



Elora Sands/Keating Lands

Preliminary Stormwater Management Strategy Report

Project Location:

Township of Centre Wellington, Ontario

Prepared for:

Elora Sands Development Inc.
c/o Cachet Developments
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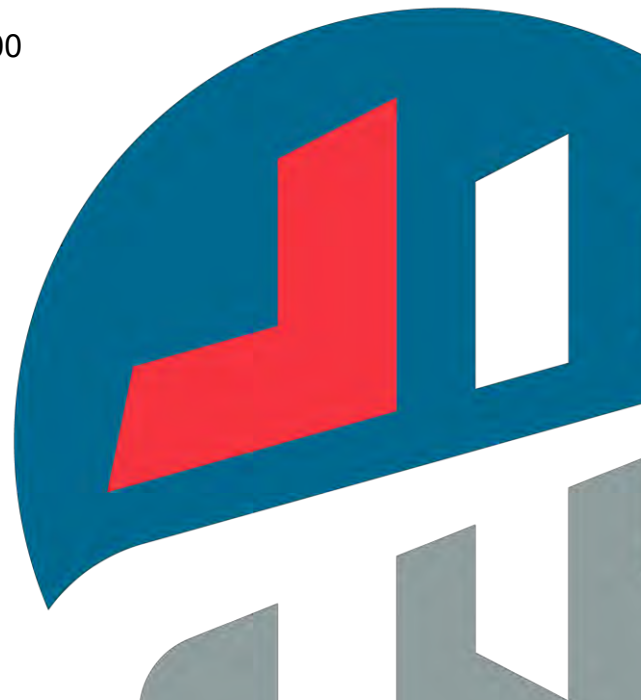
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Existing Conditions Plan (Elora Sands/Keating Lands)	
MTE Drawing No. 49878-100-EC2.1	Encl.

1.0 INTRODUCTION

1.1 Overview

MTE Consultants Inc. (MTE) was retained by Elora Sands Development Inc. to prepare the following Preliminary Stormwater Management Strategy Report (PSWMSR) in support of a privately initiated settlement boundary expansion Official Plan Amendment (OPA) application.

The lands that comprise the OPA application are known as the Elora Sands (formerly Gibson Farm) and the Keating Lands (owned by James Keating Construction). The Elora Sands are located at 7581 Sideroad 15, legally described as Lot 16 of Concession 12, Nichol Township, County of Wellington, and are approximately 40.0ha. The Keating Lands are located at 6583 Irvine Street, legally described as Lot 17 of Concession 12, Nichol Township, County of Wellington, and are approximately 36.8ha. These lands, herein referred to as the 'subject lands', are in the geographic community of Salem and both immediately adjacent to the current settlement boundary for Elora. The subject lands comprise a total area of approximately 76.8ha. Refer to **Figure 1.1** which illustrates the location of the subject lands.

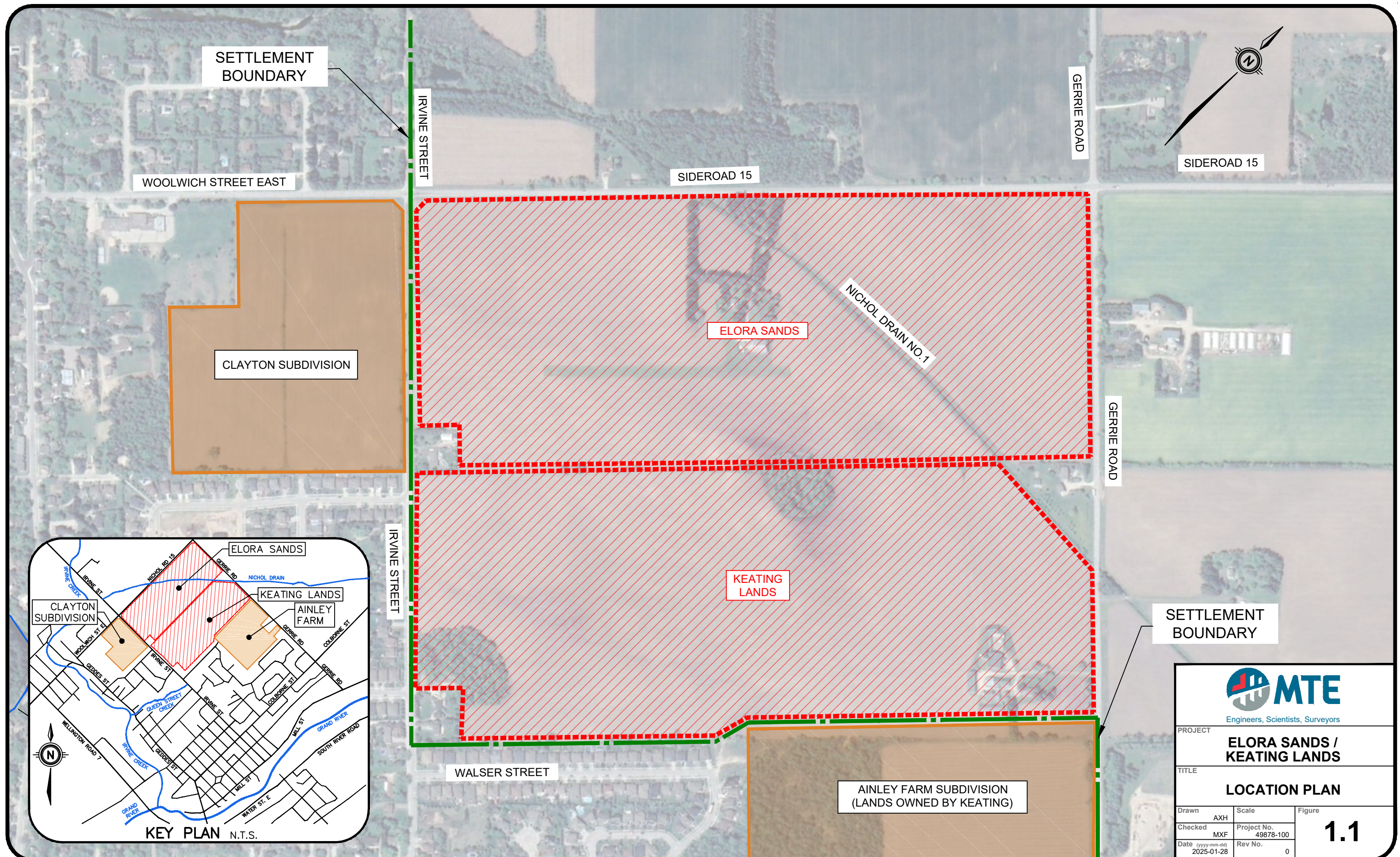
The subject lands are generally bounded by Sideroad 15 to the north, Gerrie Road to the east, existing residential and future development (Ainley Farm Subdivision 23T-18002, owned by Keating) to the south, and Irvine Street to the west. The Nichol Municipal Drain No. 1 (ND) bisects the subject lands. Further west of Irvine Street is the Clayton Subdivision (23T-22005, owned by Cachet Development).

The Ainley Farm Subdivision is within the current settlement boundary and has recently received draft plan approval (November 14, 2023) and is proceeding to final design. The Clayton Subdivision is within the current settlement boundary and for which a Zoning By-law Amendment and Draft Plan of Subdivision applications were submitted and is currently under appeal and going through Ontario Land Tribunal mediation.

Concept Plans for the proposed development were prepared by Malone Given Parsons Ltd. (MGP) for the subject lands and form the basis for this PSWMSR. Refer to the Concept Plans, dated February 28, 2025, in **Appendix B**.

The purpose of this report is to present a Stormwater Management Strategy for the Concept Plan to support the privately initiated settlement boundary expansion.

This report should be read in conjunction with the *Elora Sands/Keating Lands – Functional Servicing Report*, prepared by MTE (March 2025).





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PROJECT			Figure 1.1
ELORA SANDS / KEATING LANDS			
TITLE			
LOCATION PLAN			
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1.2 Background Information

1.2.1 Excerpts from the Ontario Provincial Planning Statement 2024

The Ontario Provincial Planning Statement (PPS) 2024 outlines province-wide direction and regulation on land use planning and development within Ontario. This section outlines key statements and excerpts from the PPS that provide the basis for the Stormwater Management strategies presented in this report.

Chapter 4: Wise Use and Management of Resources

4.2 Water

1. *Planning authorities shall protect, improve or restore the quality and quantity of water by:*
 - a. *using the watershed as the ecologically meaningful scale for integrated and long-term planning, which can be a foundation for considering cumulative impacts of development.*
 - b. *minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts.*
 - c. *identifying water resource systems.*
 - d. *maintaining linkages and functions of water resource systems.*
 - e. *implementing necessary restrictions on development and site alteration to:*
 - i. *protect all municipal drinking water supplies and designated vulnerable areas; and*
 - ii. *protect, improve or restore vulnerable surface and ground water, and their hydrologic functions.*
 - f. *planning for efficient and sustainable use of water resources, through practices for water conservation and sustaining water quality.*
 - g. *ensuring consideration of environmental lake capacity, where applicable.*
2. *Development and site alteration shall be restricted in or near sensitive surface water features and sensitive ground water features such that these features and their related hydrologic functions will be protected, improved or restored, which may require mitigative measures and/or alternative development approaches.*
3. *Municipalities are encouraged to undertake, and large and fast-growing municipalities shall undertake watershed planning to inform planning for sewage and water services and stormwater management, including low impact development, and the protection, improvement or restoration of the quality and quantity of water.*
4. *Despite policy 4.2.3, where planning is conducted by an upper-tier municipality that includes one or more lower-tier large and fast-growing municipalities, the upper-tier municipality shall undertake watershed planning in partnership with lower-tier municipalities, including lower-tier large and fast-growing municipalities.*
5. *All municipalities undertaking watershed planning are encouraged to collaborate with applicable conservation authorities.*

1.2.2 Nichol Drain Subwatershed Study

A subwatershed study for the ND was undertaken by the Township of Centre Wellington and is detailed in the *Nichol Drain Subwatershed Study, Phase 1 Existing Conditions - Final Report* (NDSS) prepared by Aquafor Beech Limited (October 2008). This study was approved in June 2010. Based on the NDSS, the drainage area of the subwatershed encompasses an area of approximately 767ha, mostly of agricultural lands. The NDSS identified the ND as being a coldwater watercourse downstream of Sideroad 15 (without coldwater fish species) and a warmwater system upstream. However, the Grand River Conservation Authority's (GRCA) GRIN mapping shows the entire reach of the ND as being a warmwater system.

The ND is an open channel type municipal drain that starts adjacent to Beatty Line, at its most upstream point. The channel flows west approximately 4km and discharges to Irvine Creek immediately west of Irvine Street, which in-turn discharging to the Grand River just downstream of the Town of Elora.

Through the implementation of a stormwater management strategy for the subject lands, updates to the subwatershed study flow targets will be assessed. The updates to the NDSS will consider the subject lands as developed where the previous study did not contemplate any development beyond developments within Fergus. Pre and post-development flows were established for the ND through the NDSS. Later in this report, the flows in the ND are updated from the NDSS for development of the subject lands to demonstrate alignment with the previously approved subwatershed study objectives.

1.2.3 Queen Street Creek (Irvine Creek Tributary)

The Queen Street Creek (QSC) flows through urban, residential lots southwest of the subject lands, with an outlet to Irvine Creek west of Geddes Street. The QSC drainage area is almost entirely built out except for the southwest corner of the Keating Lands. This drainage area within the Keating Lands first drains to a wetland along Irvine Street, before discharging to the QSC.

Drainage to this tributary under post-development conditions is not subject to an approved subwatershed study. Site specific controls may need to be implemented to limit both flow and volumes while maintaining a surface water balance to the existing wetland feature.

1.2.4 County of Wellington Official Plan

As shown within Schedule A-1 – Land Use Plan of the Official Plan (**Appendix C**), the subject lands are not currently designated as residential but are immediately adjacent to the current settlement boundary. As such, the owners of the subject lands are submitting applications for a settlement boundary expansion request to provide housing in the County of Wellington (County) with the overall objective of providing more housing which is aligned with the Provincial Goal of 1.5 million homes built in Ontario by 2031.

The subject lands are considered potential future development lands in the context of this report.

1.2.5 Other Studies

The following studies represent background studies completed by the broader study team:

- *Environmental Impact Study, Elora Sands and Keating Lands, Township of Centre Wellington (Beacon Environmental, February 2025).*
- *Hydrogeological Considerations (HC-SM), Proposed Residential Development Elora Sands and Keating Lands, Elora (Soil-Mat, February 28, 2025).*
- *Source Water Protection Due Diligence Review, Elora Sands, 7581 Sideroad 15 (SR15), and Keating Lands (Part of Lot 17, Concession 12), Salem (Elora), ON (Terra-Dynamics Inc., March 6, 2025).*
- *Nichol Drain and Queen Street Creek, Preliminary Fluvial Geomorphological Assessment, Elora Sands and Keating Lands, Township of Centre Wellington (GEO Morphix, February 2025).*

2.0 EXISTING CONDITIONS

2.1 Topographical Information

The subject lands are generally comprised of rolling agricultural land. A topographical survey was completed for the Elora Sands property by MTE in 2022. A topographical survey of the Keating Lands has not yet been completed and as such the topography for Keating presented in the existing conditions plans is extracted from digital terrain information from the GRCA.

A topographic survey for the Clayton Subdivision was completed by JD Barnes (formerly Black, Shoemaker, Robinson & Donaldson Limited) in the Fall of 2021, as part of its draft plan of subdivision application.

The existing topography of the subject lands are shown on **MTE Drawing 49878-100-EC2.1**.

The subject lands generally consist of moderately sloped topography with slopes typically ranging from 1.0% to 12.5%. Existing elevations within the lands range from approximately 400.8m in the ND to 420.5m at the north corner of the lands.

The subject lands have a topographical ridge which extends through the Elora Sands and Keating lands, generally parallel to the ND. The southwest corner of the subject lands drains from the ridge (from northwest to southeast) to a wetland located in the southwest corner, adjacent to Irvine Street. The wetland and Irvine Street drain to the QSC.

2.2 Geotechnical and Hydrogeological Information

In October 2021, Soil-Mat Engineers & Consultants Ltd. (Soil-Mat) prepared two geotechnical and hydrogeological investigations for the Clayton Subdivision and the Elora Sands development. The fieldwork for the investigations included: 4 boreholes, 3 of which included monitoring wells for the Clayton Subdivision and an additional 7 boreholes, of which 1 included a monitoring well for the Elora Sands. The boreholes were advanced to depths ranging between 2.1 to 7.6m. In March 2022, Soil-Mat prepared additional preliminary hydrogeological considerations for the Clayton Subdivision and the Elora Sands.

A supplementary hydrogeological assessment was completed by Soil-Mat dated July 20, 2022 for the Clayton Subdivision and the Elora Sands, advancing 14 additional boreholes, 12 of which included monitoring wells drilled in February and April 2022. The additional boreholes were advanced to depths ranging between 3.0 to 8.2m. This assessment included groundwater levels in all monitoring wells. Levels were measured from February to June 2022. An updated groundwater contour plan was also provided to supplement the groundwater contours establish within the original March 2022 hydrogeological report.

In August 2024, a supplemental groundwater data summary was completed by Soil-Mat to provide updated groundwater monitoring data. Based on this summary, groundwater levels were slightly higher as compared to previous monitored levels.

A Hydrogeological Considerations for the subject lands (Elora Sands and Keating Lands) was prepared by Soil-Mat dated February 2025. Detailed field investigation on the Keating Lands to confirm conclusions from the Hydrogeological Considerations is recommended to be completed at a later date to support detailed design.

Based on the results of the previous detailed investigations, the subsurface stratigraphy for the subject lands is generally described as topsoil underlain by sandy silt, silty sand till, and clayey sandy silt till deposits, with generally trace amounts of gravel. Based on the groundwater level readings recorded by Soil-Mat and extrapolation for the Keating Lands, groundwater levels

generally rise and fall with the topography. Groundwater flow is interpreted as having a high point located near the topographical ridge. The groundwater flow generally mimics the surface water flow direction. Based on the findings in the NDSS and the hydrogeological assessment by Soil-Mat, generally groundwater contributes to the ND as shallow interflow and baseflow. The wetland in the southwest corner of the subject lands is generally characterized as being supplied by precipitation and surface water runoff with a slight vertical downward gradient to shallow groundwater.

The geotechnical and hydrogeological reports can be found in **Appendix D**.

2.3 Source Water Protection and GRCA Mapping

The subject lands are within a Wellhead Protection Area (WHPA) and a Significant Groundwater Recharge Area-Tier 2 (SGRA) as defined by the Source Water Protection Plan Mapping, as illustrated in **Appendix E**. A majority of the lands have a WHPA classification of WHPA-C, while the southwestern portion of the lands have a classification of WHPA-B and the eastern portion of the lands have a classification of WHPA-D. The majority of the subject lands are within a wellhead vulnerability score of 6 with a small portion in the southwest corner having a vulnerability score of 8 and the eastern portion of the lands with a vulnerability of 4. There is an existing municipal drinking water supply well located on Aqua Street approximately 550m south of the subject lands.

The intrinsic vulnerability for the SGRA is characterised as moderate (generally having a vulnerability score of 4), generally indicative of shallow groundwater flow towards Irvine Creek west of the subject lands.

As part of the Hydrogeological Considerations, Terra-Dynamics Inc. conducted a Source Water Protection Due Diligence Review of the subject lands dated March 2025. The management strategies proposed for mitigation of impacts for quality and quantity to WHPAs and SGRAs by Terra-Dynamics aligns with the stormwater management strategies and servicing proposed in the Functional Servicing Report and this Preliminary Stormwater Management Strategy Report. Refer to **Appendix D and E** for details.

2.4 Hydrology

An existing conditions hydrologic model was developed as part of the Nichol Drain Subwatershed Study using the SWMHYMO hydrologic model platform. A future conditions model was also prepared to assess impact of the secondary plan area that was being considered as part of the subwatershed study. Both the existing and future conditions were modelled for the:

- 2, 5, 10, 25, 50 and 100-year return period rainfall events (4hr Chicago distribution) utilizing the Fergus Shand Dam Intensity-Duration-Frequency (IDF) parameters.
- Regional storm event (212mm depth, last 12 hours of Hurricane Hazel and AMC III conditions).

Summarized in **Table 6.1** are the estimated peak flows for the 2-year through 100-year events and the Region storm event at various locations within the Nichol Drain subwatershed for existing and future conditions.

2.4.1 Pre-Development Drainage Conditions (Subject Lands)

Approximately 72% of the subject lands (56.9ha) located in the northeast drains to the ND, which in-turn drains to Irvine Creek. Approximately 28% of the subject lands (22.7ha) located in the southwest drains to the Queen Street Creek which also drains to Irvine Creek.

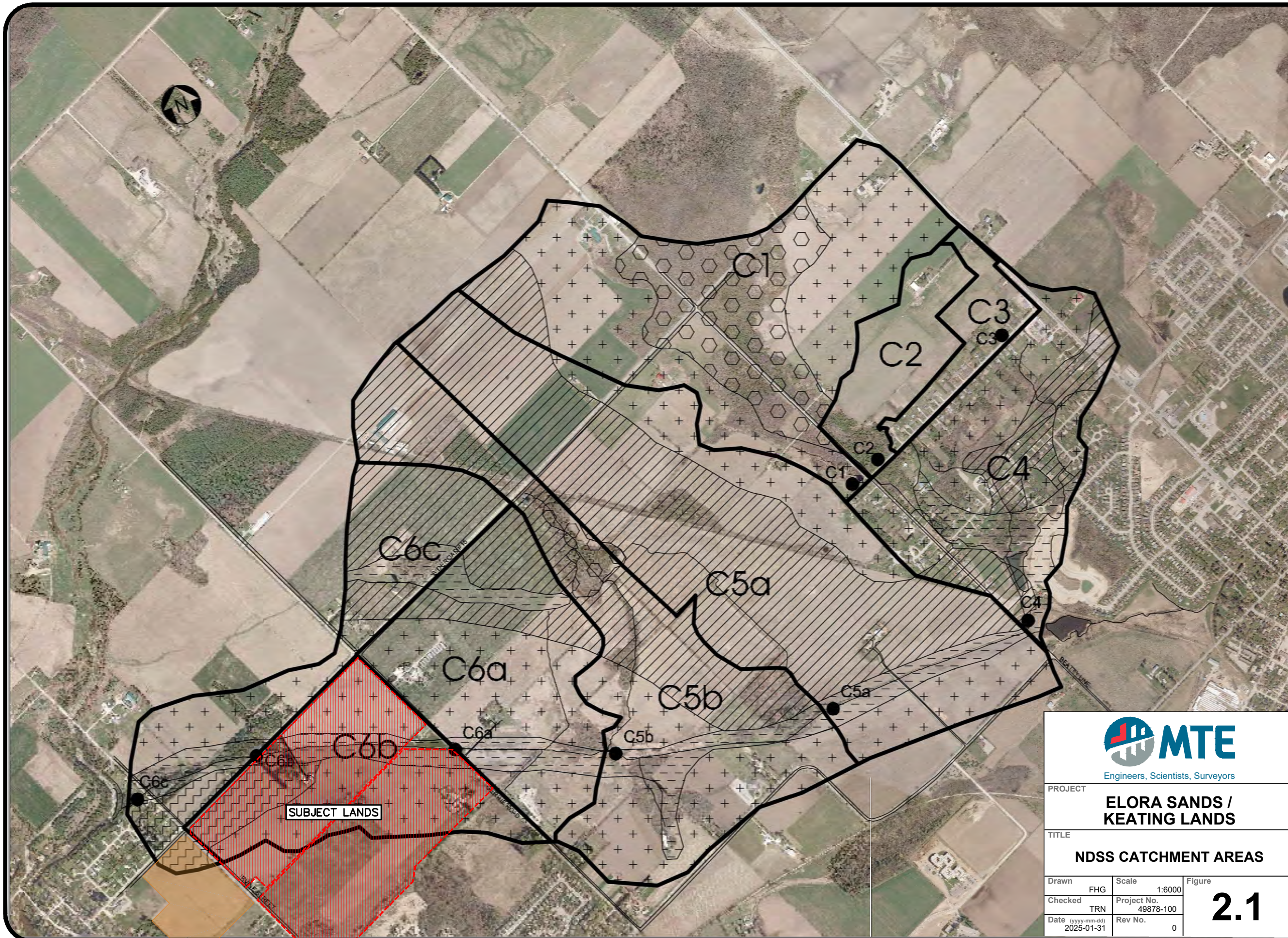
Refer to **Figure 2.1** for Upstream Drainage Areas documented in the NDSS.

Refer to **Figure 2.2** for the existing conditions drainage area plan which documents updates based on current topography. Refer to **Figure 2.3** for the current conditions drainage area plan which documents current conditions including upstream areas that have been approved for development since the NDSS.

The existing conditions catchments for the subject lands can be summarized as follows:

- Sub-catchment 622 - Surface runoff from the northeast corner flows from northeast to southwest and directly into the ND. A future Stormwater Management Facility (SWMF) will be in 622 at the downstream end of the ND.
- Sub-catchments 621 and 623 - Surface runoff from the subject lands flows from south to north directly into the ND.
- Sub-catchment 624 - Surface runoff from the subject lands flows from southwest to northeast and into the south ditch of Sideroad 15 or directly into the ND.
- The Sideroad 15 ditch, which originates west of Irvine Street receiving flows from the Clayton Subdivision (625) and existing external roads (626), conveys flows northeasterly across Irvine Street via a culvert to the ND.
- The development of the Clayton Subdivision proposes an interim SWMF to be located where the future SWMF would be located in 624 at the downstream end of the ND to service 621, 623, 624, 625 and 626. Sub-catchment 625 was updated from the original NDSS as part of this report based on current site-specific topography.
- Sub-catchment 709 - Surface runoff from the subject lands flows from the ridge in the northeast to the wetland (706) located in the southwest, then onto Irvine Street which outlets to the QSC.

Please refer to **Tables A2, A.3, A.4 and A.6 (Appendix A)** for the pre-development parameters from the NDSS and the modified catchments/parameters used in this report.



