13.66 | 2.000   12.37 | 3.000    6.36 |  4.00    4.51

     Unit Hyd Qpeak  (cms)=   0.299

     PEAK FLOW       (cms)=   0.178 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  37.965
     TOTAL RAINFALL   (mm)=  70.382
     RUNOFF COEFFICIENT   =   0.539

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

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| ADD HYD  (  0033)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0018):     0.94   0.178     1.33    37.97
      + ID2= 2 (  0032):    16.04   0.261     3.33    38.61
        ================================================
        ID = 3 (  0033):    16.98   0.273     3.25    38.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0034)|   Area    (ha)=   6.82   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.10   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

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


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.06 | 1.083   26.53 | 2.083   10.53 |  3.08    5.93
               0.167    5.06 | 1.167   26.53 | 2.167   10.53 |  3.17    5.93
               0.250    5.69 | 1.250  186.64 | 2.250    9.23 |  3.25    5.57
               0.333    5.69 | 1.333  186.64 | 2.333    9.23 |  3.33    5.57
```

0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.521

PEAK FLOW (cms)= 0.454 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 37.133
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.528

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

CALIB			
NASHYD (0035)	Area (ha)= 12.06	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 3.90	# 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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.838

PEAK FLOW (cms)= 0.779 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 38.478
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.547

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

RESERVOIR(0036)	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	0.9922	0.4686
	0.0150	0.0403	1.3581	0.5239
	0.0508	0.0819	1.4554	0.5809
	0.0745	0.1250	1.5104	0.6396
	0.1065	0.1696	1.5636	0.6999
	0.1567	0.2156	1.6156	0.7620
	0.1928	0.2631	1.6657	0.8257

0.2872	0.3021	|	1.7150	0.8913
0.4020	0.3627	|	1.7631	0.9586
0.5684	0.4149	|	1.8561	1.0987

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	12.060	0.779	1.92	38.48
OUTFLOW: ID= 1 (0036)	12.060	0.235	3.42	38.42

PEAK FLOW REDUCTION [Qout/Qin](%)= 30.14
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.2806

ADD HYD (0037)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0034):	6.82	0.454	1.83	37.13
	+ ID2= 2 (0036):	12.06	0.235	3.42	38.42
	ID = 3 (0037):	18.88	0.520	1.92	37.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0045) | ID= 1 DT= 5.0 min			
Area (ha)= 2.10	Curve Number (CN)= 82.0		
Ia (mm)= 4.30	# of Linear Res.(N)= 3.00		
U.H. Tp(hrs)= 0.14			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.573

PEAK FLOW (cms)= 0.329 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 35.572
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.505

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

CALIB NASHYD (0046) | ID= 1 DT= 5.0 min			
Area (ha)= 1.31	Curve Number (CN)= 82.0		
Ia (mm)= 4.30	# of Linear Res.(N)= 3.00		
U.H. Tp(hrs)= 0.08			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.625

PEAK FLOW (cms)= 0.301 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 33.811
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.480

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

CALIB	
NASHYD (0047)	Area (ha)= 1.89 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.10 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.22

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.06	1.083	26.53	2.083	10.53	3.08	5.93
0.167	5.06	1.167	26.53	2.167	10.53	3.17	5.93
0.250	5.69	1.250	186.64	2.250	9.23	3.25	5.57
0.333	5.69	1.333	186.64	2.333	9.23	3.33	5.57
0.417	6.55	1.417	33.08	2.417	8.25	3.42	5.25
0.500	6.55	1.500	33.08	2.500	8.25	3.50	5.25
0.583	7.79	1.583	20.27	2.583	7.49	3.58	4.97
0.667	7.79	1.667	20.27	2.667	7.49	3.67	4.97
0.750	9.78	1.750	15.20	2.750	6.87	3.75	4.72
0.833	9.78	1.833	15.20	2.833	6.87	3.83	4.72
0.917	13.66	1.917	12.37	2.917	6.36	3.92	4.51
1.000	13.66	2.000	12.37	3.000	6.36	4.00	4.51

Unit Hyd Qpeak (cms)= 0.328

PEAK FLOW (cms)= 0.230 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 37.086
TOTAL RAINFALL (mm)= 70.382
RUNOFF COEFFICIENT = 0.527

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

Alternative Method 3
100-year 3-hour Chicago

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\CAKK072000\AppData\Local\Civica\VH5\1fc8c6ba-c089-4a7c-9924-7f19dee13d05\412c6336-
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616f-46e3-89d8-e25e89bdd9f4\s


DATE: 07-15-2025                          TIME: 10:17:30

USER:



COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : 100-year-3hr-Chicago         **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1032.793
| Ptotal= 65.35 mm |                          B=   0.000
--------------------                          C=   0.743
                       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    6.55 |  0.83  186.64 |  1.67   10.53 |  2.50    6.36
                0.17    7.79 |  1.00   33.08 |  1.83    9.23 |  2.67    5.93
                0.33    9.78 |  1.17   20.27 |  2.00    8.25 |  2.83    5.57
                0.50   13.66 |  1.33   15.20 |  2.17    7.49 |
                0.67   26.53 |  1.50   12.37 |  2.33    6.87 |


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--------------------
| CALIB            |
| NASHYD   (  0011)|   Area     (ha)=  12.45   Curve Number    (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   3.10   # of Linear Res.(N)= 3.00
```