LEGEND

SUBCATCHMENT

FLOW NODE

SOIL TYPE

LISTOWEL LOAM

HARRISTON LOAM

MUCK

PARKHILL LOAM

BRANT

No.	By	Date	Revision	Chk'd

Aquafor Beech Limited

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PROJECT
ELORA SANDS / KEATING LANDS

TITLE
NDSS CATCHMENT AREAS

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ENGINEER

CLIENT
TOWNSHIP OF CENTRE WELLINGTON

PROJECT
NICHOL DRAIN SUB WATERSHED STUDY

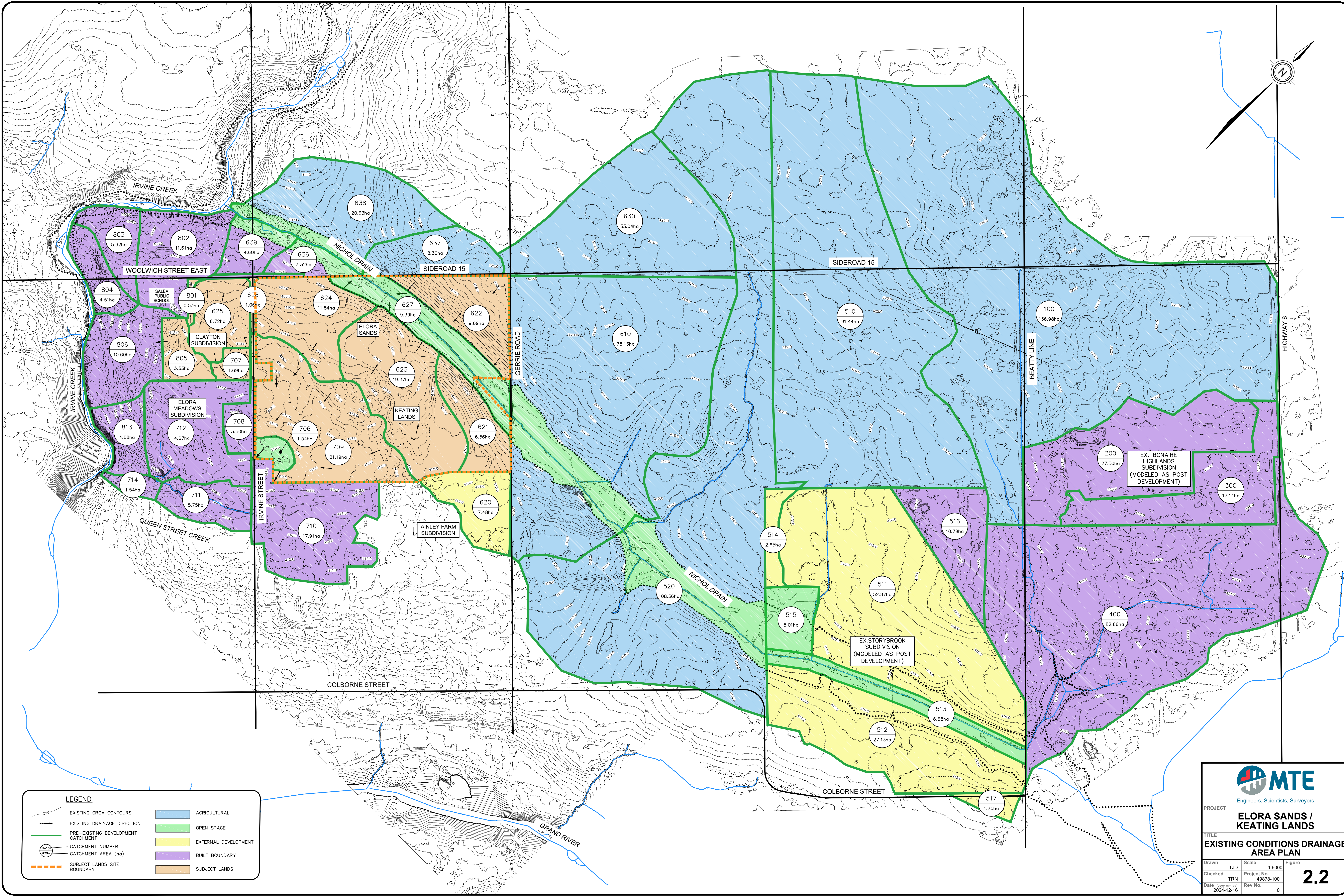
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ELORA SANDS / KEATING LANDS

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EXISTING CONDITIONS DRAINAGE AREA PLAN

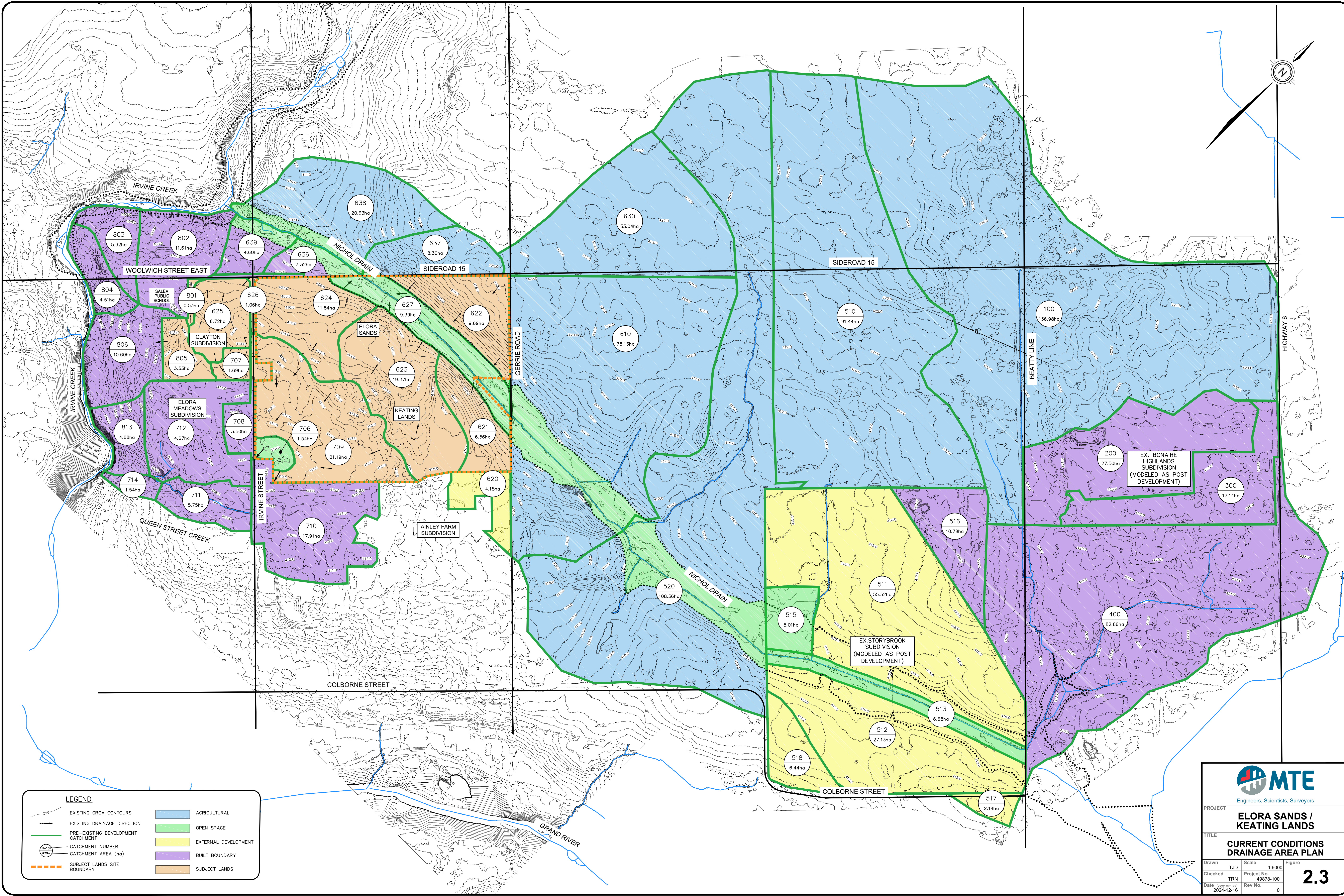
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Figure

2.2

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LEGEND

EXISTING GRCA CONTOURS	AGRICULTURAL
EXISTING DRAINAGE DIRECTION	OPEN SPACE
PRE-EXISTING DEVELOPMENT CATCHMENT	EXTERNAL DEVELOPMENT
CATCHMENT NUMBER	BUILT BOUNDARY
CATCHMENT AREA (ha)	SUBJECT LANDS
SUBJECT LANDS SITE BOUNDARY	

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ELORA SANDS / KEATING LANDS	
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CURRENT CONDITIONS DRAINAGE AREA PLAN	
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Figure 2.3

3.0 CONCEPT DEVELOPMENT PLAN

The Concept Plans (**Appendix B**) for this potential residential development comprises the following:

- Low and Medium density residential lands.
- Park block.
- Three (3) Stormwater Management Facility Blocks.
- One (1) Sanitary Pumping Station (SPS) Block.
- Municipal Right-of-Ways.

The implementation of the concept plan of low and medium density development would result in a growth population of approximately 4,300 people (approximately 1,300 units).

The SWM strategy for the subject lands includes three SWMF's. Two of these facilities are located in the northeast portion of the development outletting to the ND, and the third is located in the southwest portion of the development adjacent to the wetland feature, which outlets to the QSC.

4.0 CONCEPT GRADING PLAN

4.1 Grading Considerations

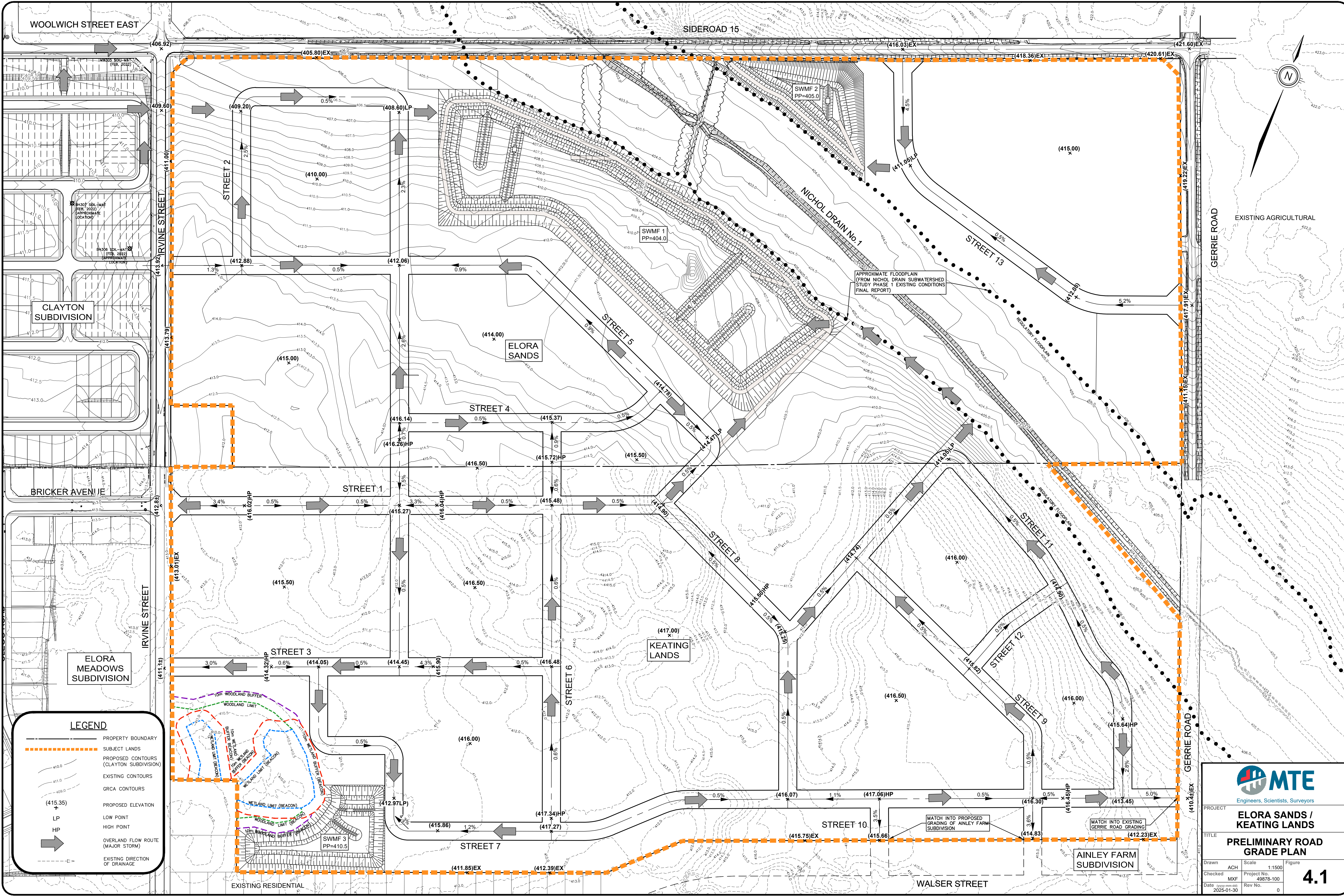
Refer to **Figure 4.1** – Preliminary Road Grade Plan for the subject lands.

The following is a list of considerations which influenced and/or governed the Concept grading design of the subject lands:

- Match centreline elevations of existing and proposed road grades;
- Match boundary grades around the perimeter of the subject lands;
- Match grades at Natural Heritage System buffer limits
- Ensure major storm event overland flows are directed towards the proposed SWMFs;
- Comply with municipal standards for minimum and maximum road and landscaped area grades;
- Ensure adequate cover is feasible, over municipal services;
- Manage the cut/fill balance for the concept development to the extent possible at this time; and,
- Maintain 0.30m vertical separation from underside of footing to seasonal high groundwater levels.

Preliminary centreline road grades ranging from 0.5% (minimum) to 6% were used to complete the concept grading design. The other considerations listed above were incorporated into the overall concept grading design.

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TITLE

PRELIMINARY ROAD GRADE PLAN

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5.0 STORMWATER MANAGEMENT STRATEGY

The objective of this stormwater management plan is to ensure that the concept development includes the necessary measures to protect the hydrology, hydrogeology, and water quality of the receiving water systems, significant surface water and groundwater features.

Furthermore, the plan ensures that the Concept Plan provides the necessary stormwater management measures to comply with the NDSS mitigating impacts to ND and to mitigate impacts to the QSC.

5.1 Objectives

The primary objectives of the stormwater management strategy are as follows:

- Document criteria for the management of stormwater runoff from the subject lands.
- Recommend a comprehensive plan for controlling the quality and quantity of storm water runoff from the subject lands in accordance with the PPS.
- Provide erosion protection for the ND and the QSC.
- Provide thermal mitigation for storm water discharged to the ND.
- Provide chloride impacts to the wetland feature upstream of the QSC.
- Consider climate change and convey Regional storm flows to an appropriate outlet.
- Prepare conceptual designs for the proposed SWMF's.

5.1.1 Stormwater Management Criteria

New developments are required to provide stormwater management in accordance with provincial and municipal policies. Relevant documents have been referenced in the design of the stormwater management plan for the subject site; including:

- Stormwater Management Planning and Design Manual (MOE, 2003).
- GRCA Policies for the Administration of Ontario Regulation 41/24 (GRCA, 2024).
- Nichol Drain Subwatershed Study - Phase 1 Existing Conditions - Final Report (Aquafor Beech, 2008).

Based on the above policies and relevant documents, background reports, agency requirements, and site-specific considerations, the following SWM criteria have been established for this study area:

- **Water Quality** – Provide an Enhanced (MOE, 2003) level of stormwater quality treatment prior to discharge to the ND and the QSC.
- **Water Quantity** – Control the peak flow rates of existing catchment areas for all storms up to and including the 100-year storm event to the allowable flow rates prior to releasing the flows to the ND.
- **Instream Erosion Control** – Provide erosion protection through the extended detention of the 25mm storm event over a 48-hour period.
- **Thermal Mitigation** – Implement Low Impact Development (LID) measures and mitigation measures at SWMF outlets.

- **Water Balance - Infiltration** – Maintain or exceed pre-development groundwater volume inputs established within the NDSS through active and/or passive infiltration measures.
- **Water Balance - Surface Water Runoff** – Maintain or exceed pre-development surface water volume inputs into significant environmental features.
- **Chloride Mitigation** – minimize chloride impacts to the wetland feature upstream of the QSC.

Water Quality Control

The NDSS required that an *Enhanced Level* of water quality control be provided to protect the potential coldwater fish habitat of the ND. The requirements for this level of quality control are established in Table 3.2 of the *Stormwater Management Planning and Design Manual* (MOE, 2003). Similarly, provide an Enhanced Level of water quality control prior to discharging to the QSC.

Quantity Control to ND and QSC

The SWMFs for the subject lands will maintain post-development peak flow release rates at pre-development levels for all storms up to and including the 100-year storm event, as well as provide a sufficient outlet to convey the Regional event to the ND and the QSC.

Instream Erosion Control

The NDSS documented that the reaches of the ND upstream of Sideroad 15 were stable and reaches downstream of Sideroad 15 were moderately stable with no existing erosion sites in need of remedial action. The NDSS also concluded that erosion stress should be minimized as a result of hydrologic changes. Management strategies implemented within the watershed for erosion have been through the extended detention of the 25mm storm event runoff volume over a 24 to 48 hour period.

It should be noted that erosion control for the North West Fergus Secondary Plan Area was provided utilizing this same strategy.

GEO Morphix's future report intends to confirm the criteria of the proposed strategy through a detailed erosion assessment.

Thermal Mitigation

Implement thermal mitigation using at-source lot-level infiltration, and bottom draws and cooling trenches at end-of-pipe SWMF's.

Water Balance - Infiltration

Low Impact Design (LID) best management practices to be used to mimic pre-development recharge rates.

Water Balance – Surface Water Runoff

The wetland upstream of the QSC is a surface water fed feature (410.5m) recharging to the shallow water table (410.0m) which has a ditch inlet outlet along Irvine Street at elevation 409.5m. The wetland is not a closed depression and is a "flow through" wetland.

A surface water runoff analysis for the wetland upstream of the QSC should be assessed.

Chloride Mitigation

Chlorides can be harmful to wetland vegetation and therefore to protect the wetland upstream of the QSC, it is recommended to implement a winter bypass which may reduce runoff volumes from December 1st to April 1st.

5.2 Post-Development Conditions

The proposed SWM strategy requires the implementation of wet pond stormwater management ponds designed to accommodate storm water runoff from the majority of the subject lands. The proposed development plans for the subject lands are comprised of residential land uses, municipal road rights-of-way, a park block and walkway blocks.

Three SWMF blocks are proposed for the subject lands. Two of these facilities are located near the ND, and the third is located in the southwest corner adjacent to the wetland. The proposed SWM scheme receives drainage from the development and right-of-way lands as follows:

- SWMF1 – 57.65ha
- SWMF2 – 8.95ha
- SWMF3 – 10.71ha

The location of the proposed SWMFs, along with contributing drainage areas, is illustrated in **Figure 5.1**. SWMF3 considered an alternate location situated adjacent to Irvine Street to provide a more suitable outlet location. SWMF3a represents the current location in the southwest corner and SWMF3b represents the alternate location against Irvine Street. Both SWMF concepts generally have the same design parameters.

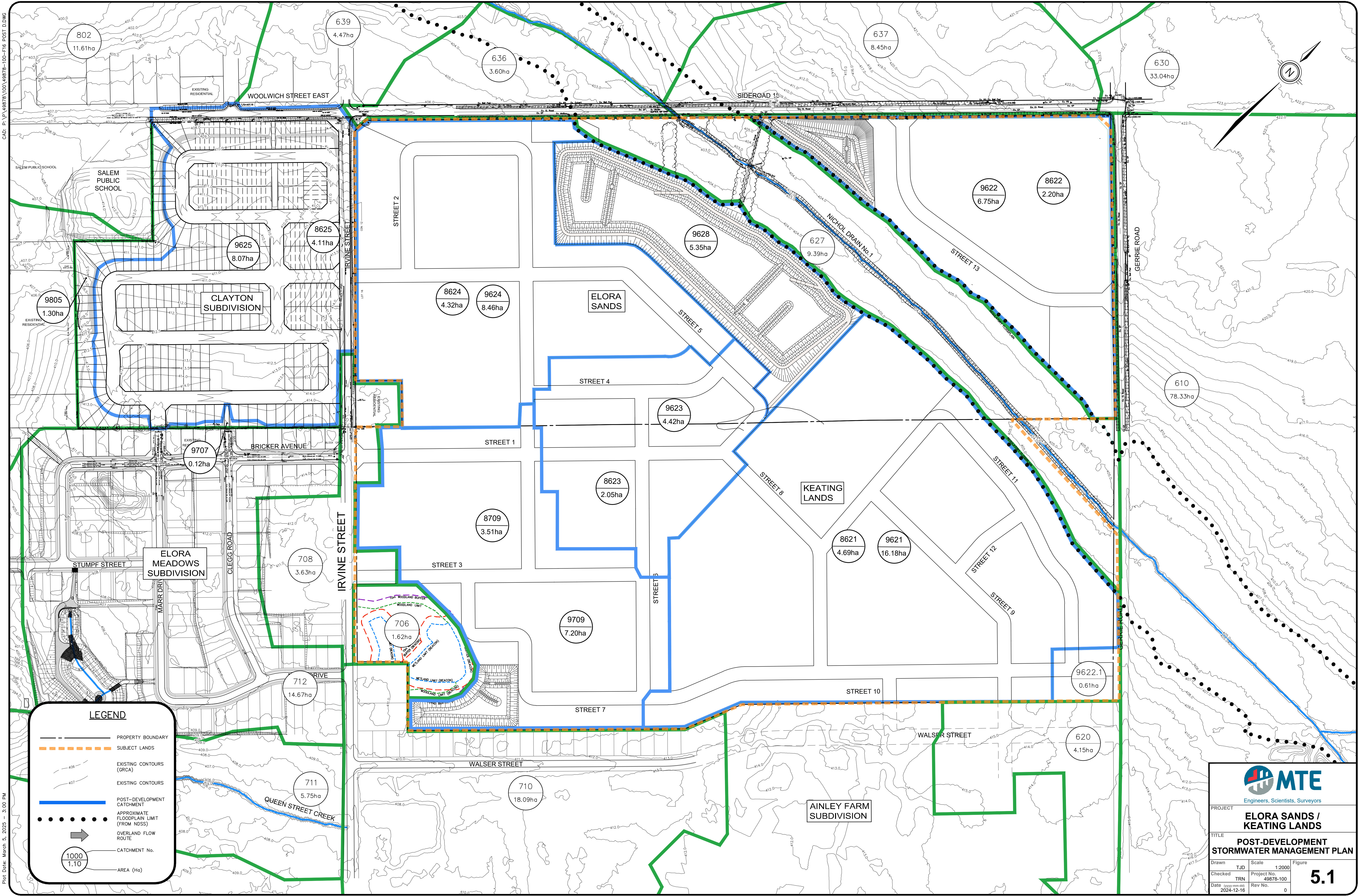
Minor system runoff from the contributing areas will be conveyed through the proposed storm sewer system and overland flow routes to the SWMFs. Roof areas for all units, where possible, will be directed to lot-level infiltration galleries prior to any overflow being directed to the SWMFs. Excess runoff from the major storms will flow overland to the SWMFs via the proposed rights-of-way and designated overland flow routes.

Under post-development conditions, the subject lands were delineated into several catchments. Refer to **Tables A.5** and **A.7** which provide a brief description of the catchment areas as well as the design parameters used in the hydrologic modelling from the NDSS, as well as the current hydrologic modelling.

A detailed copy of the post-development catchment parameters and modelling output logs have been included in **Appendix F**.

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LEGEND

- PROPERTY BOUNDARY
- SUBJECT LANDS
- EXISTING CONTOURS (ORCA)
- EXISTING CONTOURS
- POST-DEVELOPMENT CATCHMENT
- APPROXIMATE FLOODPLAIN LIMIT (FROM NDSS)
- OVERLAND FLOW ROUTE
- CATCHMENT No.
- AREA (Ha)

1000
1.10

MTE
Engineers, Scientists, Surveyors

PROJECT
ELORA SANDS / KEATING LANDS

TITLE
POST-DEVELOPMENT STORMWATER MANAGEMENT PLAN

Drawn TJD Scale 1:2000 Figure
Checked TRN Project No. 49878-100
Date (yyyy-mm-dd) 2024-12-16 Rev No. 0

5.1

6.0 STORMWATER MANAGEMENT STRATEGY IMPACT ASSESSMENT

6.1 Hydrologic Modelling

Three conditions were modelled being: existing conditions, current conditions, and proposed conditions (post-development), using the Visual OTTHYMO (VO) modelling software, to reflect the detailed drainage conditions for the subject lands. This allows for a quantitative estimate of flows under the pre and post-development conditions. All three scenarios were modelled for the following rainfall conditions:

- Quality storm event (25mm depth, 4-hour Chicago distribution).
- 2, 5, 10, 25, 50, and 100-year return period rainfall events (4-hour Chicago distribution) utilizing the Fergus Shand Dam IDF parameters.
- Regional storm event (212mm depth, last 12 hours of Hurricane Hazel and AMC III conditions).
- 30-year continuous simulation period (1995 to 2024 meteorological data set derived from the Fergus Shand Dam station).

Refer to **Figure 6.1** for the proposed conditions drainage area plan.

The IDF parameters, hydrologic parameters, and model output files for each of the pre- and post-development catchment areas are provided in **Appendix F**.

6.2 Water Quality

The SWMFs have been designed as wet ponds with a permanent pool depth of 1.5m. These facilities will incorporate a sediment forebay with a depth of 1.5m which offers the benefits of dilution and settling of sediment. Refer to **Tables A.8, A.9 and A.10** for details of the SWMFs.

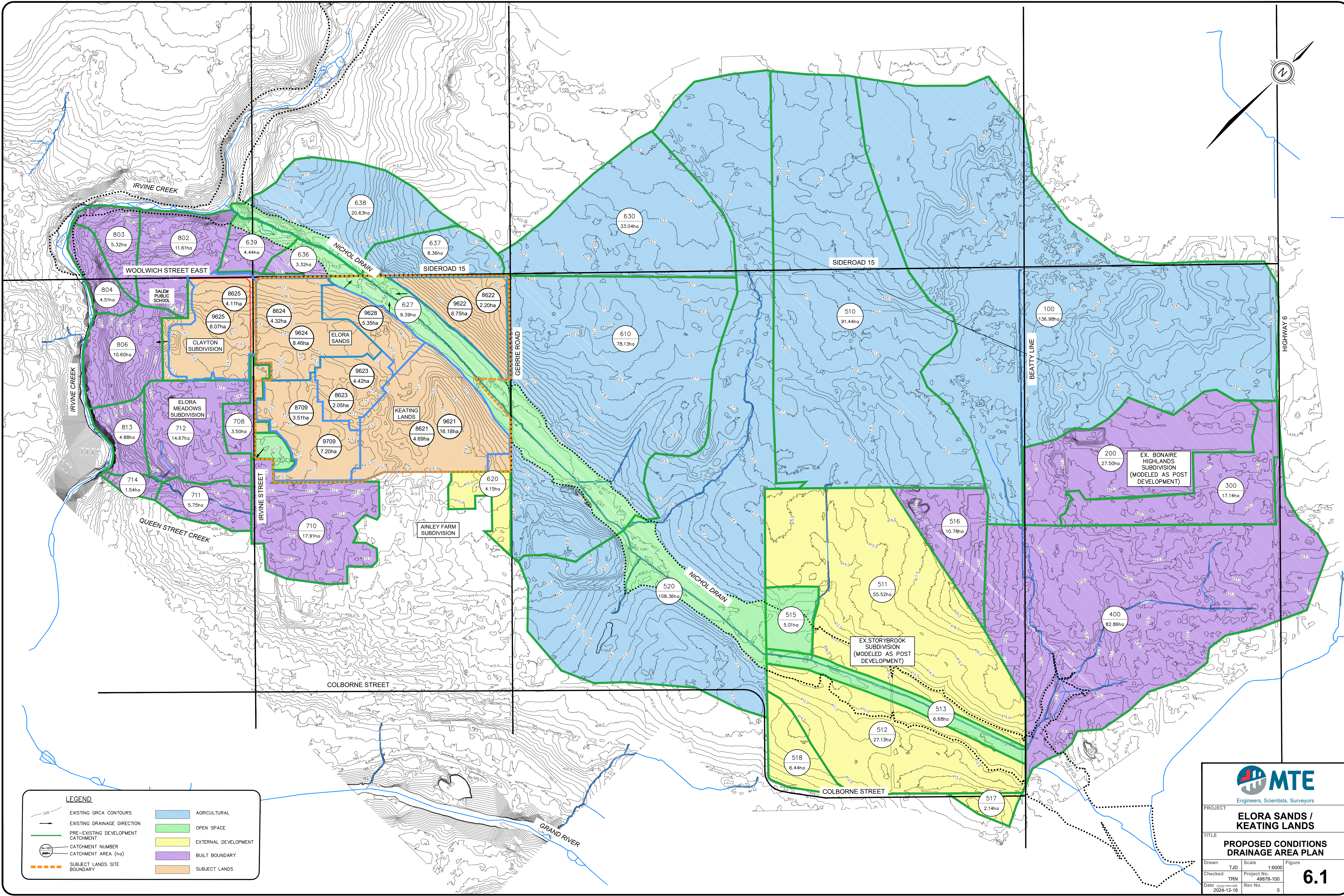
The SWMFs have been sized to provide an enhanced level of protection. According to Table 3.2 from the MOE's 2003 stormwater management guidelines, SWMF1 and SWMF2 require 213m³/ha of storage (60% imperviousness) and SWMF3 requires 226m³/ha of storage (70% imperviousness).

A planting scheme should be prepared that carefully selects plant species and their location in and around the basins to stabilize banks, mitigate temperature increases, deter waterfowl from nesting within the area, and provide aesthetics and safety benefits.

Refer to the following figures for the schematic concept plans for SWMF1, SWMF2, and SWMF3a/3b.

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LEGEND

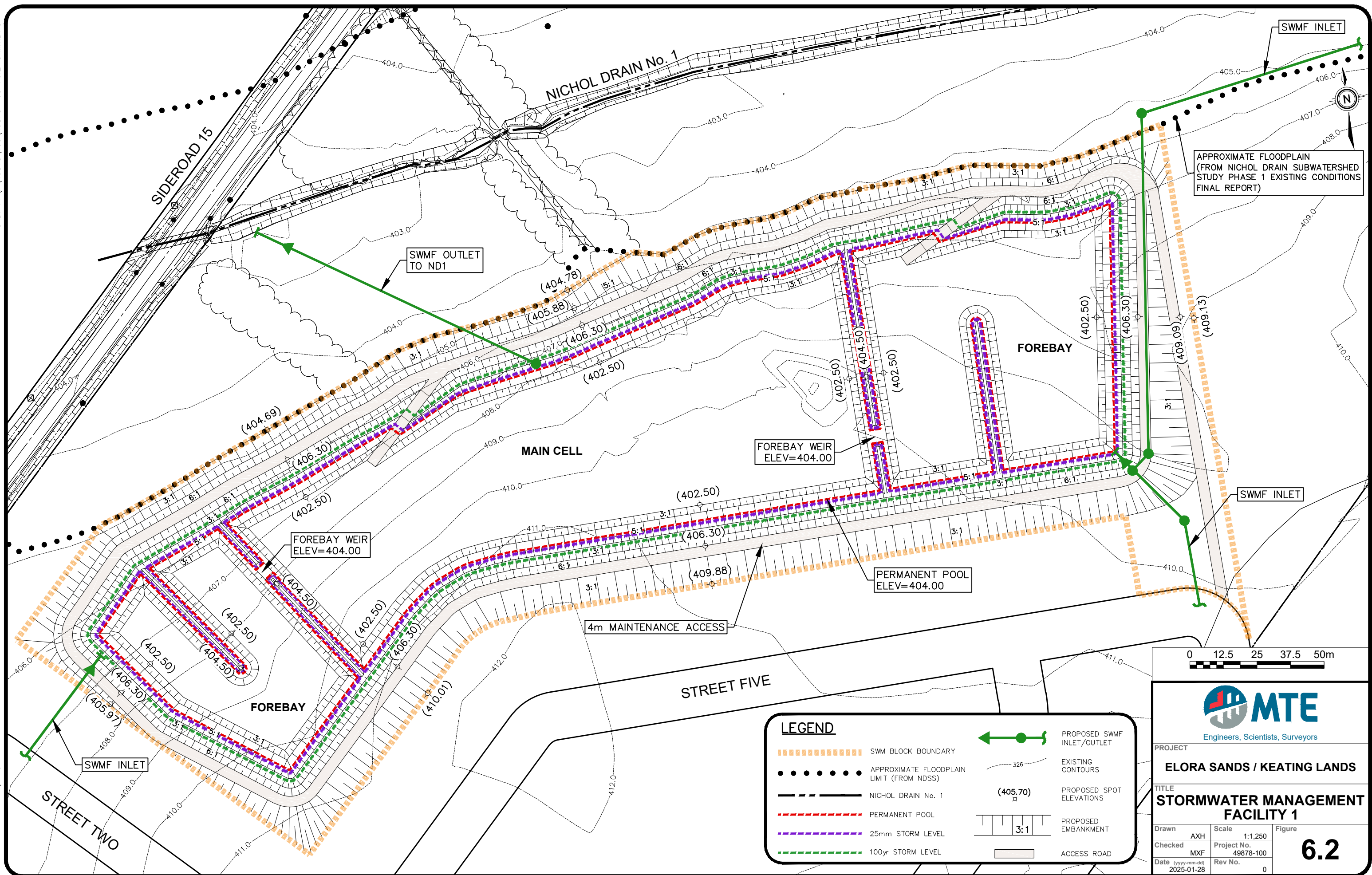
	EXISTING GRCA CONTOURS		AGRICULTURAL
	EXISTING DRAINAGE DIRECTION		OPEN SPACE
	PRE-EXISTING DEVELOPMENT CATCHMENT		EXTERNAL DEVELOPMENT
	CATCHMENT NUMBER		BUILT BOUNDARY
	CATCHMENT AREA (ha)		SUBJECT LANDS
	SUBJECT LANDS SITE BOUNDARY		

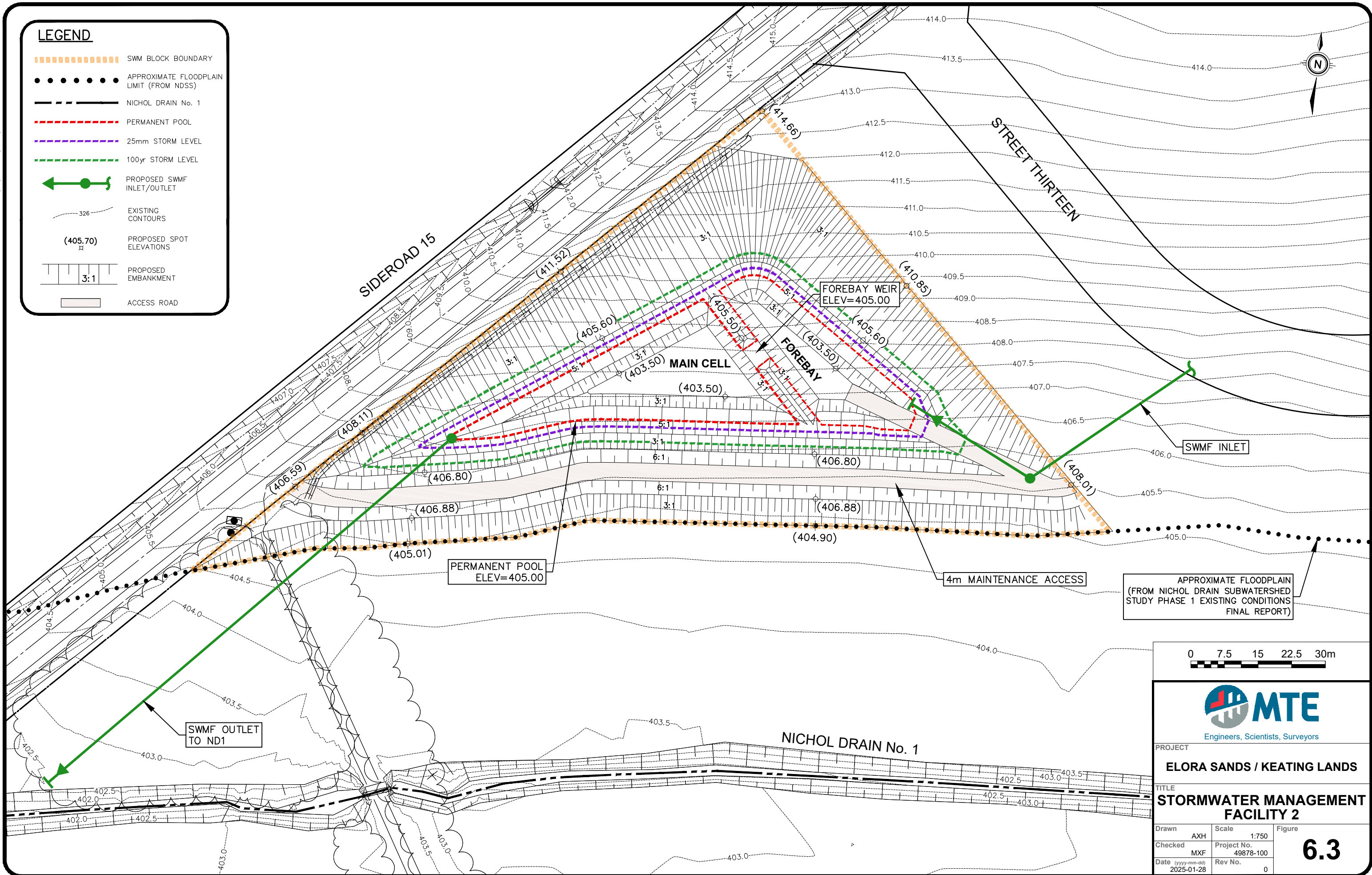
MTE
Engineers, Scientists, Surveyors

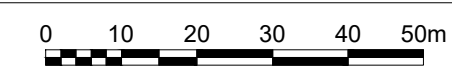
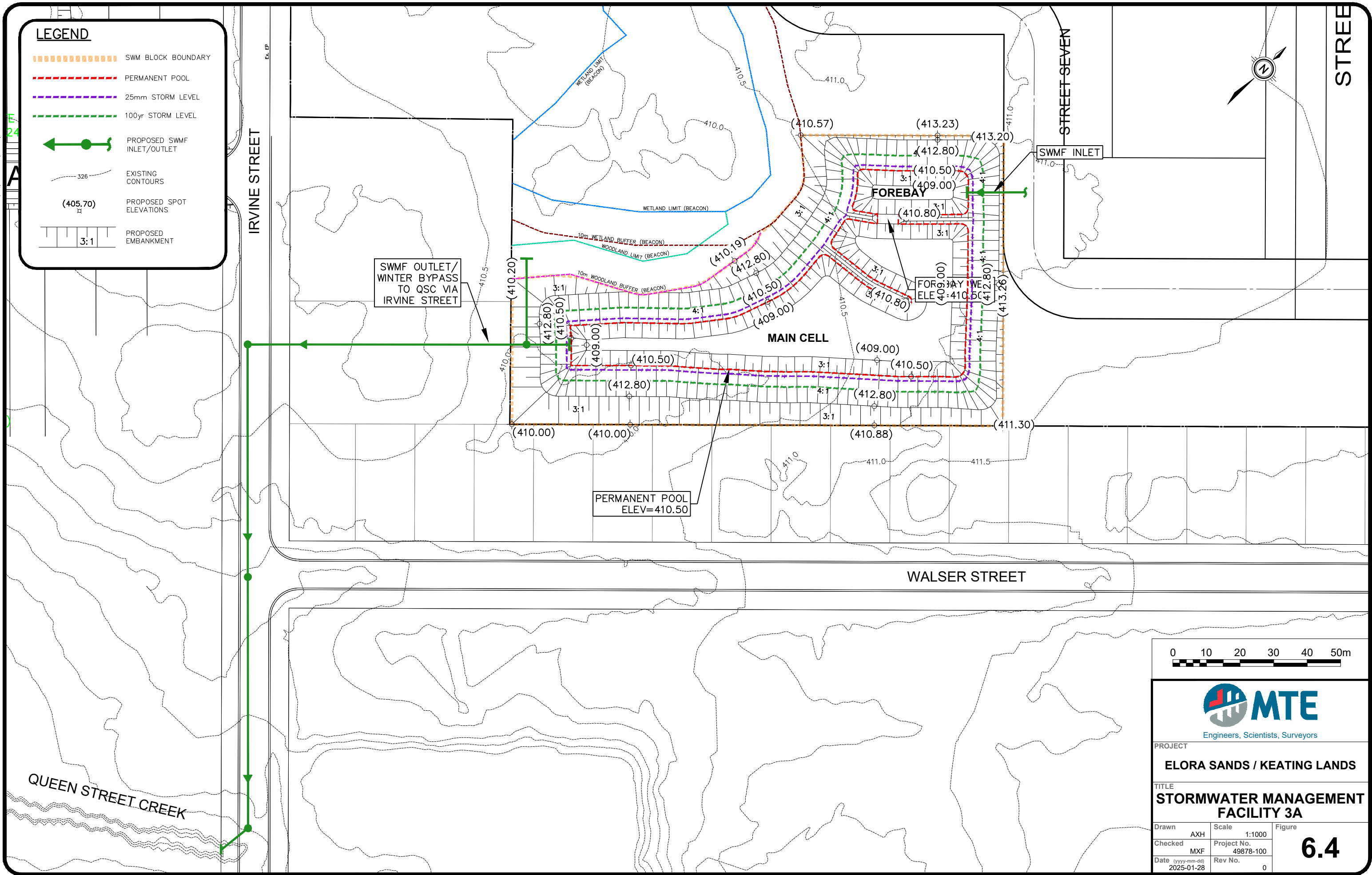
PROJECT
ELORA SANDS / KEATING LANDS

TITLE
PROPOSED CONDITIONS DRAINAGE AREA PLAN

Drawn	TJD	Scale	1:6000	Figure	6.1
Checked	TRN	Project No.	49878-100		
Date	2024-12-16	Rev No.	0		

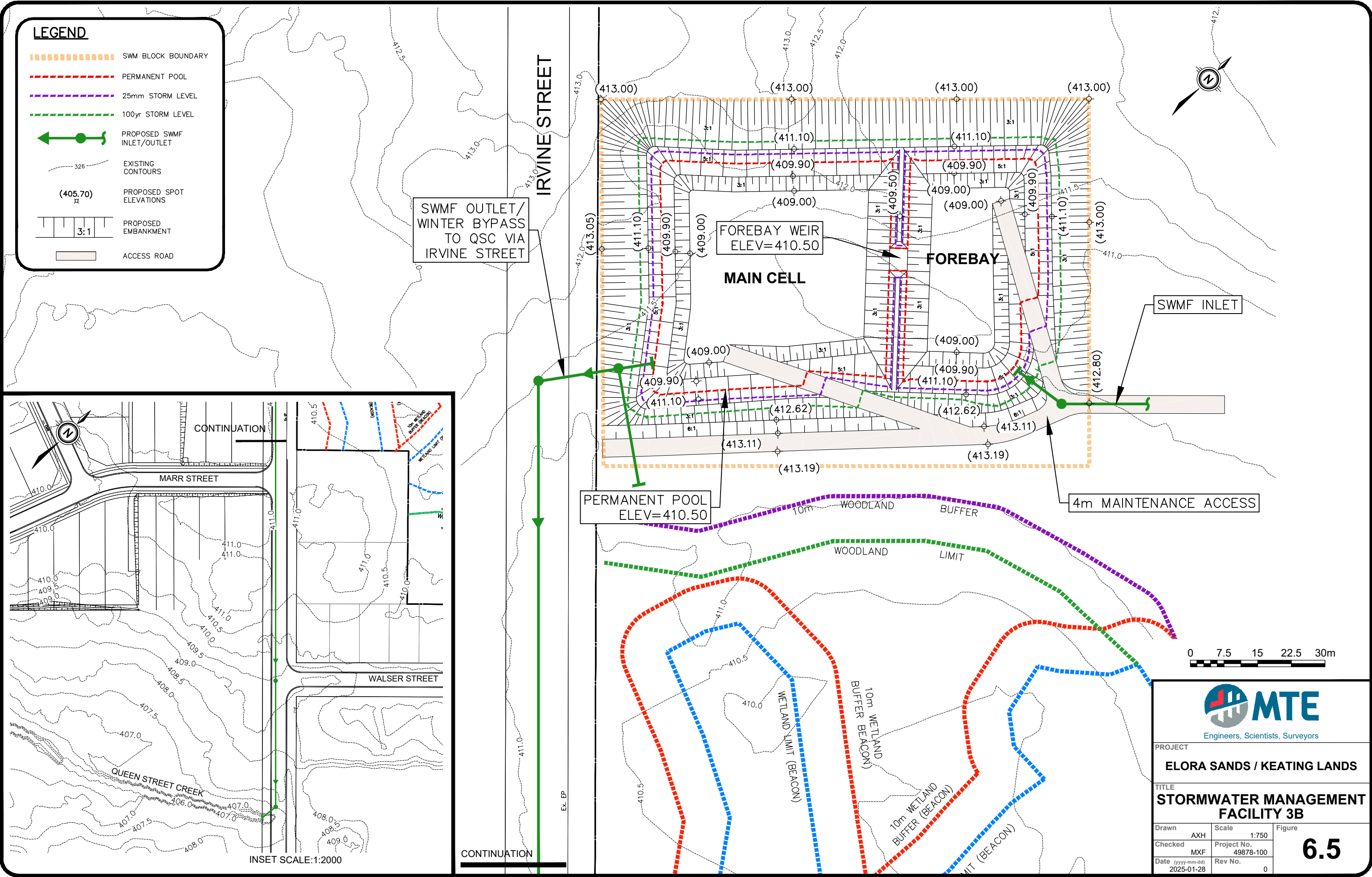






PROJECT		
ELORA SANDS / KEATING LANDS		
TITLE		
STORMWATER MANAGEMENT FACILITY 3A		
Drawn	AXH	Scale 1:1000
Checked	MXF	Project No. 49878-100
Date (yyyy-mm-dd)	2025-01-28	Rev No. 0

Figure 6.4



6.3 Water Quantity

An existing conditions hydrologic model was developed as part of the *Nichol Drain Subwatershed Study, Phase 1 Existing Conditions - Final Report* (Aquafor Beech Limited, October 2008) using the SWMHYMO hydrologic model platform. A future conditions model was also prepared to assess impacts of the North West Fergus Secondary Plan development. As part of this study, the hydrologic modelling (with Visual OTTHYMO) has been further revised to prepare 3 new models (revised existing conditions, current conditions, and future conditions incorporating the subject lands).

6.3.1 Nichol Drain Subwatershed Study Results

Based on the hydrologic modelling completed as part of the NDSS, peak flow rates for each catchment under existing conditions as well as future conditions for the North West Fergus Secondary Plan development were determined. Regional peak flows rates are uncontrolled. Refer to **Table 6.1** for the peak flows for each of the storm events.

Table 6.1 – Peak Flow Estimates (NDSS 2008)

Location	Drainage Area (ha)	Peak Flow Rate (m³/s)						
		2yr	5yr	10yr	25yr	50yr	100yr	Regional
Nichol Drain – Existing Conditions								
C1	136.9	0.8	1.7	2.5	3.7	4.6	5.7	13.0
C2	168.7	1.0	2.2	3.2	4.7	5.9	7.2	15.9
C3	181.9	1.1	2.4	3.4	5.0	6.2	7.6	17.3
C4	263.0	1.8	4.0	5.9	8.6	10.9	13.3	26.0
C5a	443.0	2.8	6.1	8.8	12.6	15.9	19.1	41.7
C5b	563.0	3.5	7.7	11.1	15.9	20.1	24.3	53.3
C6a	640.1	3.7	8.4	12.2	17.3	21.7	26.2	58.4
C6b	700.6	4.0	8.9	13.0	18.4	22.9	27.7	62.6
C6c	767.1	4.3	9.7	14.2	20.1	24.9	30.0	68.8
Nichol Drain – Future Condition								
C1	136.9	0.8	1.7	2.5	3.7	4.6	5.7	13.0
C2	168.7	1.0	2.2	3.2	4.7	5.9	7.2	15.9
C3	181.9	1.1	2.4	3.4	5.0	6.2	7.6	17.3
C4	263.0	1.8	4.0	5.9	8.6	10.9	13.3	26.0
C5a	443.0	3.3	7.2	10.4	15.0	18.3	21.7	42.9
C5b	563.0	4.3	9.3	13.4	19.3	23.7	28.3	55.9
C6a	640.1	4.5	10.0	14.3	20.3	25.0	30.0	61.5
C6b	700.6	4.9	11.0	15.6	22.1	27.2	32.7	67.4
C6c	767.1	5.4	12.3	17.4	24.8	30.6	36.7	74.3

6.3.2 Updated Nichol Drain Subwatershed Study Results

Three hydrologic models were prepared to capture the existing conditions, current conditions and future conditions of the Nichol Drain subwatershed.