--------------------   U.H. Tp(hrs)=   1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)=   0.462

PEAK FLOW   (cms)=   0.458 (i)
TIME TO PEAK   (hrs)=   2.250
RUNOFF VOLUME   (mm)= 32.837
TOTAL RAINFALL   (mm)= 65.350
RUNOFF COEFFICIENT   =   0.502

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

CALIB			
NASHYD (0012)	Area (ha)=	29.27	Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)=	2.70	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.40	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)=   2.795

PEAK FLOW   (cms)=   2.351 (i)
TIME TO PEAK   (hrs)=   1.417
RUNOFF VOLUME   (mm)= 35.346
TOTAL RAINFALL   (mm)= 65.350
RUNOFF COEFFICIENT   =   0.541

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

CALIB			
NASHYD (0031)	Area (ha)=	25.41	Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)=	2.80	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.17	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.830

PEAK FLOW (cms)= 0.857 (i)
TIME TO PEAK (hrs)= 2.417
RUNOFF VOLUME (mm)= 33.071
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.506

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

CALIB			
NASHYD (0041)	Area (ha)= 10.73	Curve Number (CN)= 83.0	
ID= 1 DT= 5.0 min	Ia (mm)= 2.90	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.12		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.366

PEAK FLOW (cms)= 0.386 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 34.068
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.521