The **existing conditions model** generally follows the existing conditions model as presented in the *Nichol Drain Subwatershed Study, Phase 1 Existing Conditions - Final Report* (Aquafor Beech Limited, October 2008). In areas of detailed study (North West Fergus Secondary Plan and Ainley Farm Subdivision), catchment delineation was updated to reflect pre-development conditions as reported. The Elora Sands, Keating Lands, and Clayton Subdivision pre-development catchments were updated to reflect surveyed topographical information.

The **current conditions model** (generally mimicking **future conditions** modelling from the NDSS) considers the North West Fergus Secondary Plan Area and Ainley Farm Subdivision as being fully developed. Catchments and SWM controls were modelled as presented in their respective SWM reports. In this model, the subject lands and the Clayton Subdivision are modelled as pre-development.

The **proposed conditions model** updates the current conditions model with the subject lands and the Clayton Subdivision as developed representing the ultimate developed condition.

Utilized catchment parameters for the three scenarios can be found in **Appendix A**. The peak flows from the NDSS were subsequently updated using the updated hydrologic model scenarios created as part of this study. Under regional storm conditions, SWM controls were removed, and flows are modelled as uncontrolled. Refer to **Table 6.2**.

Based on our analysis, flows are generally reduced from those published in the approved NDSS as a result of the SWM strategy implemented.

Table 6.2 – Peak Flow Estimates (MTE Updated)

Location	Drainage Area (ha)	Peak Flow Rate (m³/s)						
		2yr	5yr	10yr	25yr	50yr	100yr	Regional
Nichol drain – Updated Existing Conditions								
C1	137.0	0.8	1.8	2.5	3.7	4.5	5.5	13.3
C2	168.8	1.0	2.2	3.1	4.5	5.6	6.8	16.2
C3	182.0	1.1	2.3	3.3	4.8	5.9	7.1	17.6
C4	264.8	1.9	4.2	6.1	8.9	11.2	13.6	26.4
C5a	469.3	3.0	6.6	9.5	13.7	16.8	20.0	43.4
C5b	577.7	3.6	7.8	11.2	16.1	20.0	23.8	53.8
C6a	655.7	3.9	8.5	12.2	17.3	21.3	25.4	59.3
C6b	727.8	4.2	9.3	13.3	18.9	23.2	27.6	65.2
C6c	797.8	4.6	10.4	14.3	21.2	25.9	30.9	72.2
Nichol Drain – Current Conditions								
C1	137.0	0.8	1.8	2.5	3.7	4.5	5.5	13.3
C2	168.8	1.0	2.2	3.1	4.5	5.6	6.8	16.2
C3	182.0	1.1	2.3	3.3	4.8	5.9	7.1	17.6
C4	264.8	1.9	4.2	6.1	8.9	11.2	13.6	26.4
C5a	467.3	3.2	6.8	9.9	14.2	17.5	20.8	44.2
C5b	575.7	3.9	8.3	11.8	16.9	20.9	25.0	54.4
C6a	653.7	4.1	9.0	12.8	18.2	22.4	26.7	59.6
C6b	722.5	4.6	10.2	14.6	20.7	25.4	28.7	65.9
C6c	792.5	5.2	11.7	16.9	23.9	29.3	31.4	73.2
Nichol Drain – Proposed Conditions								
C1	137.0	0.8	1.8	2.5	3.7	4.5	5.5	13.3
C2	168.8	1.0	2.2	3.1	4.5	5.6	6.8	16.2
C3	182.0	1.1	2.3	3.3	4.8	5.9	7.1	17.6
C4	264.8	1.9	4.2	6.1	8.9	11.2	13.6	26.4
C5a	467.3	3.2	6.8	9.9	14.2	17.5	20.8	44.2
C5b	575.7	3.9	8.3	11.8	16.9	20.9	25.0	54.4
C6a	653.7	4.1	9.0	12.8	18.2	22.4	26.7	59.5
C6b	734.5	4.2	9.3	13.5	19.6	24.3	29.1	66.3
C6c	804.7	4.5	9.9	14.4	20.8	25.7	30.8	73.7

Table 6.3 summarizes the storage volume requirements within the SWMFs.

Table 6.3 – Summary of 100yr Detention Volume Requirements

Stormwater Management Facility	Volume Required for 100yr Storm Event (m³)
SWMF1	27,083
SWMF2	3,155
SWMF3a or SWMF3b	4,277

6.4 Thermal Mitigation

Urbanization within any watershed will cause temperature increases in storm water runoff, picking up stored heat from asphalt and other impervious surfaces. Mitigation measures are required for coldwater creeks by implementing lot-level infiltration and end-of-pipe SWMF management of runoff from high frequency precipitation events prior to discharge to the receiving watercourse.

Since most of the annual rainfall occurs in high frequency storm events, as a best management practice the 25mm storm event was chosen for thermal mitigation as this event accounts for the majority of annual precipitation.

The following mitigation measures (lot level infiltration, bottom draws, and landscaping) have been proposed for the subject lands and will mitigate changes to the thermal regime downstream of Sideroad 15 in the ND.

6.4.1 Lot-Level Infiltration

The majority of the storm water runoff that is generated at the lot-level via roofs, will be effectively disconnected from the ND during all rain events up to a 25mm depth through the proposed lot-level infiltration galleries.

6.4.2 SWMF Bottom Draw Outlet

The outlet configuration of the SWMF will incorporate a reverse-sloped bottom draw pipe which will draw the coldest water from the bottom of the SWMF and discharge to the ND.

6.4.3 Landscape Design of the SWMF

A landscape design for the proposed SWMF will be completed during the final design stage of the development. The primary aspect of the landscape design is to address thermal mitigation and aesthetics with secondary aspects being, erosion protection, long term bank stability, and to limit pedestrian access into the permanent pool components. The facility will be designed in accordance with the Township's stormwater management policies and guidelines for aesthetics, landscaping, and safety of stormwater management facilities.

6.5 Water Balance Assessments

A water budget calculation was completed to assess potential hydrologic impacts the proposed development may have on the ND and the QSC wetland feature.

Annual precipitation for the subject lands was estimated to be approximately 974mm/year, based on data gathered at the Fergus Shand Dam weather station between 1995 and 2024.

Table 6.4 summarizes the water balance to the ND in a similar manner as the NDSS based on continuous modelling.

Table 6.4 – Water Balance for Nichol Drain Subwatershed

Water Budget Component (mm/year)	Pre-Development of Storybrook/Ainley/Subject Lands (Existing Conditions)	Post-Development of Storybrook and Ainley (Current Conditions)	Post-Development of Subject Lands (Proposed Conditions)
Precipitation	974	974	974
Evapotranspiration	493	470	447
Water Surplus by difference	481	504	527
Infiltration	206	201 ¹	217 ²
Runoff	275	303	310

1. Storybrook development proposed at-source infiltration however the modelling did not reflect these LIDs.

2. The post-development model for the Storybrook development also does not include at-source infiltration LIDs.

6.5.1 Infiltration

Under pre-development conditions, infiltrated water for a large portion of the subject lands contributes to the shallow groundwater table, which from the ridge within the subject lands flows northerly towards the ND. The balance of the subject lands flows southwest from the ridge to the QSC.

6.5.2 Overall Surface Water Flow Inputs to the Nichol Drain

The water budget calculation was completed for the entire ND subwatershed.

Under post-development conditions, the water inputs to the ND will comprise of four components: the controlled surface discharge from the SWMFs, the uncontrolled surface runoff from the lands downstream of the SWMF (catchments 9621.1 and 627), surface discharge from the Ainley Subdivision (catchment 620) and the surface flows from all upstream lands in the subwatershed. Refer to **Tables 6.5** and **6.6** for summaries of annual surface water volume inputs to the Nichol Drain.

Table 6.5 – Summary of Annual Surface Water Volume Inputs to the Nichol Drain

General		Annual Volume (m³/year)
Existing Conditions Surface Flow to ND	Surface Flow to ND (Drainage Areas 620-627 - 72.11ha)	193,518[1]
	Surface Flow to ND from upstream drainage areas (excluding Drainage Areas 620-627 upstream of C6b at SR15 in NDSS – 655.71ha)	1,822,874 [2]
	Total [1+2]	2,016,392 [Pre]
Proposed Conditions Surface Flow to ND	Controlled Discharge from SWMF1 and 2 (Drainage Areas 9621-9625 & 8621-8625 - 66.6ha)	266,400 [3]
	Uncontrolled runoff (Drainage Areas 9621.1 & 627 – 10.0ha)	32,441 [4]
	External runoff (Drainage Areas 620* – 4.15ha)	24,111 [5]
	Total [3+4+5]	311,952 [6]
	Surface flows to ND from upstream drainage areas (excluding Drainage Areas upstream of C6b at SR15 in NDSS – 652.83ha)	2,017,245 [7]
	Total [6+7]	2,340,197 [8]
Increased Surface Flow to ND [8–Pre]		323,805 [9]
Percentage of Increase [9/Pre]		16.1%

1. Split into additional catchments within model

Table 6.6 – Summary of Annual Runoff Increases

Stormwater Management Facility	Annual Runoff Volume at SR15 (m³)	Percent Increase
Existing Conditions	2,016,392	-
Current Conditions	2,214,434	9.8% over EC
Proposed Conditions	2,340,197	5.7% over CC 16.1% over EC

Refer to **Table 6.7** for changes in groundwater input to the Nichol Drain subwatershed.

Table 6.7 – Change in Groundwater Water Balance to the Nichol Drain

Water Budget Component (mm/year)	Existing Conditions (agricultural)	Proposed Conditions (residential only)
Drainage Area - ha	72.1	80.8
Precipitation mm	974	974
Evapotranspiration mm	507	265
Water Surplus by difference mm	467	709
Passive Infiltration mm	198	121
Roof Gallery Infiltration mm	-	181
Runoff mm	268	408
Annual Infiltration m ³	143,095 (based 72.1ha)	217,451 (based on 72.1ha) or 243,505 (based on 80.8ha)

1. Precipitation and temperatures from on 1995-2024 data set from EC, PET determined from 1991-2010 climate normals using T&M process and then inputted into VO as maximum ET.

6.5.3 Surface Water Balance to Wetland Upstream of the Queen Street Creek

Table 6.8 below summarises existing conditions and post-development conditions water balance to the QSC wetland.

Table 6.8 – Surface Water Balance to Wetland Upstream of the QSC

Water Budget Component (mm/year)	Existing Conditions (agricultural)	Proposed Conditions (residential only)
Drainage Area - ha	21.2	10.7
Precipitation - mm	974	974
Evapotranspiration - mm	511	181
Water Surplus by difference - mm	463	793
Passive Infiltration - mm	210	96
Roof Gallery Infiltration - mm	-	297
Runoff - mm	251	401
Annual Runoff m ³ to wetland	53,187	42,947
Clean water collection system to wetland - m ³	0	11,000
Annual runoff to the wetland	53,187	53,947
Roof Infiltration (21.2ha) m ³	n/a	51,934
Passive Infiltration (21.2ha) m ³	44,499	20,342
Total Infiltration (21.2ha) m ³	44,499	72,276 (based on 21.2ha)

1. Precipitation and temperatures from on 1995-2024 data set from EC, PET determined from 1991-2010 climate normals using T&M process and then inputted into VO as maximum ET.

A winter bypass could be implemented for runoff discharging to the wetland feature upstream of the QSC to address chloride impacts. The surface water runoff volume deficit (as a result of bypassing flows during the winter months) could be offset by the implementation of additional roof water collection system outletting directly to the wetland.

6.6 Erosion Assessment

The MECP recommends that any newly proposed development throughout a watershed should implement a stormwater management solution that provides at least a 48-hour drawdown for the volume generated during the 25mm storm event, to ensure that erosion threshold flow durations do not exceed pre-development levels.

A Preliminary Fluvial Geomorphological Assessment (FGA) for the ND and the QSC was prepared by GEO Morphix, dated February 2025. The FGA provides a background review and desktop assessment of the ND and the QSC. The FGA is proposed to be updated based on field data collected in the Spring 2025.

7.0 FLOODPLAIN MAPPING

7.1 Nichol Drain No. 1 Floodplain Mapping

The NDSS made a recommendation to establish a proposed terraced natural floodplain channel. Based on this NDSS recommendation and consistent with the recommendations in the Environmental Impact Study dated February 2025 prepared by Beacon Environmental, it was recommended that a setback from each streambank of the ND be provided to encourage a more natural channel form including riparian vegetation. It was also recommended to reconnect the floodplain with the channel by terracing each side. This could be completed as part of the future development of the subject lands adjacent to the ND and is not required at this time. The floodplain mapping work completed to date considered both existing conditions and proposed conditions (i.e., terraced natural floodplain channel).

The floodplain analysis completed as part of the NDSS did not model the development of the subject lands. The subject lands are very small relative to the overall 767ha drainage area of ND. The subject lands are adjacent to the urban area and should have been included in the long-term floodplain mapping.

As part of the NDSS, a HEC-RAS model was prepared to determine the Regional Storm Floodlines for the Nichol Drain subwatershed. The model used the uncontrolled regional storm flows forecasted by the future conditions model, documented in **Table 6.1**. The uncontrolled regional flows from MTE's updated future conditions model, in **Table 6.2**, are reduced from the forecasted flows from the NDSS. As such, it is expected that no changes in the floodplain mapping lines are required at this time. A summary of the flows upstream and downstream of the subject lands can be found in **Table 7.1**.

Table 7.1 – Summary of Uncontrolled Regional Storm Flows

Nichol Drain Node	Location	NDSS Future Conditions (m ³ /s)	Updated MTE Proposed Conditions (m ³ /s)
C6a	Upstream of subject lands at Gerrie Road	61.5	59.5
C6b	Downstream of subject lands at SR 15	67.4	66.3
C6c	Upstream of ND confluence with Irvine Creek	74.3	73.7

8.0 CONCLUSIONS

The main findings of this report for the subject lands are:

1. The stormwater management strategy outlined within this report will provide the appropriate levels of quality, quantity, erosion, and water balance controls to meet the objectives of the *Nichol Drain Subwatershed Study, Phase 1 Existing Conditions - Final Report* (Aquafor Beech Limited, October 2008).
2. The stormwater management strategy outlined within this report, will provide appropriate level of quality, quantity and risk mitigation to adequately address the requirements of source water protection outlined in the Source Water Protection Due Diligence Review by Terra-Dynamics Inc.
3. Hydrologic modelling has been developed to establish the required flow controls for the stormwater management facilities.
4. Three stormwater management facilities have been proposed to service the subject lands. The proposed stormwater management facility blocks satisfy all the sizing criteria for peak flow, water quality and erosion control.
5. *Enhanced* quality control of stormwater runoff can be provided by the proposed stormwater management strategy through the implementation of SWMFs which include a forebay, and a wet pond cell.
6. Quantity control targets for post-development peak flows rates attenuation to pre-development levels that are directed to the ND can be achieved in the proposed SWMFs for all storm events up to and including the 100-year event.
7. Post-development instream erosion will be mitigated by the use of a minimum 24 to 48-hour extended detention of the 25mm storm event.
8. The SWMFs will be designed with measures to mitigate thermal impacts to the ND.
9. Lot-level infiltration of roof water for all storm events up to the 25mm event will also mitigate thermal impacts.
10. Infiltration (both active and passive) on the subject lands will provide an enhancement to the groundwater balance.
11. Chloride mitigation should be implemented through a winter bypass for the wetland feature upstream of the QSC.
12. Conveyance of the Regional storm flows through the SWMFs to the ND can be achieved.
13. The floodplain mapping within the subwatershed study is more conservative based on regional storm flow rates being less than those presented in the HECRAS modelling.
14. The stormwater management strategy proposed conforms to the Provincial Planning Statement (2024).

All of which is respectfully submitted,
MTE Consultants Inc.



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Appendix A

Tables

Table A.1 – Infrastructure Costs Included in Development Charges Calculation

Project No.	Increased Service Needs Attributable to Anticipated Development	Timing (Year)	Gross Capital Cost Estimate (2020\$)	Comments
Roads				
1	Sideroad 15, Beatty Line N to Highway 6	2021-2023	1,950,000	Sideroad 15 improvements to connect to Highway 6
15	Sideroad 15, Gerrie Road to Beatty Line N	2024-2031	3,990,000	Sideroad 15 improvements to connect to Beatty Line and Project 1 Highway 6
16	Sideroad 15, James Street to Irvine Street	2024-2031	1,120,000	Sideroad 15 improvements from James Street to Irvine Street
33	Sideroad 15, Gerrie Road to Irvine Street	2024-2031	2,050,000	Sideroad 15 improvements to connect James through to Highway 6
17	Walser Street Ext E, Walser Street to Gerrie Road	2024-2031	1,560,000	Roadway improvements within Ainley subdivision with road stubs to the subject lands
19	Gerrie Road, Sideroad 15 to Walser Street Ext East	2024-2031	1,350,000	Roadway improvements adjacent to the Ainley subdivision
27	Gerrie Road, Walser Street Ext E to Colborne Street	2024-2031	1,220,000	Roadway improvements adjacent to the subject lands
68	Gerrie Road and Colborne Street	2024-2031	350,000	Intersection improvements south of the subject lands
New	Intersection improvements at Irvine Street Sideroad 15			Works contemplated to accommodate Clayton subdivision
New	Intersection improvements at Gerrie Road and Sideroad 15			Works contemplated to accommodate the subject lands
Wastewater – Sewers				
1	Colborne Sanitary Upsizing – Wilson to Irvine	2024	170,200	Trunk sewer improvements on Colborne near intersection of Irvine. Project should be extended to include Queen Street North trunk.
Water Facilities				
4	Replacement of F2 Well with additional capacity expanded	2022	1,795,000	
5	Replacement and expansion of F5 Well	2022	863,000	
1	New Well - Area #3	2023-2026	4,734,000	
2	New Well - Area #5	2028-2030	4,710,000	Well field immediately north of the subject lands
6	New Well - Area 7	2032-2040	3,608,000	
7	New Well - Area 8	2020-2037	6,721,000	
Water Distribution				
1	Gerrie Watermain Extension - Colborne to ER10 (North Limit)	2024	614,000	Watermain extension to Ainley subdivision northern limit and the southern limit of the subject lands.
2	Irvine Watermain Extension – Bricker to SR 15	2029	798,000	Watermain extension immediately adjacent to the subject lands on Irvine Street.
12	Woolwich Watermain Extension - Irvine to James	2028	436,000	Watermain extension immediately adjacent to the Clayton subdivision and a key supply at the northwest corner of the subject lands.
19	Irvine Watermain Extension - Woolwich to Well Area 5	2030	2,534,000	North connection to expanded water supply at Well 5
20	Sideroad 10(11) Watermain Extension - Irvine to Well Area 5	2030	691,000	Watermain extension along Irvine Street from Sideroad 15 then extending ~ 1km north to well area 5. Key water supply for the subject lands.
28	SDRD 15 Watermain Extension - Beatty Line to Well Area 7	2039	145,000	Future water supply for further growth and expansion.
Future	Sideroad 15 watermain from Gerrie Road to Beatty Line			Key connection for watermain transmission.

Table A.2 – Existing Conditions Soil Parameters (NDSS 2010)

Catchment	Area	Soils	Coverage (ha)	% Coverage	Soil Group	CN	Composite CN	
							AMC II	AMC III
Nichol Drain								
C1	136.9	Listowel loam	9.0	7	BC	71	69	85
		Harriston loam	81.2	59	BC	71		
		Muck	46.2	34	B	66		
C2	31.8	Based on Bonaire Hydrology Model						
C3	13.2	Based on Bonaire Hydrology Model						
C4	81.1	Listowel loam	22.9	28	BC	71	71	85
		Harriston loam	41.1	51	BC	71		
		Muck	2.7	3	B	66		
		Parkhill loam	14.4	18	BC	71		
C5a	180.3	Listowel loam	125.9.	70	BC	71	71	86
		Harriston loam	25.8	14	BC	71		
		Muck	9.1	5	B	66		
		Parkhill loam	19.4	11	BC	71		
C5b	120.0	Listowel loam	55.5	46	BC	71	71	86
		Harriston loam	47.1	39	BC	71		
		Muck	4.7	4	B	66		
		Parkhill loam	12.2	10	BC	71		
C6a	77.1	Listowel loam	18.5	24	BC	71	71	86
		Harriston loam	46.2	60	BC	71		
		Parkhill loam	12.4	16	BC	71		
C6b	60.5	Brant	9.4	16	B	66	70	85
		Harriston loam	41.9	69	BC	71		
		Parkhill loam	9.2	15	BC	71		
C6c	66.5	Brant	9.3	14	B	66	70	85
		Listowel loam	25.6.	39	BC	71		
		Harriston loam	19.8	30	BC	71		
		Parkhill loam	11.5	17	BC	71		

Table A.3 – Existing Condition Soil Parameters (MTE Updated)

SWS Catchment	VO Catchment #	Area	Composite CN	
			AMC II	AMC III
Nichol Drain				
C1	100	136.98	69	85
C2	200*	31.8	Based on Bonaire Hydrology Model	
C3	300*	13.2	Based on Bonaire Hydrology Model	
C4	400	82.86	71	85
C5a	500 ¹	193.01	Based on North-West Fergus Secondary Plan Model	
C5b	520	108.36	71	86
C6a	610	78.05	71	86
C6b	620	4.55	70	85
	621	6.56	70	85
	622	9.69	70	85
	623	19.37	70	85
	624	11.84	70	85
	625	6.72	70	85
	626	1.06	70	85
	627	9.39	70	85
C6c	630	33.04	70	85
	636	3.32	70	85
	637	8.36	70	85
	638	20.63	70	85
	639	4.6	70	85

1. split into additional catchments within model

Table A.4 – Existing Conditions Catchment Parameters (NDSS 2010)

Catchment	Description	Area (ha)	% Impervious	Flow Length (m)	Slope (%)
To Nichol Drain No. 1					
C1	Rural/Woods	136.9	0	1736	0.3
C2	Based on Bonaire Hydrology Model				
C3	Based on Bonaire Hydrology Model				
C4	Low-density Residential	81.1	10	1437	0.7
C5a	Rural/Woods	180	0	2932	0.7
C5b	Rural/Woods	120	0	2649	0.8
C6a	Rural/Woods	77.1	0	1080	1.1
C6b	Rural/Woods	60.5	0	1052	2.0
C6c	Rural/Woods	66.5	0	1067	2.3

Table A.5 – Post-Development Catchment Parameters (NDSS 2010)

Catchment	Description	Area (ha)	% Impervious	Flow Length (m)	Slope (%)
To Nichol Drain No. 1					
C1	Undevelopment/Woods	136.9	0	1826	0.3
C2	Based on Bonaire Model	13.2			
C3	Based on Bonaire Model	31.8			
C4	Low-density Residential	81.1	10	1437	0.7
C5a	Residential Undevelopment/Woods	77.3 102.7	40 0	2031	1.0
C5b	Residential Undevelopment/Woods	13.0 107.0	40 0	2031	1.0
C6a	Undevelopment/Woods	77.1	0	1013	1.5
C6b	Undevelopment/Woods	60.5	0	1229	1.2
C6c	Undevelopment/Woods	66.5	0	1959	1.5

Table A.6 – Existing and Current Conditions Catchment Parameters (MTE Updated)

Catchment	VO #	Description	Area (ha)	% Impervious	Flow Length (m)	Slope (%)
To Nichol Drain No. 1						
C1	100	Rural/Woods	136.98	0	1736	0.3
C2	200*	Based on Bonaire Hydrology Model				
C3	300*	Based on Bonaire Hydrology Model				
C4	400	Low-density Residential	82.86	10	1437	0.7
C5a	510*	Based on North-West Fergus Secondary Plan Model				
C5b	520	Rural/Woods	108.36	0	2649	0.8
C6a	610	Rural/Woods	78.05	0	1080	1.1
C6b	620*	Based on Ainley Farm Subdivision Model				
	621	Agricultural	6.56	0	400	4
	622	Agricultural	9.69	0	450	5
	623	Agricultural	19.37	0	520	3
	624	Agricultural	11.84	0	250	3
	625	Agricultural	6.72	0	200	2.5
	626	External Roadway	1.06	60	84.06	1
	627	Floodplain	9.39	0	50	3
C6c	630	Agricultural	33.04	0	410	3.5
	636	Agricultural	3.32	0	500	2.5
	637	Agricultural	8.36	0	550	3
	638	Agricultural	20.63	0	530	3
	639	Agricultural/ Woods	4.6	0	450	3

Table A.7 – Proposed Conditions Parameters (MTE Updated)

Catchment	VO #	Description	Area (ha)	% Impervious	Flow Length (m)	Slope (%)
To Nichol Drain No. 1						
C1	100	Rural/Woods	136.98	0	1736	0.3
C2	200*	Based on Bonaire Hydrology Model				
C3	300*	Based on Bonaire Hydrology Model				
C4	400	Low-density Residential	82.86	10	1437	0.7
C5a	510*	Based on North-West Fergus Secondary Plan Model				
C5b	520	Rural/Woods	108.36	0	2649	0.8
C6a	610	Rural/Woods	78.05	0	1080	1.1
C6b	620*	Based on Ainley Farm Subdivision Model				
	621	Residential	20.87	47	400	4
	622.1	Residential	0.61	58	75	4
	622	Residential	8.95	58	450	5
	623	Residential	6.47	64	520	3
	624	Residential	12.78	68	640	3
	625	Residential	12.18	70	330	2.5
	627	Floodplain	9.39	0	50	3
	628	SWMF	5.35	60	199	2
C6c	630	Agricultural	33.04	0	410	3.5
	636	Agricultural	3.60	0	500	2.5
	637	Agricultural	8.42	0	550	3
	638	Agricultural	20.63	0	530	3
	639	Agricultural/ Woods	4.47	0	450	3

Table A.8 – SWMF1 Design Details

General	Facility Characteristics
Stormwater Management Facility Type	Wet Pond
Required MECP Water Quality Protection	Enhanced (Level 1)
Total Contributing Area	57.65ha
Imperviousness	59%
Bottom Elevation (Wet Pond)	402.5m
Storage	
Unit Area Storage Volume Requirements as per SWMMP (MOE 2003)	213m ³ /ha
Required Total Volume	12,400m ³
<i>Permanent Pool</i>	
Required Permanent Pool Volume	10,070m ³
Permanent Pool Elevation	404.0m
<i>Extended Detention</i>	
Minimum Required Volume (based on 40m ³ /ha)	2,330m ³
Extended Detention Elevation	404.3m
Peak Release Rate for Extended Detention (Quality)	0.006m ³ /s
<i>Quantity and Erosion Control (25mm-4hr)</i>	
Approximate Drawdown Time	48 hours

Refer to SWMF1 illustrated on **Figure 6.2**

Table A.9 – SWMF2 – Design Details

General	Facility Characteristics
Stormwater Management Facility Type	Wet Pond
Required MECP Water Quality Protection	Enhanced (Level 1)
Total Contributing Area	8.95ha
Imperviousness	58%
Bottom Elevation (Wet Pond)	403.5m
Storage	
Unit Area Storage Volume Requirements as per SWMMP (MOE 2003)	213m ³ /ha
Required Total Volume	1.888m ³
<i>Permanent Pool</i>	
Required Permanent Pool Volume	1.533m ³
Permanent Pool Elevation	405.0m
<i>Extended Detention</i>	
Minimum Required Volume (based on 40m ³ /ha)	355m ³
Extended Detention Elevation	405.3m
Peak Release Rate for Extended Detention (Quality)	0.003m ³ /s
<i>Quantity and Erosion Control (25mm-4hr)</i>	
Approximate Drawdown Time	48 hours

Refer to SWMF2 illustrated on **Figure 6.3**

Table A.10 – SWMF3a/3b – Design Details

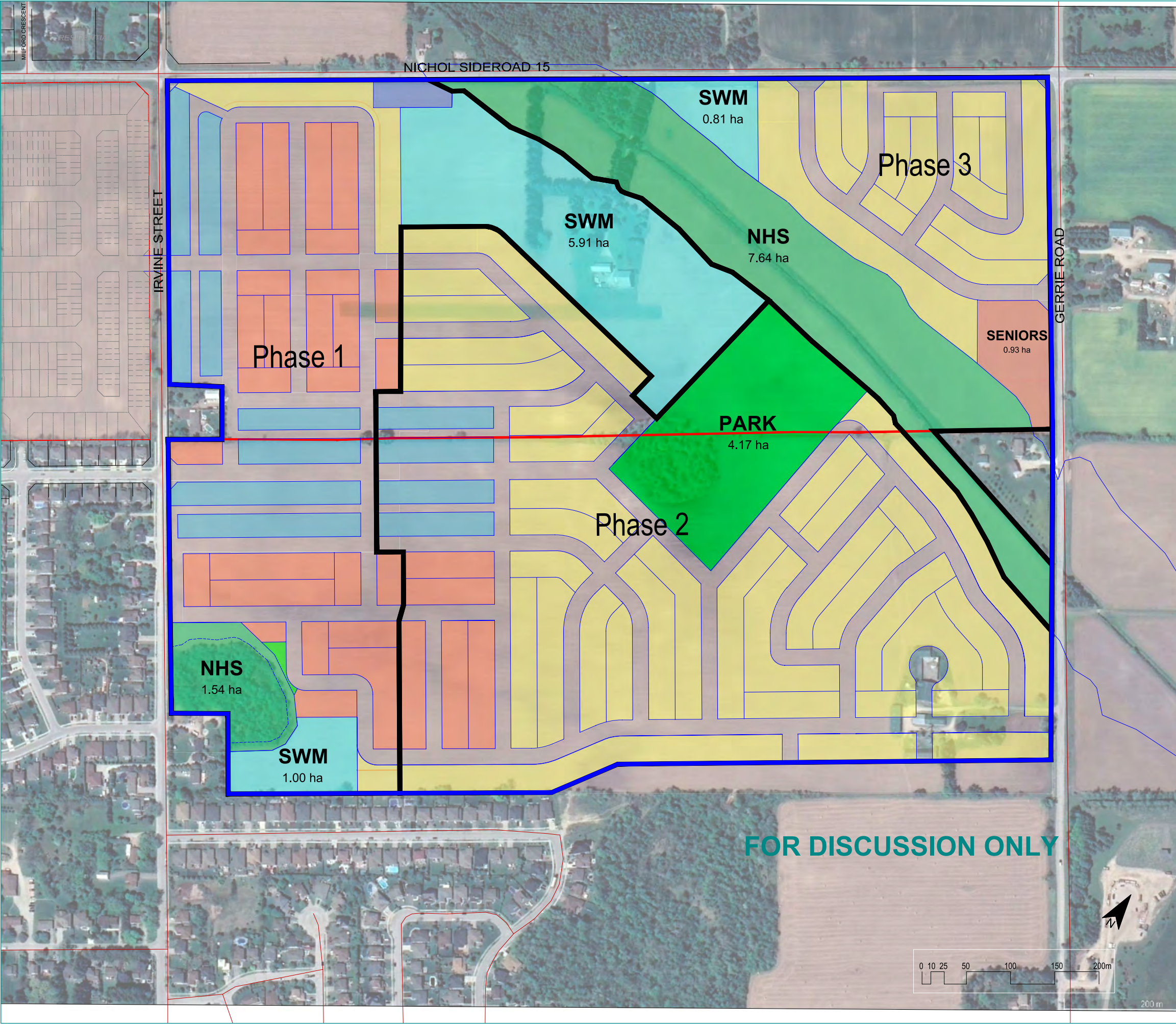
General	Facility Characteristics
Stormwater Management Facility Type	Wet Pond
Required MECP Water Quality Protection	Enhanced (Level 1)
Total Contributing Area	10.71ha
Imperviousness	70%
Bottom Elevation (Wet Pond)	409.0m
Storage	
Unit Area Storage Volume Requirements as per SWMMP (MOE 2003)	226m ³ /ha
Required Total Volume	2,455m ³
<i>Permanent Pool</i>	
Required Permanent Pool Volume	2,020m ³
Permanent Pool Elevation	410.5m
<i>Extended Detention</i>	
Minimum Required Volume (based on 40m ³ /ha)	435m ³
Extended Detention Elevation	409.3m
Peak Release Rate for Extended Detention (Quality)	0.003m ³ /s
<i>Quantity and Erosion Control (25mm-4hr)</i>	
Approximate Drawdown Time	48 hours

Refer to SWMF3a illustrated on **Figure 6.4**

Refer to SWMF3b illustrated on **Figure 6.5**

Appendix B

Concept Plans (MGP)



PHASING PLAN

PHASE 1		AREA		FRONTAGE		APPROX. UNITS
LAND USE		ha	ac.	m	ft.	
Developable Area						
Low Density Residential @	11 m	1.30	3.21	343	1,125	31
Low/Medium Density Residential @	6 m	6.56	16.21	1,864	6,115	311
Lane Access Residential @	6 m	3.31	8.18	1,105	3,626	184
Vista		0.05	0.12			
SWM		6.91	17.07			
Pumping Station		0.26	0.64			
Roads / Lanes		5.84	8.70			
SUBTOTAL		24.23	59.87	3,312	10,866	526
Non Developable Area						
NHS		1.54	3.81			
TOTAL		25.77	63.68	3,312	10,866	526

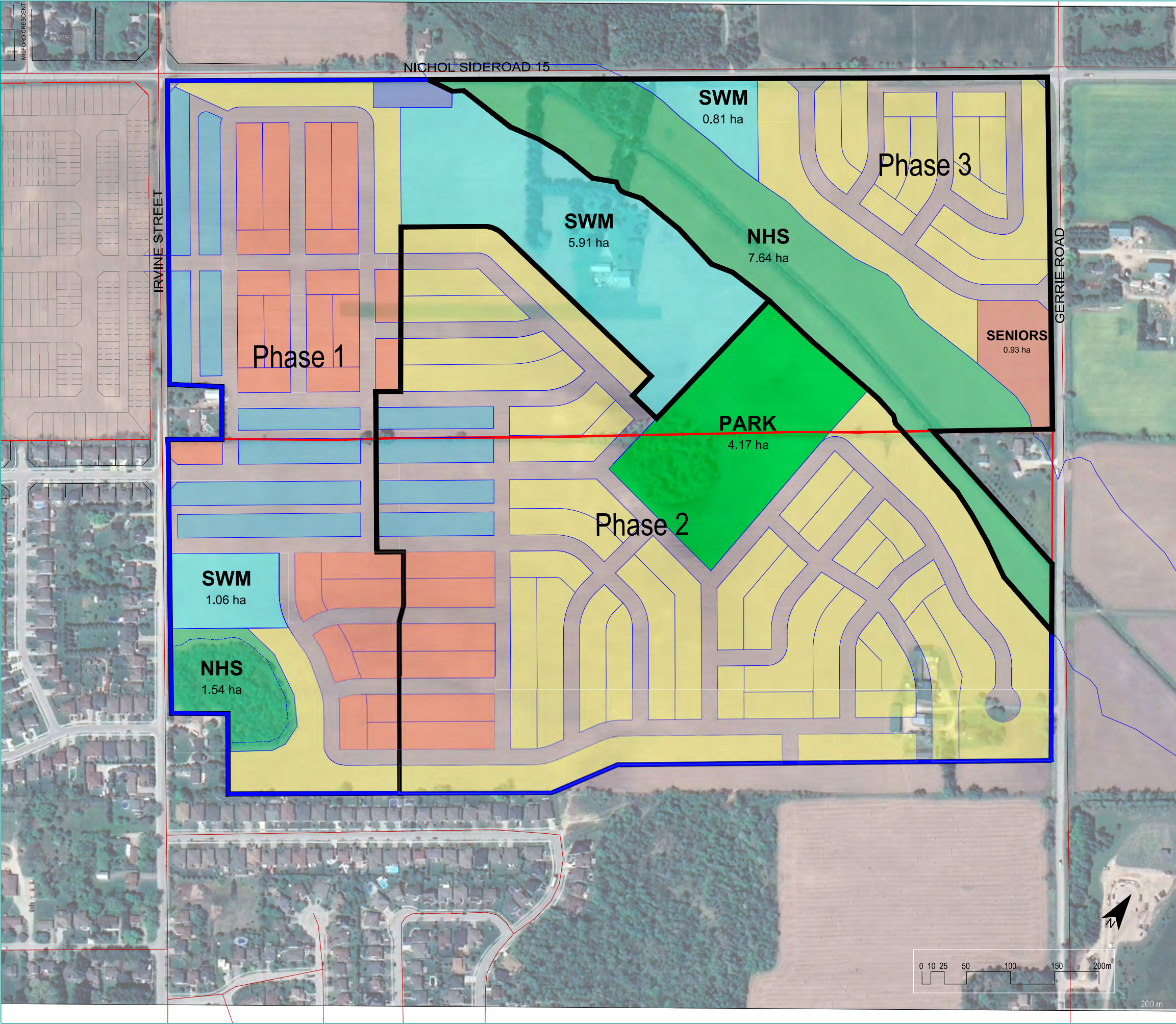
PHASE 2		AREA		FRONTAGE		APPROX. UNITS
LAND USE		ha	ac.	m	ft.	
Developable Area						
Low Density Residential @	11 m	17.61	43.51	4,735	15,534	430
Low/Medium Density Residential @	6 m	1.92	4.74	553	1,813	92
Lane Access Residential @	6 m	1.40	3.46	455	1,491	76
Park		4.17	10.30			
Vista		0.00	0.00			
SWM		0.00	0.00			
Roads / Lanes		9.09	22.46			
TOTAL		34.19	84.48	5,742	18,838	598

PHASE 3		AREA		FRONTAGE		APPROX. UNITS
LAND USE		ha	ac.	m	ft.	
Developable Area						
Low Density Residential @	11 m	5.37	13.27	1,354	4,441	123
Seniors Residence		0.93	2.30			
Park		0.00	0.00			
SWM		0.81	2.00			
Roads / Lanes		2.07	5.11			
SUBTOTAL		9.18	22.68	1,354	4,441	123
Non Developable Area						
NHS		7.64	18.88			
TOTAL		16.82	41.56	1,354	4,441	123

TOTAL ALL PHASES		AREA		FRONTAGE		APPROX. UNITS
LAND USE		ha	ac.	m	ft.	
Developable Area						
Low Density Residential @	11 m	24.28	60.00	6,431	21,100	585
Low/Medium Density Residential @	6 m	8.48	20.95	2,417	7,928	403
Lane Access Residential @	6 m	4.71	11.64	1,560	5,117	260
Seniors Residence		0.93	2.30			
Vista		0.05	0.12			
SWM		7.72	19.08			
Pumping Station		0.26	0.64			
Roads / Lanes		17.00	8.70			
TOTAL NET DEVELOPABLE AREA		67.60	167.04	10,408	34,145	1,247
Non Developable Area						
NHS		9.18	22.68			
TOTAL PROPERTY AREA		76.78	189.72	10,408	34,145	1,247

NOTE: Development limits are preliminary and subject to further technical study.
Frontage lengths have been discounted by 10% to compensate for inefficiencies in lotting.

Prepared For:
ELORA SANDS DEVELOPMENTS INC.



ALTERNATIVE CONCEPT PLAN

PHASE 1		AREA		FRONTAGE		APPROX. UNITS
LAND USE		ha	ac.	m	ft.	
Developable Area						
Low Density Residential @	11 m	2.45	6.05	523	1,716	48
Low/Medium Density Residential @	6 m	5.68	14.04	1,638	5,374	273
Lane Access Residential @	6 m	3.31	8.18	1,105	3,626	184
SWM		6.98	17.25			
Pumping Station		0.26	0.64			
Roads / Lanes		5.55	8.70			
SUBTOTAL		24.23	59.87	3,266	10,715	505
Non Developable Area						
NHS		1.54	3.81			
TOTAL		25.77	63.68	3,266	10,715	505

PHASE 2		AREA		FRONTAGE		APPROX. UNITS
LAND USE		ha	ac.	m	ft.	
Developable Area						
Low Density Residential @	11 m	17.79	43.96	4,563	14,970	415
Low/Medium Density Residential @	6 m	1.99	4.92	569	1,866	95
Lane Access Residential @	6 m	1.40	3.46	455	1,491	76
Park		4.17	10.30			
SWM		0.00	0.00			
Roads / Lanes		8.84	21.84			
TOTAL		34.19	84.48	5,586	18,328	585

PHASE 3		AREA		FRONTAGE		APPROX. UNITS
LAND USE		ha	ac.	m	ft.	
Developable Area						
Low Density Residential @	11 m	5.37	13.27	1,354	4,441	123
Seniors Residence		0.93	2.30			
Park		0.00	0.00			
SWM		0.81	2.00			
Roads / Lanes		2.07	5.11			
SUBTOTAL		9.18	22.68	1,354	4,441	123
Non Developable Area						
NHS		7.64	18.88			
TOTAL		16.82	41.56	1,354	4,441	123

TOTAL ALL PHASES		AREA		FRONTAGE		APPROX. UNITS
LAND USE		ha	ac.	m	ft.	
Developable Area						
Low Density Residential @	11 m	25.61	63.28	6,440	21,127	585
Low/Medium Density Residential @	6 m	7.67	18.95	2,207	7,240	368
Lane Access Residential @	6 m	4.71	11.64	1,560	5,117	260
Seniors Residence		0.93	2.30			
SWM		7.79	19.25			
Pumping Station		0.26	0.64			
Roads / Lanes		16.46	8.70			
TOTAL NET DEVELOPABLE AREA		67.60	167.04	10,206	33,484	1,213
Non Developable Area						
NHS		9.18	22.68			
TOTAL PROPERTY AREA		76.78	189.72	10,206	33,484	1,213

FOR DISCUSSION ONLY

NOTE: Development limits are preliminary and subject to further technical study.

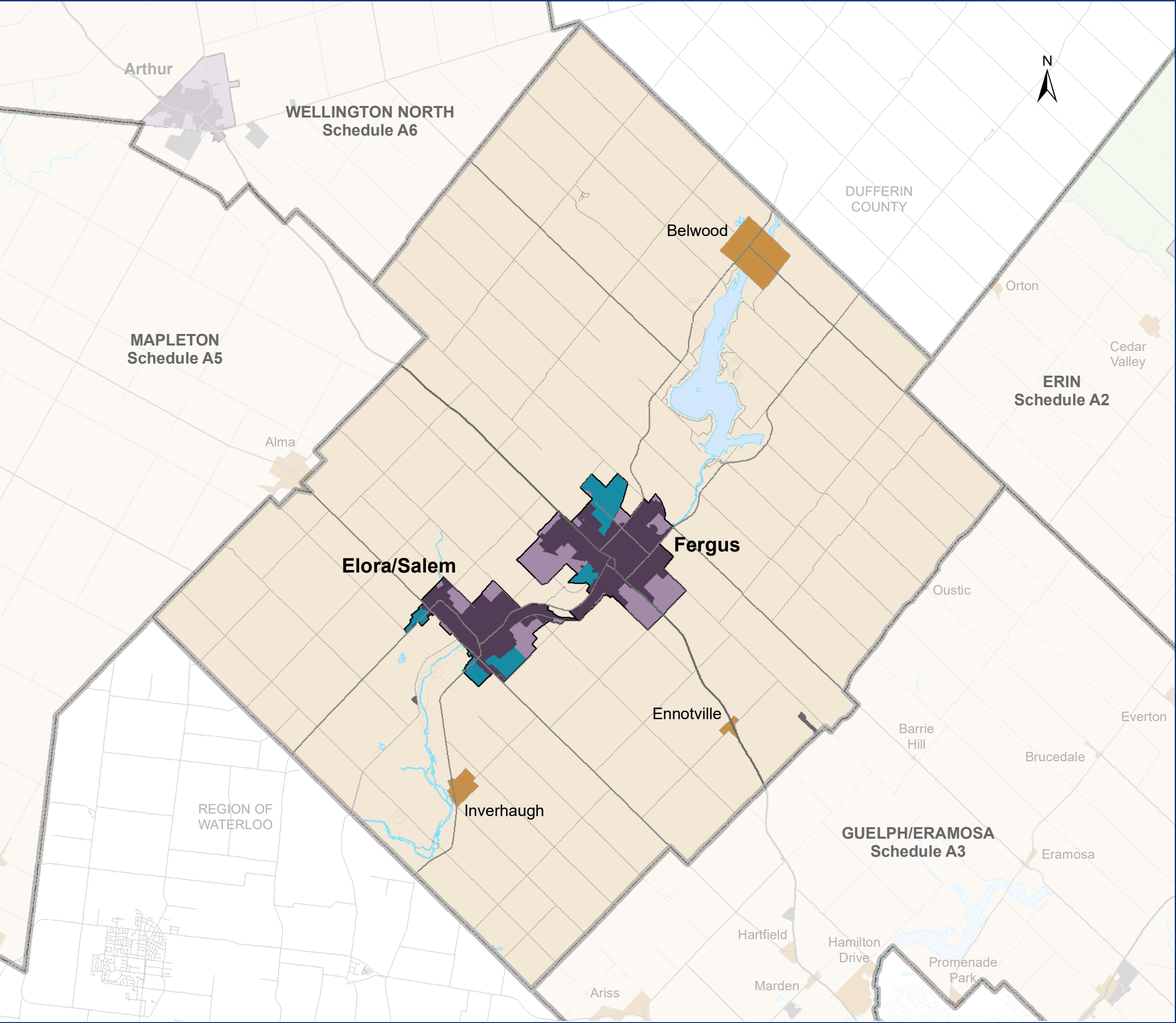
Prepared For:
ELORA SANDS DEVELOPMENTS INC.

MGP File No.: 22-3192
Date: February 28, 2025

MGP Malone
Given
Parsons.
140 Redburn Drive, Suite 201 | Markham, ON | L3R 6B3
905 513 0170 | mgi@mgp.ca

Appendix C

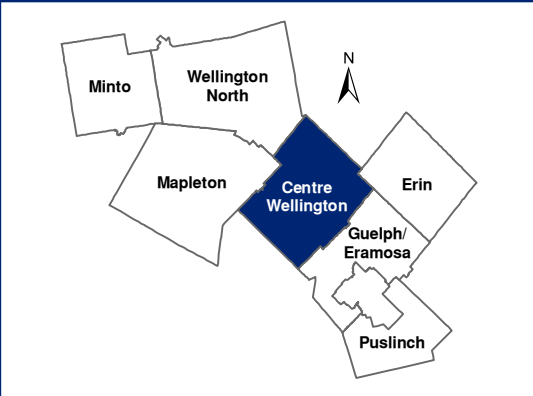
County of Wellington Official Plan Schedule A1



County Growth Structure

CENTRE WELLINGTON

- Urban System**
- Primary Urban Centre
 - Delineated Built-up Area
 - Designated Greenfield Area
 - Employment Area
- Rural System**
- Hamlet
 - Rural Employment Area
- Other**
- Waterbody/Watercourse

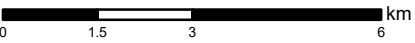


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Sources:
County of Wellington 2024
Ministry of Natural Resources and Forestry,
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Last Revised: July 2024



Appendix D

Geotechnical and Hydrogeological Investigations





SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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🌐 www.soil-mat.ca ✉ info@soil-mat.ca ☎ 905.318.7440 / 800.243.1922 (toll free) 📠 905.318.7455

PROJECT No.: SM 241154-G

February 28, 2025

CACHET DEVELOPMENTS
361 CONNIE CRESCENT, SUITE 200
Concord, Ontario
L4K 5R2

Attention: Brendan Walton, P.Eng.
Engineering Manager, Land Development

**HYDROGEOLOGICAL CONSIDERATIONS
PROPOSED RESIDENTIAL DEVELOPMENT
ELORA SAND AND KEATING LANDS
ELORA, ONTARIO**

Dear Mr. Walton,

Further to your recent information and request, and meetings with the project team, SOIL-MAT ENGINEERS & CONSULTANTS LTD. have prepared the following hydrogeological considerations report to address the existing subsurface soil and groundwater conditions over the Elora Sands and Keating Lands development area.