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

ADD HYD (0051)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	29.27	2.351	1.42	35.35
+ ID2= 2 (0031):	25.41	0.857	2.42	33.07
	==========	==========	==========	==========

```
        ID = 3 (  0051):    54.68   2.742     1.42    34.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0051)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0051):    54.68   2.742     1.42    34.29
      + ID2= 2 (  0041):    10.73   0.386     2.33    34.07
        ================================================
        ID = 1 (  0051):    65.41   2.949     1.50    34.25

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0002)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |    (cms)     (ha.m.)
                           0.0000     0.0000   |   1.3450      2.1963
                           0.0302     0.2196   |   2.0056      2.4160
                           0.1060     0.4393   |   2.9861      2.6356
                           0.1484     0.6589   |   5.1073      3.0749
                           0.1976     0.8785   |   6.4750      3.5141
                           0.2620     1.0982   |   6.9124      3.9534
                           0.3256     1.3178   |   7.3312      4.3927
                           0.4719     1.5374   |   7.7329      4.8319
                           0.6161     1.7571   |   8.1186      5.2712
                           0.8070     1.9767   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0051)     65.410      2.949      1.50      34.25
   OUTFLOW: ID= 1 (  0002)     65.410      0.570      4.17      34.22

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 19.33
                  TIME SHIFT OF PEAK FLOW         (min)=160.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.6867

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0021)|   Area    (ha)=  19.40   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.66

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


                            ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.123

     PEAK FLOW       (cms)=   0.960 (i)
     TIME TO PEAK    (hrs)=   1.750
```

```
     RUNOFF VOLUME    (mm)=  31.882
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.488

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0042)|   Area    (ha)=  40.21   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   2.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.20

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   1.280

     PEAK FLOW       (cms)=   1.428 (i)
     TIME TO PEAK    (hrs)=   2.417
     RUNOFF VOLUME    (mm)=  35.350
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.541

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0001)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           0.0000     0.0000   |   0.7119      0.9480
                           0.0123     0.0780   |   1.9253      1.1420
                           0.0329     0.1570   |   2.5634      1.3440
                           0.0407     0.2380   |   2.7870      1.5530
                           0.0476     0.3210   |   2.9936      1.7700
                           0.0805     0.4060   |   3.1872      1.9930
                           0.1414     0.4920   |   3.3696      2.2250
                           0.1808     0.5790   |   3.6262      2.5860
                           0.2708     0.6690   |   3.7476      2.7730
                           0.4375     0.7600   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0042)     40.210      1.428      2.42      35.35
   OUTFLOW: ID= 1 (  0001)     40.210      0.635      4.25      35.31

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 44.51
                  TIME SHIFT OF PEAK FLOW         (min)=110.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.8958

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```
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0001):    40.21   0.635     4.25    35.31
      + ID2= 2 (  0011):    12.45   0.458     2.25    32.84
        ================================================
        ID = 3 (  0052):    52.66   0.830     3.67    34.73

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

--------------------
| ADD HYD  (  0052)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0052):    52.66   0.830     3.67    34.73
      + ID2= 2 (  0002):    65.41   0.570     4.17    34.22
        ================================================
        ID = 1 (  0052):   118.07   1.387     3.83    34.45

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

--------------------
| ADD HYD  (  0052)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0052):   118.07   1.387     3.83    34.45
      + ID2= 2 (  0021):    19.40   0.960     1.75    31.88
        ================================================
        ID = 3 (  0052):   137.47   1.629     3.33    34.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0017)|   Area    (ha)=  32.33   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   3.70   # 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    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Unit Hyd Qpeak  (cms)=   2.245

     PEAK FLOW       (cms)=   2.001 (i)
     TIME TO PEAK    (hrs)=   1.583
     RUNOFF VOLUME    (mm)=  34.541
     TOTAL RAINFALL   (mm)=  65.350
     RUNOFF COEFFICIENT   =   0.529

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

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```
| RESERVOIR(  0020)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   1.7783      1.1263
                          0.0245     0.1030   |   1.8455      1.2511
                          0.0690     0.2080   |   1.9113      1.3782
                          0.1181     0.3152   |   1.9743      1.5076
                          0.2257     0.4245   |   2.0363      1.6394
                          0.3402     0.5360   |   2.1548      1.9101
                          0.4374     0.6496   |   2.2669      2.1903
                          0.7664     0.7654   |   2.3755      2.4803
                          1.3220     0.8835   |   2.4795      2.7803
                          1.6822     1.0038   |   2.5047      2.8569

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0017)     32.330      2.001      1.58      34.54
   OUTFLOW: ID= 1 (  0020)     32.330      0.656      3.00      34.51

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 32.80
                  TIME SHIFT OF PEAK FLOW         (min)= 85.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7268

--------------------------------------------------------------------------------
--------------------
| DIVERTHYD(  0023)|
| IN= 1   # OUT= 5 |
--------------------
     Outflow / Inflow  Relationships

      Flow 1 + Flow 2 + Flow 3 + Flow 4 + Flow 5 = Total
      (cms)    (cms)    (cms)    (cms)    (cms)    (cms)
       0.00     0.00     0.00     0.00     0.00     0.00
       0.02     0.01     0.00     0.00     0.00     0.02
       0.05     0.02     0.00     0.00     0.00     0.07
       0.07     0.02     0.02     0.00     0.00     0.12
       0.11     0.04     0.08     0.00     0.00     0.23
       0.16     0.07     0.11     0.00     0.00     0.34
       0.20     0.10     0.14     0.00     0.00     0.44
       0.27     0.34     0.16     0.00     0.00     0.77
       0.29     0.64     0.39     0.00     0.00     1.32
       0.30     0.70     0.68     0.00     0.00     1.68
       0.31     0.73     0.73     0.00     0.00     1.78
       0.32     0.76     0.76     0.00     0.00     1.85
       0.33     0.79     0.79     0.00     0.00     1.91
       0.34     0.81     0.81     0.00     0.00     1.97
       0.35     0.84     0.84     0.00     0.00     2.04
       0.36     0.87     0.87     0.00     0.00     2.10
       0.38     0.91     0.91     0.00     0.00     2.21
       0.40     0.96     0.96     0.00     0.00     2.32
       0.42     1.01     1.01     0.00     0.00     2.43
       0.43     1.04     1.04     0.00     0.00     2.50

                           AREA     QPEAK     TPEAK     R.V.
                           (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):  32.33      0.66      3.00    34.51
     ====================================================
     ID= 2  (   3)    :  16.54      0.25      3.00    34.51
     ID= 3  (   3)    :   8.84      0.26      3.00    34.51
     ID= 4  (   3)    :   6.95      0.15      3.00    34.51
     ID= 5  (   3)    :   0.00      0.00      0.00     0.00
     ID= 6  (   3)    :   0.00      0.00      0.00     0.00
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0028)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1650.00
| DT=  5.0 min     |     Length       (m)= 500.00
```

```
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013
```