1. INTRODUCTION

SOIL-MAT ENGINEERS has conducted a Preliminary Hydrogeological Assessment [SM - 301951-G, dated July 20, 2022], Supplemental Groundwater Data [SM 301951-G, dated August 19, 2024] and Geotechnical Investigation [SM 301951-G, dated September 3, 2021] over the Elora Sands and Clayton Lands portion of the proposed development area. In addition to this information, we have been provided borehole and ground water information for the Ainley Farm Subdivision [Hydrogeological Study Ainley Farm Subdivision, GM BluePlan Engineering, April 12, 2023] to the south of the Keating Lands and the Elora Meadows Residential Development [Hydrogeological Investigation Elora Meadows Residential Development, Waterloo Geoscience Consultants Ltd., September 19, 2025] which has since been constructed. The purpose of this hydrogeological considerations report is to provide a high-level summary of the hydrogeological conditions of the subject site from geotechnical perspective, and comments with respect to the feasibility of proposed development of the subject lands.

2. SITE AND SUBSURFACE CONDITIONS

Drawing No. 1, Site Plan, illustrates the subject lands.

As noted above, prior investigations by our office have been conducted on the Elora Sands lands, as well as the Clayton lands to the northwest. In addition, investigations by others have been conducted on the Elora Meadows development to the west, and the Ainley Farm lands to the southeast. This information has been reviewed and summarised in the following discussion, however it is noted that our full reports for Elora Sands and Clayton lands should be referenced for the complete description and discussion of the site conditions.

GEOLOGIC SETTING

A review of publicly available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soil in the immediate area to consist of a mixture of stone poor silty sand to sandy silt till, ice-contact stratified deposits of sand and gravel with minor silt and clay, and glaciofluvial deposits of gravely and sandy material.

SUBSURFACE SOIL CONDITIONS

SOIL-MAT ENGINEERS has conducted detailed geotechnical investigation works over the subject site [SM 301915-G, dated October 14, 2021], as well as hydrogeological assessment [SM 301951-G, dated July 20, 2022]. These site investigations included the advancement of sampled boreholes across the site, multiple grain size analyses on recovered soil samples, and have thoroughly characterised the onsite subsurface conditions.

The subsurface soils were investigated to depths of up to approximately 8.2 metres below the existing grade, and found to consist of sandy silt to silty sand till deposits in the upper levels with some areas and variable layers of clayey sandy silt till with depth, with generally trace amounts of gravel. Occasional deposits of gravelly sand were encountered within some of the boreholes. As such, the presence of permeable granular deposits or 'veins' should be expected across the site.

Grain size analyses conducted on ten [10] recovered soil samples at varying depths demonstrated the following:

- Clay contents in the range of 2 to 22%, average of 10%
- Silt in the range of 4 to 51%, average of 26%
- Sand in the range of 26 to 94%, average of 53%
- Gravel in the range of 0 to 43%, average of 9%

These conditions are consistent with the referenced geology mapping information indicating stone poor silty sand to sandy silt till, to glaciofluvial deposits of gravely and sandy material. There is limited to negligible indication of ice-contact stratified deposits of sand and gravel with minor silt and clay.

It is noted that the conditions established in the boreholes advanced on the Elora Sands lands are consistent with those reported in referenced reports by others for the Elora Meadows and Ainley Farm lands. Predominantly sandy silt and silty sand till, with varying more clayey layers, and limited gravel content.

The areas indicated as having greater clay content should be further evaluated for potential use as low-permeable recompacted clay liner material for SWM ponds, in the event that lining of the ponds is determined to be required.

It is noted that a portion of the site has been designated as an area of sand and gravel resource of primary and secondary significance. However, given the limited gravel content established, these deposits would not be considered as significant sand and gravel resource in terms of aggregate production.

GROUNDWATER CONDITIONS

A total of seventeen [17] groundwater monitoring wells were installed within the Elora Sands and Clayton Lands development areas over the course of the geotechnical investigation and hydrogeological assessment works. Groundwater readings have been collected both manually and through installed data loggers from August of 2021 to May 2023, the results of which have been summarised as follows;

TABLE A
SUMMARY OF MANUAL GROUNDWATER READINGS (ELORA SANDS)

Borehole No. 004 (Ground Surface Elevation of 405.55 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	2.74	402.8
August 27, 2021	1.75	403.8
February 23, 2022	1.33	404.2
April 22, 2022	1.47	404.1
June 1, 2022	1.78	403.8
May 3, 2023	1.20	404.35

Borehole No. 201 (Ground Surface Elevation of 404.80 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.69	402.1
April 22, 2022	1.88	402.9
June 1, 2022	2.44	402.4
May 3, 2023	1.88	402.9

Borehole No. 201A (Ground Surface Elevation of 404.75 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	Dry	<401.8
April 22, 2022	2.05	402.7
June 1, 2022	2.43	402.3
May 3, 2023	1.71	403.1

Borehole No. 202 (Ground Surface Elevation of 406.59 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	5.5	401.1
April 22, 2022	4.76	401.8
June 1, 2022	5.43	401.2
May 3, 2023	4.51	402.1

Borehole No. 203 (Ground Surface Elevation of 407.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	Dry	<401.0
April 22, 2022	5.90	401.2
June 1, 2022	5.91	401.2
May 3, 2023	Dry	<401.0

Borehole No. 204 (Ground Surface Elevation of 409.56 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.81	406.7
April 22, 2022	1.16	408.4
June 1, 2022	1.53	408.0
May 3, 2023	1.20	408.4

Borehole No. 205 (Ground Surface Elevation of 412.99 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.56	410.4
April 22, 2022	2.25	410.7

June 1, 2022	2.39	410.6
May 3, 2023	2.34	410.6

Borehole No. 206 (Ground Surface Elevation of 412.88 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	6.83	406.1
April 22, 2022	4.60	408.3
June 1, 2022	4.66	408.2
May 3, 2023	4.76	408.1

Borehole No. 401 (Ground Surface Elevation of 420.91 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
April 22, 2022	2.29	418.6
June 1, 2022	2.39	418.5
May 3, 2023	2.31	418.6

TABLE B
SUMMARY OF MANUAL GROUNDWATER READINGS (CLAYTON LANDS)

Borehole No. 101 (Ground Surface Elevation of 408.60 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	4.78	403.8
August 27, 2021	4.71	403.9
October 14, 2021	4.33	404.3
February 23, 2022	4.31	404.3
April 22, 2022	4.07	404.5
June 1, 2022	4.15	404.5
May 3, 2023	4.06	404.5

Borehole No. 102 (Ground Surface Elevation of 414.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	3.58	410.6
August 27, 2021	3.61	410.5
October 14, 2021	3.62	410.5
February 23, 2022	3.50	410.6
April 22, 2022	2.89	411.2
June 1, 2022	3.05	411.1
May 3, 2023	3.00	411.0

Borehole No. 103 (Ground Surface Elevation of 414.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	6.78	407.3
August 27, 2021	6.96	407.2
October 14, 2021	7.09	407.0
February 23, 2022	6.83	407.3
April 22, 2022	6.13	408.0
June 1, 2022	6.28	407.8
May 3, 2023	6.56	407.6

Borehole No. 301 (Ground Surface Elevation of 412.75 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	6.29	406.5
April 22, 2022	5.65	407.1
June 1, 2022	5.71	407.0
May 3, 2023	5.85	406.9

Borehole No. 302 (Ground Surface Elevation of 413.00 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	6.62	406.4
April 22, 2022	6.06	406.9
June 1, 2022	6.12	406.9
May 3, 2023	6.35	406.7

Borehole No. 303 (Ground Surface Elevation of 414.00 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	5.40	408.6
April 22, 2022	6.04	407.9
June 1, 2022	6.11	407.9
May 3, 2023	6.41	407.6

Borehole No. 304 (Ground Surface Elevation of 407.90 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	2.87	405.0
April 22, 2022	2.60	405.3
June 1, 2022	2.96	404.9
May 3, 2023	2.42	405.5

Borehole No. 305 (Ground Surface Elevation of 408.60 metres)*		
--	--	--

	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	Dry	<405.6
April 22, 2022	Dry	<405.6
June 1, 2022	Dry	<405.6
May 3, 2023	Dry	<405.6

*Ground surface elevations have been interpolated based on contours from current topographic survey

As noted above, additional groundwater information was provided for the Ainley Farm subdivision as well as the Elora Meadows development. The spring high values were utilised in conjunction with the above recorded measurements to evaluate the groundwater conditions across the proposed development lands. The readings used have been summarised as follows;

TABLE C
SUMMARY OF MANUAL GROUNDWATER READINGS (AINLEY FARM)

Borehole No.	Date	Elevation
101	April 8, 2014	413.60
102	April 8, 2014	412.51
103	April 8, 2014	413.77
104	April 8, 2014	410.71
105	April 8, 2014	414.02
106	April 8, 2014	411.02
107	April 8, 2014	409.61
108	April 8, 2014	409.33

TABLE D
SUMMARY OF MANUAL GROUNDWATER READINGS (ELORA MEADOWS)

Borehole No.	Date	Elevation
12	April 14, 2005	395.17
13	April 14, 2005	406.68
14	April 14, 2005	405.29
15	April 14, 2005	405.97
16	April 14, 2005	410.71
17	April 14, 2005	410.09
18	April 14, 2005	410.00
19	April 14, 2005	407.98
20	April 14, 2005	405.48

The combined groundwater data from similar time of year has been utilised to compile the groundwater contour plan for the area, illustrated in Drawing No. 2. It is noted that the current data provides for a good resolution and confidence in the groundwater contours over the Elora Sand and Clayton lands, Elora Meadows and Ainley Farm lands.

Within the Keating lands the groundwater contours have been extrapolated based on the available data, and considering the existing topography. These are considered to be reasonable and appropriate at this stage of assessment, however it would be necessary to undertake specific detailed study to support detailed design of future proposed development on the Keating lands.

The groundwater flow, as illustrated in Drawing No. 2, generally follows the site topography. Overall, the groundwater flow is from southeast to northwest across the subject sites, and then splitting to the north towards the Nichol Drain and Irvine Creek, and to the southwest and west to Irvine Creek. The majority of the site drains toward the Nichol Drain to the north which ultimately outlets to the Irvine Creek and the Grand River. The southwest portion of the sites drain towards a noted wetland at the southwest corner of the Keating lands, and ultimately west to Irvine Creek and the Grand River.

WETLAND AREA

It is noted a designated wetland area [Queen Street Wetland] is located in the southwest corner of the Keating lands. The available topography indicates the average ground surface elevation at this location is approximately 410 to 411 metres, with a preliminary measurement of water level within the wetland on the order of 410.5 metres. This is roughly coincident with the groundwater elevation at that location indicated on the Groundwater Contour Plan. The wetland does not have any apparent connection to a watercourse, and it is anticipated that the wetland is fed through shallow groundwater due to localised low topography versus the groundwater level, and surface runoff. There does not appear to be any indication of an upward gradient, or upwelling, in the groundwater conditions that would be supply the wetland. Rather, there may be a slight downward vertical gradient. This would suggest the wetland is primarily supplied by precipitation and surface runoff, however this should be confirmed through more detailed hydrogeological assessment.

SOURCE WATER PROTECTION CONSIDERATIONS

Terra-Dynamics Inc. has conducted a Source Water Protection Due Diligence Review of the subject site, and is appended for reference. This review provides detailed information and discussion with respect to surface and groundwater, including Well Head Protection Areas and Significant Groundwater Recharge Areas. This report is appended for reference, and key items noted as follows.

Nichol Drain is identified as a groundwater discharge area, with the regional groundwater levels above the elevation of the drain. This is consistent with monitoring well observations on the Elora Sands lands. The Drain is noted as having coldwater fishery potential, and should be considered as a coldwater stream with respect to stormwater management design and construction. Further assessment of the Nichol Drain is warranted to support and inform detailed design of site development.

Groundwater recharge of the site has likely been over-estimated in regional studies, as site specific investigations have demonstrated predominantly silty sand/sandy silt till deposit, less permeable than the sand and gravel indicated on regional mapping.

The bedrock aquifer beneath the site has a primarily low vulnerability [vulnerability scores of 2, 4 and 6], with a small portion of the southern area [Keating Lands] mapped as medium vulnerability [score of 8], and a very small portion at the southwest of the site mapped and high vulnerability [score of 10]. Considering the conditions and relevant policies significant water quality threats are not expected as part of residential development, it is not expected that there will be constraints on the residential development of the site.

DISCUSSION AND RECOMMENDATIONS

The subsurface soil and groundwater conditions, as outlined above, are discussed in detail in our Hydrogeological Investigation for the Clayton and Elora Sands lands. This report should be referred to as the commentary and discussion remains valid and applicable to assessing the feasibility of development for both the Elora Sands and Keating lands. The overburden soils are predominantly silty sand and sandy silt till, with occasional more clayey zones and limited sand and gravel.

Groundwater is present at depths ranging between approximately 2 to 7 metres below the existing grade, generally being shallower in topographically low areas, including near the Nichol Drain and adjacent to the Queen Street Wetland at the southwest of the Keating lands.

Site grading should consider the existing topography, raising the grade in low areas and cutting in higher areas, in order to minimise potential interaction with groundwater. With appropriate grading preventing interaction between groundwater and foundations, and largely limiting interaction during construction of site servicing. As such, conflict or impact to groundwater conditions are not expected to be a significant concern. The exception may be deeper services [trunk sewers], which may require some level of temporary construction dewatering. On a preliminary basis, this would be anticipated to be below 50,000 L/day in most cases, with potential for deeper excavations to exceed 400,000 L/day. This would warrant further assessment as part of detailed design.

The on-site soils, while generally less permeable than the sand and gravel indicated on regional mapping, present a moderately permeable condition that would be supportive of LID systems. This would include lot level infiltration, infiltration galleries, etc., as part of the overall stormwater management and water balance for the site development. This would warrant further assessment as part of detailed design.

Stormwater management ponds located at topographic low locations on the site would be appropriate. Portions of the site presents as potentially sufficiently clayey to be suitable for use as recompacted clay liner, in the event that it is determined that lining of the SWM ponds is required. Alternatively, the use of available geosynthetic clay liner systems may be considered.

It is noted that the subject lands are within a Wellhead Protection Area (WHPA). Water wells in the area are drawing from a much deeper confined aquifer, and would be unaffected by proposed development of the subject lands. Based on the available information, there will be no anticipated negative impact with respect to the deep bedrock aquifer serving as the potable supply source for private and municipal potable wells within the area.

Based on the currently available information, including detailed hydrogeological assessments of the Elora Sands lands, and the Elora Meadows and Ainley Farm lands, the subject lands are considered to be feasible for residential development. Appropriate design considerations and strategies will be able to readily and adequately account for and mitigate potential concerns. Further detailed assessment will be warranted, as noted, to support detailed design of future development.

GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this Hydrogeological Report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,

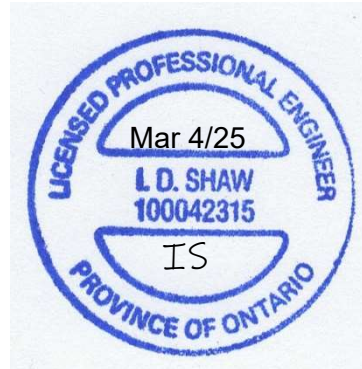
SOIL-MAT ENGINEERS & CONSULTANTS LTD.



Kevin Reid, B.Eng., EIT.
Engineer in Training



Ian Shaw, P. Eng., QP_{ESA}
Senior Engineer

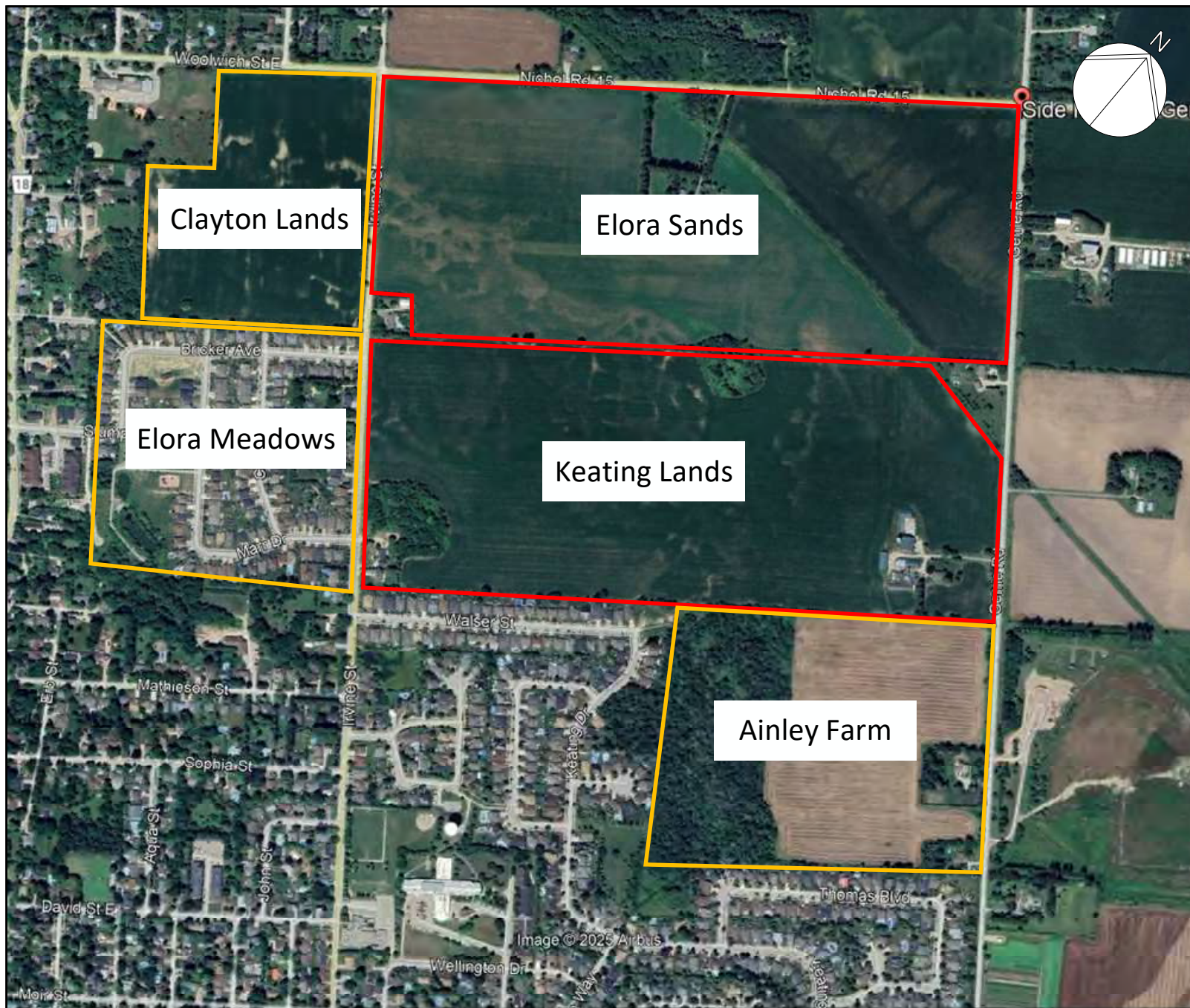


Enclosures: Drawing No. 1, Site Plan
Drawing No. 2, Groundwater Contour Plan

References:

- Source Water Protection Due Diligence Review [Terra-Dynamics, dated February 27, 2025]
- Preliminary Geotechnical and Hydrogeological Investigation [SM 301951A-G, dated October 12, 2021]
- Preliminary Hydrogeological Assessment [SM 301951-G, dated November 4, 2022]
- Supplemental Groundwater Data [SM 301951-G, dated August 19, 2024]

Distribution: Cachet Developments [pdf]



LEGEND

- Subject Lands
- Adjacent Sites

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 241154-G.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Hydrogeological Considerations
Elora Sands and Keating Lands
Elora, Ontario

Site Plan

Project No. SM 241154-G

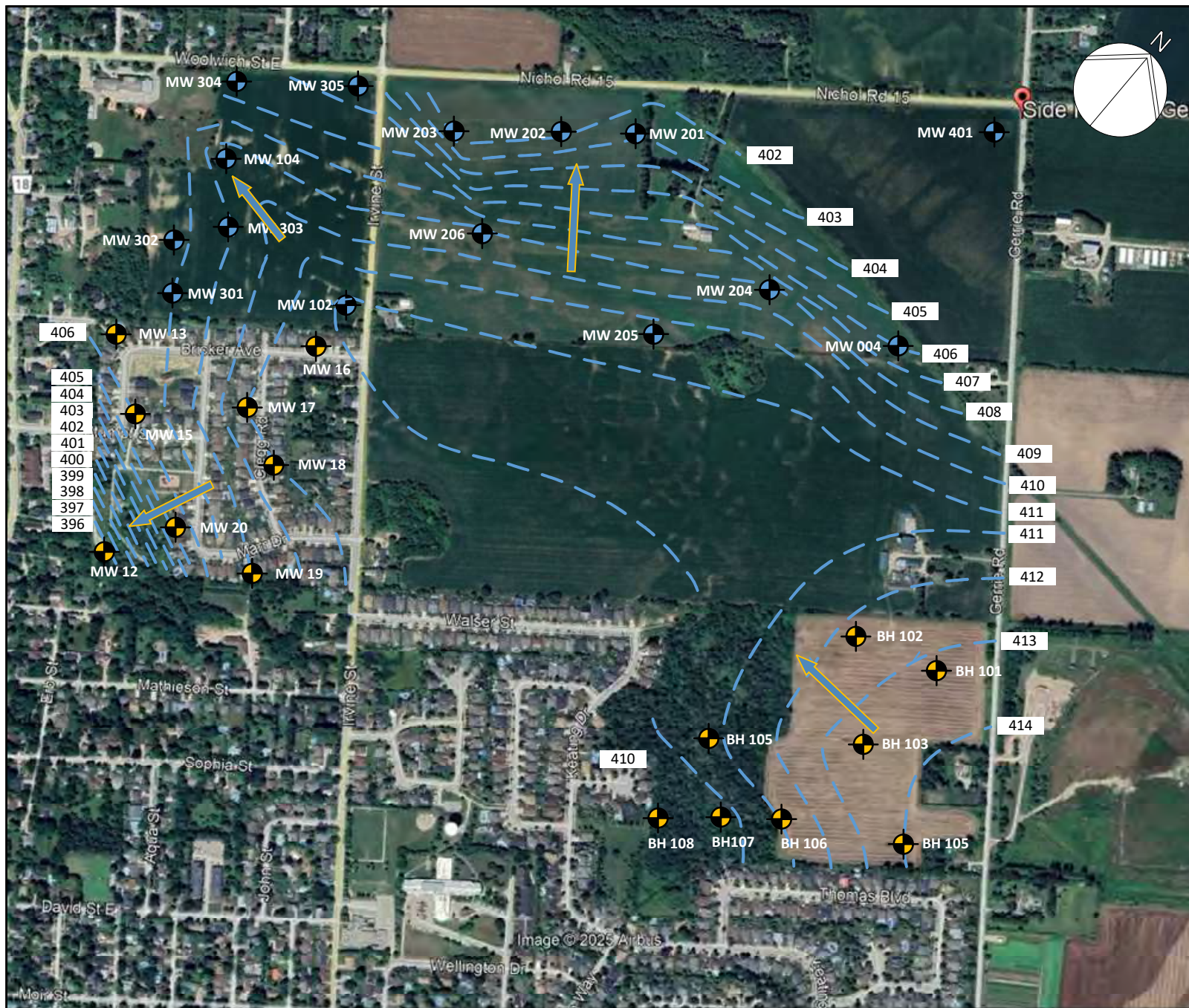
Date: February 2025

Drawn: KJR

Checked: IS

SM 241154-G Site Plan

Drawing No. 1



LEGEND

-  Soil-Mat Monitoring Well Location
MW#
-  Monitoring Well Location By Others

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 241154-G.
2. Borehole locations are approximate.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Hydrogeological Considerations
Elora Sands and Keating Lands
Elora, Ontario

Groundwater Contour Map

Project No. SM 241154-G

Date: February 2025

Drawn: KJR

Checked: IS

SM 241154-G Groundwater Contour Map

Drawing No. 2

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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PROJECT No.: SM 301951B-G

October 14, 2021

CACHET DEVELOPMENTS
361 CONNIE CRESCENT, SUITE 200
Concord, Ontario
L4K 5R2

Attention: Marcus Gagliardi
Development Planner

**PRELIMINARY GEOTECHNICAL AND HYDROGEOLOGICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
75 WOOLWICH STREET EAST
ELORA, ONTARIO**

Dear Mr. Gagliardi,

Further to your authorisation and subsequent discussions with Mr. Michael DeBiasio, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has completed the fieldwork, laboratory testing, and report preparation in connection with the above noted project. The scope of work was completed in general accordance with our proposal P301951, dated July 1, 2021, later revised and confirmed through email communication on August 3, 2021. This report should be read in conjunction with the formal report for the Gibson Farms to the east SM 301951A-G, dated October 5, 2021. Our comments and recommendations based on our findings at the four [4] borehole locations are presented in the following paragraphs.