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	8.84	0.26	3.00	34.51	0.22	1.42
OUTFLOW: ID= 1 (0028)	8.84	0.25	3.08	34.51	0.22	1.42

```
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0030)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)=1650.00
| DT=  5.0 min     |     Length       (m)= 500.00
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013
```

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	6.95	0.15	3.00	34.51	0.17	1.25
OUTFLOW: ID= 1 (0030)	6.95	0.15	3.08	34.51	0.17	1.25

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0019)|   Area    (ha)=   6.99
|ID= 1 DT= 5.0 min |   Total Imp(%)=  28.00   Dir. Conn.(%)=  28.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.96         5.03
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       0.64         1.23
     Length            (m)=     215.87       712.00
     Mannings n           =      0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.55 | 0.833   26.53 | 1.583   12.37 |  2.33    7.49
              0.167    6.55 | 0.917  186.64 | 1.667   12.37 |  2.42    6.87
              0.250    7.79 | 1.000  186.64 | 1.750   10.53 |  2.50    6.87
              0.333    7.79 | 1.083   33.08 | 1.833   10.53 |  2.58    6.36
              0.417    9.78 | 1.167   33.08 | 1.917    9.23 |  2.67    6.36
              0.500    9.78 | 1.250   20.27 | 2.000    9.23 |  2.75    5.93
              0.583   13.66 | 1.333   20.27 | 2.083    8.25 |  2.83    5.93
              0.667   13.66 | 1.417   15.20 | 2.167    8.25 |  2.92    5.57
              0.750   26.53 | 1.500   15.20 | 2.250    7.49 |  3.00    5.57

     Max.Eff.Inten.(mm/hr)=     186.64        24.61
               over (min)         5.00        85.00
     Storage Coeff.  (min)=       3.61 (ii)   84.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        85.00
     Unit Hyd. peak  (cms)=       0.25         0.01
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.96         0.15          0.968 (iii)
     TIME TO PEAK    (hrs)=       1.00         2.42           1.00
     RUNOFF VOLUME    (mm)=      63.35        31.37          40.32
     TOTAL RAINFALL   (mm)=      65.35        65.35          65.35
     RUNOFF COEFFICIENT   =       0.97         0.48           0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  82.0    Ia = Dep. 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  (  0029)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0019):     6.99   0.968     1.00    40.32
      + ID2= 2 (  0028):     8.84   0.255     3.08    34.51
        ================================================
        ID = 3 (  0029):    15.83   0.969     1.00    37.07