1. INTRODUCTION

We understand that the project will involve the construction of a residential development consisting of single-family dwellings and townhouses along asphalt paved roadways, including the installation of associated underground municipal services, located at 75 Woolwich Street East [Clayton Lands] in Elora, Ontario. The purpose of this preliminary geotechnical investigation work was to assess the subsurface soil and groundwater conditions, and to provide our comments and recommendations with respect to the design and construction of the proposed development, from a geotechnical point of view.

SOIL-MAT ENGINEERS was provided with a sub-watershed study that encompasses the surrounding area – including the subject site – prepared by Aquafor Beech Limited, dated February 2008. The results of this investigation have been considered in preparation of this geotechnical report.

This report is based on the above summarised project description, and on the assumption that the design and construction will be performed in accordance with applicable codes and standards. Any significant deviations from the proposed project design may void the recommendations given in this report. If significant changes are made to the proposed design, this office must be consulted to review the new design with respect to the results of this investigation. It is noted that SOIL-MAT ENGINEERS has also conducted Phase One and Two Environmental Site Assessments (ESAs) for the subject site, which have been reported under a separate cover.

2. PROCEDURE

A total of four [4] sampled boreholes were advanced at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment on August 6, 2021 under the direction and supervision of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD., to termination at depths of between approximately 3.6 and 7.6 metres below the existing ground surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings. Selected samples were also subjected to laboratory grain size analyses.

Upon completion of drilling, groundwater monitoring wells were installed at Borehole Nos. 1, 2, and 4 to allow for the future monitoring of the groundwater level. The monitoring well consisted of 50-millimetre PVC pipe screened in the lower 1.5 to 3.0 metres. The monitoring well was encased in well filter sand up to approximately 0.3 metres above the screened portion, then with bentonite 'hole plug' to the surface and fitted with a protective steel 'stick up' casing. The remaining boreholes were backfilled in

general accordance with Ontario Regulation 903, and the ground surface was reinstated even with the surrounding grade.

The boreholes were located in the field by representatives of SOIL-MAT ENGINEERS, based on accessibility over the site, clearance of underground utilities, and the drawing that was forwarded to our office. Best efforts were made to minimize crop damage by locating the majority of the boreholes to the perimeter of the fields. The ground surface elevation at the borehole locations has been referenced to a geodetic benchmark, described as North American 1983 CSRS, as per the survey plan completed by POI Aerial, dated August 10, 2021, which was provided to our office.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Borehole Nos. 1 to 4, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed at the exact depths of geological change.

3. SITE DESCRIPTION AND SUBSURFACE CONDITIONS

The subject site is currently an undeveloped agricultural property located at Woolwich Street East in Elora, Ontario. The parcel is bordered to the east by Irvine Street, to the south by Bricker Avenue, to the west by residential dwellings and a public school, and to the north by Woolwich Street East. The grade is relatively flat and even at the south portion of the site, sloping gently up towards the north, before quickly descending to the north towards Woolwich Street East with an approximate relief of 6 metres measured across the boreholes.

The subsurface conditions encountered at the borehole locations are summarised as follows:

Topsoil

A surficial veneer of topsoil approximately 100 to 250 millimetres in thickness was encountered at all borehole locations. It is noted that the depth of topsoil may vary across the site and from the depths encountered at the borehole locations. It is also noted that the term 'topsoil' has been used from a geotechnical point of view, and does

not necessarily reflect its nutrient content or ability to support plant life. Given the property has been historically used for agricultural purposes the upper levels of the soils would be expected to have a reworked nature resulting in more variable depths of topsoil over the site. As such, it is recommended that a conservative approach be taken when estimating topsoil quantities across the site for stripping, i.e. account for slightly greater stripping depth than those specifically noted at the borehole locations.

Sandy Silt/Clayey Silt

Native sandy silt/clayey silt was encountered beneath the topsoil in Borehole Nos. 1, 2, and 3. The fine-grained granular to slightly cohesive soils were brown in colour, with trace to some clay and gravel, with a notable increasing clay content with depth in some of the boreholes. The native sandy silt/clayey silt soils were generally noted to have a reworked or weathered appearance in the upper levels, and were generally noted to have a compact state. The sandy silt/clayey silt deposit was present to depths of approximately 0.9 to 2.2 metres in Borehole Nos. 2 and 3, and proven to termination within Borehole No. 1 at a depth of approximately 6.1 metres below the existing ground surface.

Sand

A native sand deposit was encountered beneath the topsoil in Borehole No. 4, and beneath the sandy silt/clayey silt layer in Borehole Nos. 2 and 3. The fine to medium grained soils were brown in colour, contained trace amounts of clay, silt, and gravel, and was generally in a loose to compact state. The native sand soils were proven to termination at depths of approximately 3.6 and 7.6 metres below the existing ground surface.

Grain Size Analyses

Grain size analyses were conducted on three [3] selected samples of the native soils recovered from the boreholes. The results of this grain size testing can be found appended to the end of this report, and are summarized as follows:

TABLE A
GRAIN SIZE ANALYSES

Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Hydraulic Conductivity, k [cm/s]	Estimated Infiltration Rate, [mm/hr]
BH2 SS6	4.6 m	2	6	91	1	10^{-2}	150 to 300
BH3 SS3	1.5 m	14	45	34	7	10^{-6}	<10
BH4 SS4	2.3 m	2	9	89	0	10^{-3} to 10^{-2}	100 to 150

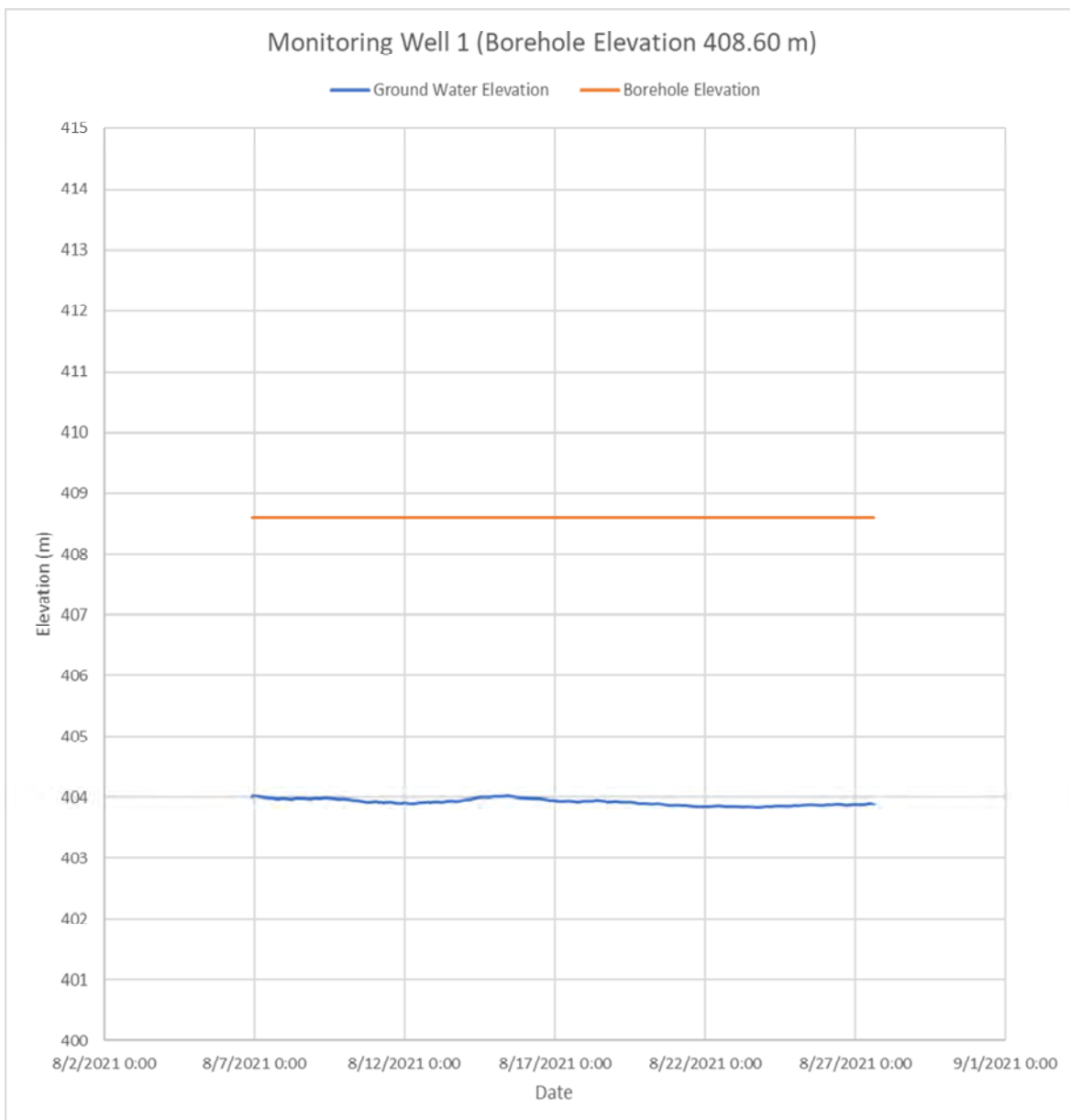
The field and laboratory testing demonstrate the native soils to generally consist of a sandy silt/clayey silt with some clay and traces of gravel in the upper levels, transitioning to a highly permeable sand with traces of clay, silt, and gravel at depth. According to the Unified Soil Classification System (USCS), the soils are classified as M.L. – inorganic silts and very fine sands, clayey silts with slight plasticity in the upper levels overlying S.P. – poorly graded sands, with little to no fines at depth. The sandy silt/clayey silt in the upper levels would generally behave as a low permeable material, but would not be considered as an impermeable material, and would be highly frost susceptible. The underlying sand deposit is highly permeable, relatively free draining.

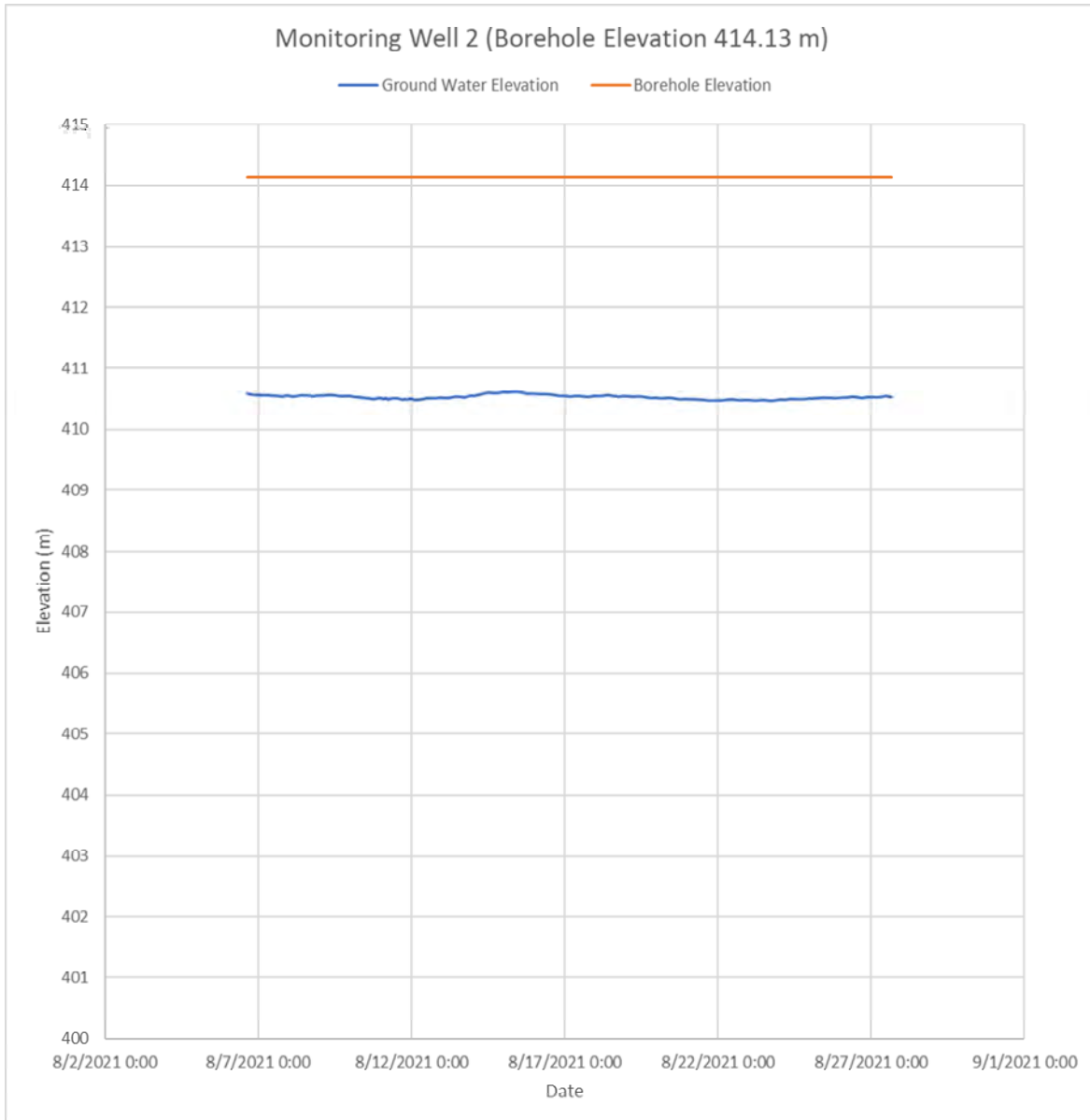
A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to be in areas noting to consist of stone-poor sandy silt to silty sand-textured till, ice-contact stratified deposits of sand and gravel, with minor silt and clay, as well as river deposits of coarse gravel. These conditions are consistent with the observations during drilling.

Groundwater Observations

Borehole No. 2 was noted to have 'caved' to a depth of approximately 3.8 metres and 'wet' at a depth of approximately 3.6 metres, while Borehole No. 4 was noted to be open and 'wet' at a depth of 7.0 metres upon completion. Borehole Nos. 3 was noted to have cave to a depth of 2.7 metres, and dry upon completion. Borehole No. 1 was noted as being open and 'dry' [i.e. no free groundwater present] upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes.

As noted above, a monitoring well was installed at Borehole Nos. 1, 2, and 4, to allow for future measurements of the static groundwater level. Furthermore, it is noted that an additional monitoring well was installed on the abutting parcel of land to the east, the work of which was completed in concert with the fieldwork on the Clayton Lands. A data logger was installed in Borehole Nos. 1 and 2 to allow for continuous monitoring of the groundwater level between August 6 and August 27, 2021, the readings of which have been illustrated in the following graphs:





In addition to this, manual monitoring well readings were also taken from all of the installed monitoring well locations across the site on August 6 and August 27, 2021 and have been summarized in the following chart:

TABLE B
SUMMARY OF GROUNDWATER LEVELS

Monitoring Well	Ground Surface Elevation [m]	August 6, 2021		August 27, 2021	
		Groundwater Depth [m]	Groundwater Elevation [m]	Groundwater Depth [m]	Groundwater Elevation [m]
MW1	408.60	4.78	403.82	4.71	403.89
MW2	414.13	3.58	410.55	3.61	410.52
MW4	414.87	6.78	408.09	6.96	407.91

The groundwater levels observed at these monitoring well locations, as well as the monitoring well installed at the adjacent property [summarised in our geotechnical report SM 301951A-G under a separate cover] indicate a stabilized groundwater level on the order of approximately 2 to 7 metres below the existing grade, at an elevation of roughly 403.8 to 410.5 metres, varying with the physical topography. This data is based on the groundwater data collected from Borehole Nos. 1, 2, and 4, as well as the monitoring well installed on the Gibson Farm land to the east. It is noted that the groundwater level would be expected to fluctuate seasonally. It is also noted that the observed groundwater levels may be influenced by more localised shallower 'perched' deposits in more permeable seams within the sandy silt/clayey silt. Further long-term monitoring may allow for a more accurate estimate of the static groundwater level, including more data during the 'wet' and 'dry' seasons.

As noted above, SOIL-MAT ENGINEERS was also provided a sub-watershed study by Aquafor Beech, which included a number of monitoring wells to the east to monitor the groundwater elevations. The conditions and groundwater levels described in this geotechnical report are consistent with those encountered during our fieldwork as described above.

General Soil Conditions

As noted above the subsurface conditions are generally characterized as sandy silt/clayey silt deposit in the upper levels, underlain by a permeably cohesionless sand deposit. The grain size analyses indicate the sandy silt/clayey silt soils to have 10 to 20 percent clay content, lending a slightly cohesive characteristic. The sandy silt/clayey silt soils are relatively consistent in terms of its constituents but are noted to contain an increasing clay content with depth in some of the boreholes, as noted above. Where the material transitions into a sand the native soils are generally fine in gradation in the upper levels, becoming medium to coarse with depth. As demonstrated above the subsurface conditions exhibit a relatively inconsistent layered structure across the large area, but can be generally distinguished by a layer of slightly cohesive sandy silt overlying a cohesionless sand. The conditions will be best assessed during excavations on an area-by-area basis. As such it may also be prudent to advance a series of test excavations in the area of proposed deeper excavations and/or stormwater management ponds to confirm soil composition and groundwater conditions in the area of deep excavations.

4. EXCAVATIONS

Excavations for the installation of foundations and underground services are anticipated to extend to depths of up to approximately 2 to 5 metres below the existing grade. Excavations through the native sandy silt/clayey silt and sand soils, as well as any engineered fill placed as part of site grading works, should be relatively straightforward, with the sides remaining stable for short construction periods at inclinations of up to 45 degrees to the horizontal, and possibly steeper depending on moisture condition and clay content. Where wet or more permeable seams are encountered, during periods of extended precipitation, or where excavations extend below the static groundwater level, the sides of excavations should be expected to 'slough in' to as flat as 3 horizontal to 1 vertical, or flatter.

Nevertheless, all excavations must comply with the current Occupational Health and Safety Act and Regulations for Construction Projects. The native sandy silt/clayey silt and sand soils would generally be considered a Type 2 or 3 soil, depending on the moisture content and relative compact to dense condition, as outlined in the Ontario Health and Safety Act III – Excavations. Excavation slopes steeper than those required in the Safety Act must be supported and a senior geotechnical engineer from this office should monitor the work.

As noted above, the groundwater level varies between depths of approximately 2 to 7 metres below the existing grade, roughly elevation 403.8 to 410.5 metres. The majority of excavations are anticipated to be above the groundwater level. Nevertheless, some infiltration of water from more permeable seams and surface runoff into the open excavations should be anticipated. Such infiltration should be readily controlled using typical construction dewatering methods. 'Perched' deposits of water may be encountered within more permeable pockets, which may require greater initial dewatering efforts and instability in the excavations, especially during the 'wet' times of the year. Where excavations extend to greater depths, to and below the groundwater level, especially within the sand deposit, the rate of infiltration will be much greater and additional pumping or more sophisticated dewatering methods should be anticipated. In this regard, ongoing monitoring of the groundwater levels, and careful review of the design servicing elevations, is recommended. As noted above, the advancement of test excavations in the area of proposed deep services and stormwater management ponds would allow for a first hand look at how groundwater levels may affect such excavations. More water should be expected when connections are made to existing services. Surface water should be directed away from the excavations.

The base of the excavations in the native soils, above the groundwater level, encountered in the boreholes should generally remain firm and stable. Where excavations extend to greater depths, to or below the groundwater level, or where 'perched' water is encountered, some base instability should be expected, especially during 'wet' times of the year. This will be especially likely in the high silt content sandy silt/clayey silt soils. Areas of base instability may be stabilised with the placement of additional bedding or ballast stone, the use of coarser stone material, etc. The appropriate measures are best assessed based on the actual conditions at the time of construction. With a firm and stable base condition, stabilised where warranted, standard pipe bedding material as specified by the Ontario Provincial Standard Specification [OPSS] or County of Wellington should be satisfactory. The bedding should be well compacted to provide sufficient support to the pipes and components (i.e. valve chambers, manholes etc.), and to minimize settlements of the roadway above the service trenches. Special attention should be paid to compaction under the pipe haunches.

We recommend that the invert elevations of any storm sewer pipes for rear yard catch basins be located above the proposed underside of footing elevations of adjacent residential structures, or that the trench excavations should be filled with 5 MPa 'lean mix' concrete product to the proposed underside of footing level where the excavations

extend below an imaginary 10 horizontal to 7 vertical line extending outwards and down from a point 0.3 metres beyond the proposed townhouse foundations.

Any utility poles, light poles, etc. located within 3 metres of the top of an excavation slope should be braced to ensure their stability. Likewise, temporary support might be required for other existing above and below ground structures, including existing underground services, roadways, etc. depending on their proximity to the trench excavations.

5. BACKFILL CONSIDERATIONS

The excavated material will consist primarily of the sandy silt/clayey silt and sand soils encountered in the boreholes as described above. These soils are generally considered suitable for use as engineered fill, trench backfill, etc., provided that they are free of organics, construction debris, or other deleterious material, and that its moisture content can be controlled to within 3 per cent of its standard Proctor optimum moisture content.

It is noted that the sandy silt/clayey silt soils encountered are not considered to be free draining and should not be used where this characteristic is necessary. It is also noted that these fine grained granular soils will present difficulties in achieving effective compaction when they become 'wet' of optimum, and where access with compaction equipment is restricted. The sandy silt/clayey silt soils encountered are generally considered to be near to slightly 'dry' of their standard Proctor optimum moisture content, with some noted 'wet' seams. Some moisture conditioning will be required depending upon the weather conditions at the time of construction. It is noted that these silty soils will become nearly impossible to compact when wet of its optimum moisture content. Any material that becomes wet to saturated should be spread out to allow to dry, or removed and discarded, or utilised in non-settlement sensitive areas. The sand soils are generally well draining, and tend to be near optimum moisture content. At depth, approaching or below the water level, the sand soils will be expected to be saturated, requiring time to drain excess moisture or other drying efforts in order to achieve effective compaction.

We note that where backfill material is placed near or slightly above its optimum moisture content, the potential for long term settlements due to the ingress of groundwater and collapse of the fill structure is reduced. Correspondingly, the shear strength of the 'wet' backfill material is also lowered, thereby reducing its ability to support construction traffic and therefore impacting roadway construction. If the soil is

well dry of its optimum value, it will appear to be very strong when compacted, but will tend to settle with time as the moisture content in the fill increases to equilibrium condition. The fine grained to cohesive soils encountered may require high compaction energy to achieve acceptable densities if the moisture content is not close to its standard Proctor optimum value. It is therefore very important that the moisture content of the backfill soils be within 3 per cent of its standard Proctor optimum moisture content during placement and compaction to minimise long term subsidence [settlement] of the fill mass. Any imported fill required in service trenches or to raise the subgrade elevation should have its moisture content within 3 per cent of its optimum moisture content and meet the necessary environmental guidelines.