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

--------------------
| ADD HYD  (  0029)|
```

3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0029):	15.83	0.969	1.00	37.07
+ ID2= 2 (0030):	6.95	0.151	3.08	34.51
ID = 1 (0029):	22.78	0.969	1.00	36.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTEPIPE(0032)	PIPE Number = 1.00
IN= 2---> OUT= 1	Diameter (mm)=1650.00
DT= 5.0 min	Length (m)= 500.00
	Slope (m/m)= 0.005
	Manning n = 0.013

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.09	.216E+02	0.0	0.80	10.40
0.17	.600E+02	0.1	1.25	6.67
0.26	.108E+03	0.3	1.61	5.18
0.35	.164E+03	0.6	1.91	4.36
0.43	.225E+03	1.0	2.18	3.83
0.52	.290E+03	1.4	2.41	3.46
0.61	.358E+03	1.9	2.61	3.19
0.69	.428E+03	2.4	2.79	2.99
0.78	.499E+03	2.9	2.95	2.83
0.87	.570E+03	3.5	3.08	2.70
0.96	.642E+03	4.1	3.20	2.61
1.04	.712E+03	4.7	3.29	2.53
1.13	.780E+03	5.2	3.36	2.48
1.22	.844E+03	5.8	3.41	2.44
1.30	.905E+03	6.2	3.44	2.43
1.39	.961E+03	6.6	3.43	2.43
1.48	.101E+04	6.9	3.40	2.45
1.56	.105E+04	6.9	3.31	2.52
1.65	.107E+04	6.5	3.02	2.76

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0023)	16.54	0.25	3.00	34.51	0.22	1.41
OUTFLOW: ID= 1 (0032)	16.54	0.25	3.08	34.51	0.22	1.41

CALIB	
NASHYD (0018)	Area (ha)= 0.94 Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)= 3.90 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.12

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.299

PEAK FLOW (cms)= 0.169 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 33.922
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.519

(i) 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 (0018):		0.94	0.169	1.00	33.92
+ ID2= 2 (0032):		16.54	0.249	3.08	34.51
ID = 3 (0033):		17.48	0.261	3.00	34.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0034)| ID= 1 DT= 5.0 min	Area (ha)= 6.82	Curve Number (CN)= 83.0	
	Ia (mm)= 4.10	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.50		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.521

PEAK FLOW (cms)= 0.431 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 33.117
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.507

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

CALIB			
NASHYD (0035)| ID= 1 DT= 5.0 min	Area (ha)= 12.06	Curve Number (CN)= 84.0	
	Ia (mm)= 3.90	# 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	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.838

PEAK FLOW (cms)= 0.742 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 34.380
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.526

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

RESERVOIR(0036)	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	0.9922	0.4686
	0.0150	0.0403	1.3581	0.5239
	0.0508	0.0819	1.4554	0.5809
	0.0745	0.1250	1.5104	0.6396
	0.1065	0.1696	1.5636	0.6999
	0.1567	0.2156	1.6156	0.7620
	0.1928	0.2631	1.6657	0.8257
	0.2872	0.3021	1.7150	0.8913
	0.4020	0.3627	1.7631	0.9586
	0.5684	0.4149	1.8561	1.0987

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	12.060	0.742	1.58	34.38
OUTFLOW: ID= 1 (0036)	12.060	0.215	3.17	34.32

PEAK FLOW REDUCTION [Qout/Qin](%)= 28.93
TIME SHIFT OF PEAK FLOW (min)= 95.00
MAXIMUM STORAGE USED (ha.m.)= 0.2722

ADD HYD (0037)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0034):	6.82	0.431	1.50	33.12
+ ID2= 2 (0036):	12.06	0.215	3.17	34.32
ID = 3 (0037):	18.88	0.494	1.58	33.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0045)	Area (ha)= 2.10	Curve Number (CN)= 82.0	
ID= 1 DT= 5.0 min	Ia (mm)= 4.30	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.14		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.573

PEAK FLOW (cms)= 0.313 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 31.669
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.485

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

CALIB	
NASHYD (0046)	Area (ha)= 1.31 Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.30 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.08

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.625

PEAK FLOW (cms)= 0.288 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 30.101
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.461

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

CALIB	
NASHYD (0047)	Area (ha)= 1.89 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 4.10 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.22

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.55	0.833	26.53	1.583	12.37	2.33	7.49
0.167	6.55	0.917	186.64	1.667	12.37	2.42	6.87
0.250	7.79	1.000	186.64	1.750	10.53	2.50	6.87
0.333	7.79	1.083	33.08	1.833	10.53	2.58	6.36
0.417	9.78	1.167	33.08	1.917	9.23	2.67	6.36
0.500	9.78	1.250	20.27	2.000	9.23	2.75	5.93
0.583	13.66	1.333	20.27	2.083	8.25	2.83	5.93
0.667	13.66	1.417	15.20	2.167	8.25	2.92	5.57
0.750	26.53	1.500	15.20	2.250	7.49	3.00	5.57

Unit Hyd Qpeak (cms)= 0.328

PEAK FLOW (cms)= 0.219 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 33.075
TOTAL RAINFALL (mm)= 65.350
RUNOFF COEFFICIENT = 0.506

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