A representative of SOIL-MAT should be present on-site during the backfilling and compaction operations to confirm the uniform compaction of the backfill material to project specification requirements. Close supervision is prudent in areas that are not readily accessible to compaction equipment, for instance near the end of compaction 'runs'. Backfill within service trenches, areas to be paved, etc., should be placed in loose lifts not exceeding 300 millimetres in thickness and compacted to a minimum of 95 per cent of its standard Proctor maximum dry density [SPMDD], and to 100 per cent of its SPMDD in the upper 1 metre below the design subgrade level. All structural fill should be compacted to 100 per cent of its SPMDD. The appropriate compaction equipment should be employed based on soil type, i.e. pad-toe for cohesive soils and smooth drum/vibratory plate for granular soils. A method should be developed to assess compaction efficiency employing the on-site compaction equipment and backfill materials during construction.

6. MANHOLES, CATCH BASINS AND THRUST BLOCKS

Properly prepared bearing surfaces for manholes, valve chambers, etc. in the native competent soils, stabilised where required, will be practically non-yielding under the anticipated loads. Proper preparation of the founding soils will tend to accentuate the protrusion of these structures above the pavement surface if compaction of the fill around these structures is not adequate, causing settlement of the surrounding paved surfaces. Conversely, the pavement surfaces may rise above the valve chambers and around manholes under frost action. To alleviate the potential for these types of differential movements, free-draining, non-frost susceptible material should be employed as backfill around the structures located within the paved roadway limits, and compacted to 100 per cent of its standard Proctor maximum dry density. A geofabric separator

should be provided between the free draining material and the on-site silt soils to prevent the intrusion of fines.

The thrust blocks in the native soils or engineered fill may be conservatively sized as recommended by the applicable Ontario Provincial Standard Specification conservatively using a horizontal allowable bearing pressure of up to 150 kPa [$\sim$ 2,000 psf]. Any backfill required behind the blocks should be a well-graded granular product and should be compacted to 100 per cent of its standard Proctor maximum dry density.

7. PAVEMENT STRUCTURE DESIGN CONSIDERATIONS

All areas to be paved must be cleared of all organic and otherwise unsuitable materials, and the exposed subgrade proof rolled with 3 to 4 passes of a loaded tandem-axle truck in the presence of a representative of SOIL-MAT ENGINEERS & CONSULTANTS LTD., immediately prior to the placement of the sub-base material. Any areas of distress revealed by this or other means should be subexcavated and replaced with suitable backfill material. Where the subgrade condition is poorer it may be necessary to implement more aggressive stabilisation methods, such as the use of coarse aggregate [50-millimetre clear stone, 'rip rap', etc.] 'punched' into the soft areas.

Good drainage provisions will optimise the long-term performance of the pavement structure. The subgrade must be properly crowned and shaped to promote drainage to the subdrain system. Subdrains should be installed to intercept excess subsurface water and to prevent softening of the subgrade material. Surface water should not be allowed to pond adjacent to the outer limits of the paved areas.

The most severe loading conditions on the subgrade typically occur during the course of construction, therefore precautionary measures may have to be taken to ensure that the subgrade is not unduly disturbed by construction traffic. SOIL-MAT should be given the opportunity to review the final pavement structure design and subdrain scheme prior to construction to ensure that they are consistent with the recommendations of this report.

If construction is conducted under adverse weather conditions, additional subgrade preparation may be required. During wet weather conditions, such as during the fall and spring months, it should be anticipated that additional subgrade preparation will be required, such as additional depth of Ontario Provincial Standard Specification [OPSS] Granular 'B', Type II (crushed limestone bedrock) sub-base material. It is also important

that the sub-base and base granular layers of the pavement structure be placed as soon as possible after exposure, preparation and approval of the subgrade level.

The roadways through the residential subdivision would be required to adequately support cars, trucks and intermittent delivery and garbage trucks. A typical generic pavement structure would consist of 350 millimetres of OPSS Granular 'B', Type II (crushed bedrock) sub-base course, 150 millimetres of OPSS Granular 'A' base course, 60 millimetres of HL8 or HL4 binder course asphaltic concrete, and 40 millimetres of HL3 surface course asphaltic concrete. Where a pit run, Granular B Type I, aggregate is utilised in the granular base, it should be increased to a minimum thickness of 450 millimetres. It is our opinion that this design is suitable for use on a residential roadway section, provided that the subgrade has been prepared as specified and is good and firm before the sub-base course material is placed. Notwithstanding, the pavement structure should conform to the relevant County of Wellington requirements where they are to be assumed by the County. If the subgrade is soft, remedial measures as discussed above may have to be implemented and/or the sub-base thickness may have to be increased. The granular sub-base and base courses and asphaltic concrete layers should be compacted to OPSS or County of Wellington requirements. A program of in-place density testing must be carried out to monitor that compaction requirements are being met. We note that this pavement structure is not to be considered as a construction roadway design.

To minimise segregation of the finished asphalt mat, the asphalt temperature must be maintained uniform throughout the mat during placement and compaction. All too often, significant temperature gradients exist in the delivered and placed asphalt with the cooler portions of the mat resisting compaction and presenting a honeycomb surface. As the spreader moves forward, a responsible member of the paving crew should monitor the pavement surface, to ensure a smooth uniform surface. The contractor can mitigate the surface segregation by 'back-casting' or scattering shovels of the full mix material over the segregated areas and raking out the coarse particles during compaction operations. Of course, the above assumes that the asphalt mix is sufficiently hot to allow the 'back-casting' to be performed.

Asphalt paving of driveways should be consistent with the general recommendations provided above. Proper preparation of the subgrade soils is essential to good long-term performance of the pavement. Likewise, sufficient depth and compaction of granular base materials and adequate drainage will be important in achieving good long-term performance, i.e. preventing/limiting premature cracking, subgrade failure, rutting, etc. A typical recommended light duty pavement structure for residential driveways would

consist of a minimum of 200 millimetres of OPSS Granular 'A' base course, compacted to 100 percent standard Proctor maximum dry density, followed by a minimum of 50 millimetres of HL3 or HL3F asphaltic concrete, compacted to a minimum of 92 per cent of their Marshall maximum relative density [MRD].

8. HOUSE AND TOWNHOUSE CONSTRUCTION

The native soils encountered at the borehole locations are considered capable of supporting the loads associated with typical residential dwelling and townhouse structures on conventional spread footings, below any fill, organic, or otherwise unsuitable materials. Bearing pressures of up to 150 kPa [~3,000 psf] SLS and 225 kPa [~4,500 psf] ULS may be considered in the competent native soils. In areas where 'wet' seams are present, or the native soils present in less compact condition, reduced bearing values of 100 kPa [~2,000 psf] SLS and 150 kPa [~3,000 psf] are recommended. The founding surfaces must be hand cleaned of any loose or disturbed material, along with any ponded water, immediately prior to placement of foundation concrete.

In the event that site grading works result in engineered fill below founding elevations, the general recommendations presented in the Backfill Considerations above should be strictly adhered to, with compaction to 100 percent standard Proctor maximum dry density, verified by monitoring and testing by a representative of SOIL-MAT ENGINEERS present on a full time basis. If there is a short fall in the volume of fill required, then the source of imported fill should be reviewed for gradation, Proctor value, compatibility with existing fill, environmental characteristics and be approved by this office prior to use. The design bearing capacity for footings within the engineered fill should be limited to 100 kPa [~2,000 psf] SLS and 150 kPa [~3,000 psf] ULS.

The support conditions afforded by the native soils and/or engineered fill are generally not uniform across the building footprint, nor are the loads on the various foundation elements. As such it is recommended that consideration be given to the provision of nominal reinforcement in the footings and foundation walls to account for variable support and loading conditions. The use of nominal reinforcement is considered good construction practice as it will act to reduce the potential for cracking in the foundation walls due to minor settlements, heaving, shrinkage, etc. and will assist in resisting the pressures generated against the foundation walls by the backfill. Such nominal reinforcement is an economical approach to the reduction and prevention of costly foundation repairs after completion and later in the life of the buildings. This

reinforcement would typically consist of two continuous 15M steel bars placed in the footings [directly below the foundation wall], and similarly two steel bars placed approximately 300 millimeters from the top of the foundation walls at a minimum, depending on ground conditions exposed during construction. These reinforcement bars would be bent to reinforce all corners and under basement windows, and be provided with sufficient overlap at staggered splice locations. At 'steps' in the foundations and at window locations, the reinforcing steel should transition diagonally, rather than at 90 degrees, to maintain the continuous tensile capacity of the reinforcement. Where footings are founded on, or partially on, engineered fill the above provision for nominal reinforcement would be required.

All basement foundation walls should be suitably damp proofed, including the provision of a 'dimple board' type drainage product, and provided with a perimeter drainage tile system outlet to a gravity sewer connection or positive sump pit a minimum of 150 millimetres below the basement floor slab. The clear stone material surrounding the weeping tile should be encased with a geotextile material to prevent the migration of fines from the foundation wall backfill into the clear stone product. In the event that sump pit systems are required we would recommend that the sump pump system should be constructed with an 'oversized' reservoir and a 'back-flow' prevention valve so that the sump pump will not cycle repeatedly within short time periods.

All footings exposed to the environment must be provided with a minimum of 1.2 meters of earth or equivalent insulation to protect against frost penetration. This frost protection would also be required if construction were undertaken during the winter months. All footings must be proportioned to satisfy the requirements of the Ontario Provincial Building Code.

It is imperative that a soils engineer be retained from this office to provide geotechnical engineering services during the excavation and foundation construction phases of the project. This is to observe compliance with the design concepts and recommendations outlined in this report, and to allow changes to be made in the event that subsurface conditions differ from the conditions identified at the borehole locations.

9. PRELIMINARY HYDROGEOLOGICAL CONSIDERATIONS

As noted above, it is understood that the development will consist of single family dwellings and townhouse blocks, including the installation of associated underground municipal services along asphalt paved roadways. Excavations for the proposed development services are expected to extend to depths of up to approximately 2 to 5 metres below the existing ground surface, while excavations for foundations would be expected to extend up to approximately 2 metres. Measurements of the groundwater level at the monitoring well locations indicate a groundwater level on the order of approximately 2 to 7 metres below the existing ground surface, however further groundwater monitoring may be conducted to more accurately assess the static groundwater level.

The short term excavations for the proposed servicing are generally anticipated to extend into the sandy silt/clayey silt and sand soils to depths above the static groundwater level. Depths of excavations should be confirmed via a preliminary site servicing and grading plan, which should be forwarded onto our office for further review and comments. Such excavations would be expected to be subject to relatively minor groundwater infiltration, such that it should be possible to adequately control such infiltration using conventional construction dewatering techniques such as pumping from sumps in the base of the excavation. During wet times of year, some instability of the excavations may be experienced. The rate of dewatering would be expected to be below 50,000 L/day, and certainly below 400,000 L/day, such that an EASR or PTTW should not be required. Where deeper excavations are identified to be required, extending below the static groundwater level, the need for temporary dewatering controls during construction should be more closely evaluated. Depending on the proposed depths of excavations for the proposed footings and site services, the rate of dewatering could approach or be greater than 50,000 L/day, potentially requiring an EASR. As such, once available, the site servicing and grading plans detailing depths of construction should be forwarded onto our office for further review and comments.

The generally permeable condition of the native sand deposit present over the site will generally allow for natural drainage and movement of groundwater. As such, it is not considered likely that service trenches would present any conflict or impact to the natural groundwater conditions. As such, the provision of clay 'cut-offs' within trench backfill is not expected to be required.

Excavations for the proposed basement levels should be well above the groundwater level, and so would not be expected to require significant ongoing groundwater control,

other than typical perimeter weeping tile and sump pump as noted above. This should be confirmed once our office has had a chance to review the site servicing and grading plans.

The final grading of the site should appropriately consider the groundwater levels in order to minimise or avoid conflict or impact to the groundwater during and post construction. In this regard the grading and storm water management plan should accommodate surface runoff that follows the existing overall drainage patterns as much as possible.

It is also noted that the use of Low Impact Design [LID] methods as part of the stormwater management for the proposed development would be viable for much of the site and should be considered. The permeable sand deposit, above the groundwater level, would afford an opportunity for natural infiltration of surface runoff, such as in 'dry' ponds, infiltration galleries, etc.

Based on our observations and details of the proposed development, it is not anticipated that the proposed construction will have an adverse impact on the groundwater condition in the area, and further detailed hydrogeological assessment is not considered warranted at this time. As the detailed design of the proposed development proceeds, this office should be consulted to review the hydrogeological conditions and assess the potential for concern, or need for additional study.

10. GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.



Scott Wylie, B.Eng., EIT.



Ian Shaw, P. Eng.
Senior Engineer



Enclosures: Drawing No. 1, Borehole Location Plan
 Log of Borehole Nos. 1 to 4, inclusive
 Grain Size Analyses
 Drawing No. 2, Recommended Design Requirements for Basement Construction

Distribution: Cachet Developments [pdf]



Image © 2021 GNS / Airbus

LEGEND

-  Borehole Location
BH#
-  Monitoring Well Location
MW#

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301951B-G.
2. Borehole locations are approximate.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Residential
Development
75 Woolwich Street East
Elora, Ontario

Borehole Location Plan

Project No. SM 301591B-G

Date: October 2021

Drawn: SW | Checked: KR

SM 301591B-G Borehole Location Plan

Drawing No. 1

E: 545149

Sheet: 1 of 1

Log of Borehole No. 2

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838180

E: 545422

Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w%			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm			
												10	20	30	40
ft	m														
0	414.13		Ground Surface												
1	413.90		Topsoil Approximately 250 millimetres of topsoil.	SS	1	4 5 7 8	12								
2			Sandy Silt Brown, trace clay, trace gravel, reworked in upper levels, loose to compact.	SS	2	2 3 6 5	9								
3	413.20		Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, loose to compact.	SS	3	3 9 12 14	21								
4				SS	4	7 8 11 10	19								
5				SS	5	6 9 11 17	20								
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9															
10															
11															
12															
13															
14															
15															
16															
17	408.90			SS	6	7 5 4 9	9								
18			End of Borehole												
19			NOTES:												
20			1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 5.2 metres.												
21			2. Borehole was recorded as caved to a depth of 3.8 metres and 'wet' at a depth of 3.6 metres upon completion and backfilled as per Ontario Regulation 903.												
22			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
23			4. A monitoring well was installed. The following free groundwater level readings have been measured:												
24			August 6, 2021 - 3.58 metres below ground surface.												
25			August 27, 2021 - 3.61 metres below ground surface.												
26															
27															
28															
29															

Drill Method: Hollow Stem Augers

Drill Date: August 6, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 3

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4837942

E: 545194

Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲ 10 20 30 40 ▲																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm ● 20 40 60 80 ●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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Drill Method: Solid Stem Augers

Drill Date: August 6, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

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Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 4

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838174

E: 545084

Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲ 10 20 30 40 ▲						
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm ● 20 40 60 80 ●						
0	414.87		Ground Surface															
1	414.60		Topsoil Approximately 250 millimetres of topsoil.	SS	1	5 5 6 7	11											
2			Sand Brown, reworked in upper levels, trace clay, silt, and gravel, fine to medium gradation, compact.	SS	2	8 9 9 7	18											
3				SS	3	2 5 8 7	13											
4				SS	4	6 11 16 13	27											
5				SS	5	10 12 11 13	23											
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18																		
19																		
20	408.80		Wet spoon															
21				SS	7	9 9 8 6	17											
22																		
23																		
24	407.30		End of Borehole															
25			NOTES:															
26			1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 7.6 metres.															
27			2. Borehole was recorded as open and 'wet' at depth of 7.0 metres upon completion and backfilled as per Ontario Regulation 903.															
28			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.															
29			4. A monitoring well was installed. The following free groundwater level readings have been measured:															
30			August 6, 2021 - 6.78 metres below ground surface.															
31			August 27, 2021 - 6.96 metres below ground surface.															

Drill Method: Hollow Stem Augers

Drill Date: August 6, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

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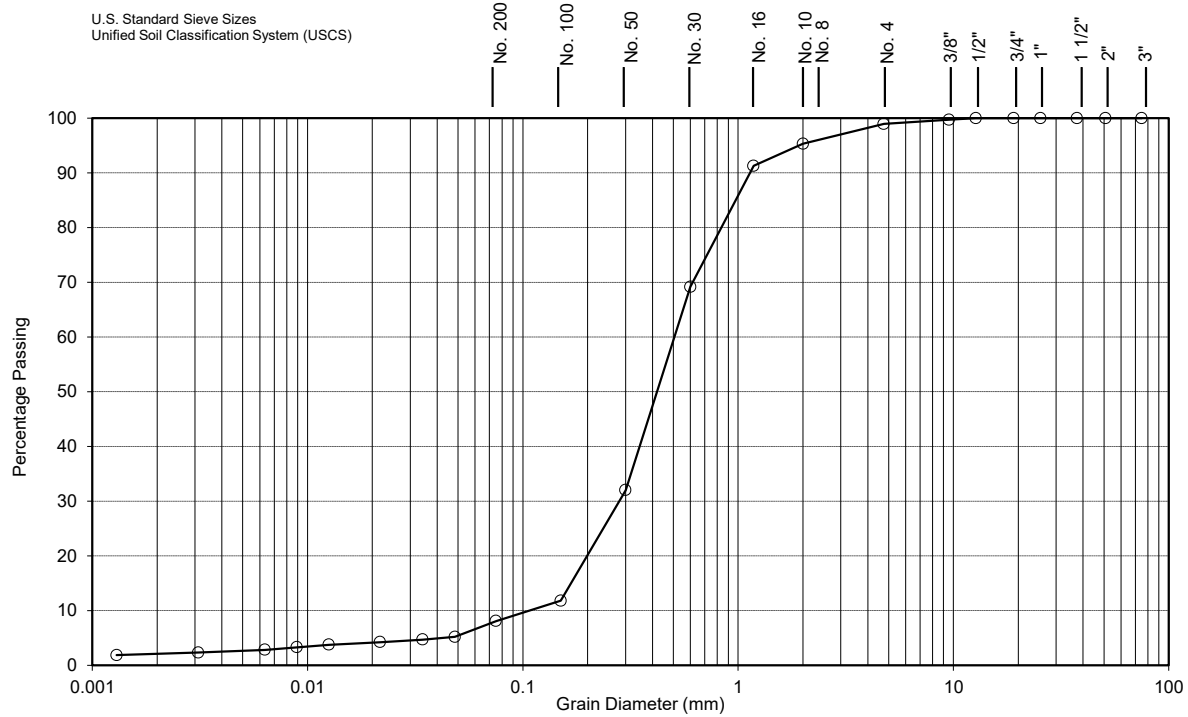
Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

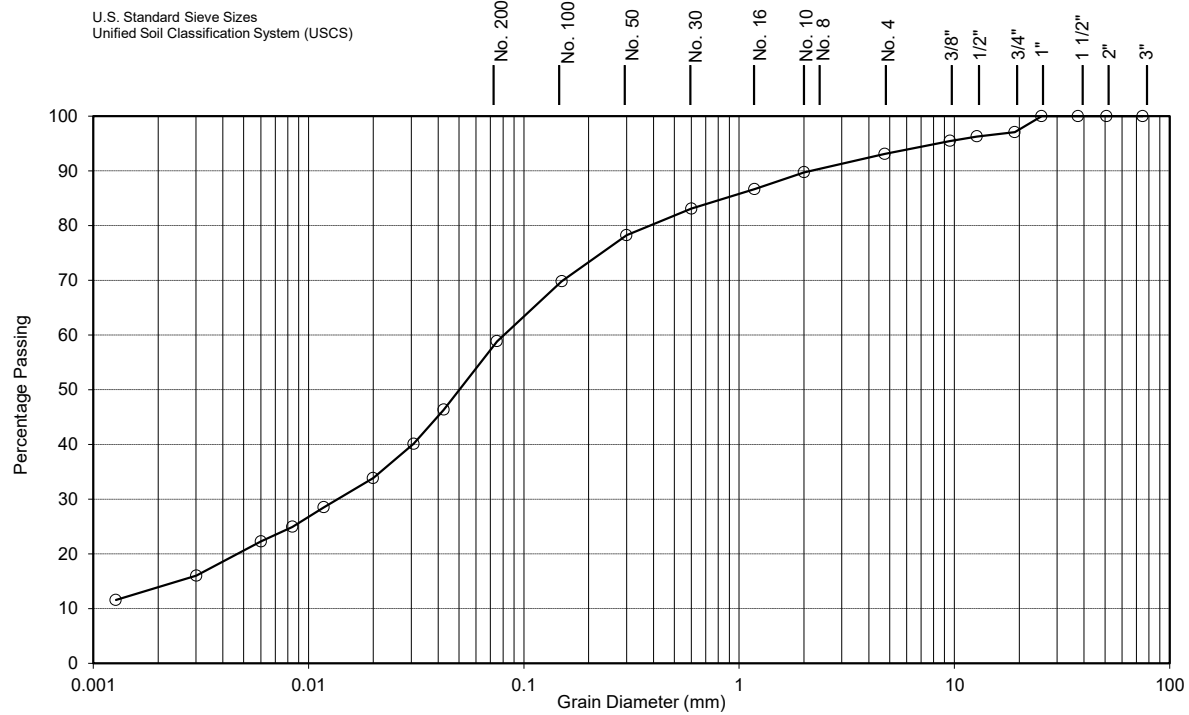
Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

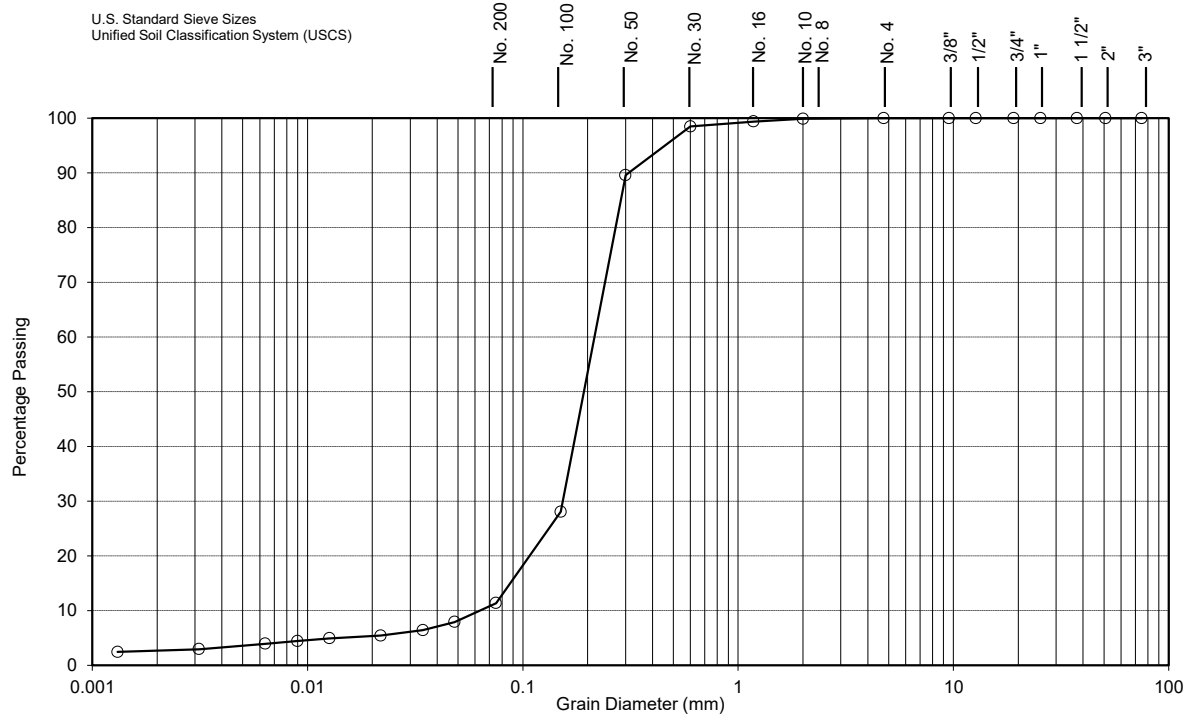
Lab No.:	21-339	Notes: Depth: 15'			
Sample No.:	6				
Borehole No.:	2				
CLAY [%]:	2	Soil Description: Brown Sand w/ traces of Silt, Clay and Gravel S.P. - Poorly graded sands, little or no fines			
SILT [%]:	6				
SAND [%]:	91				
GRAVEL [%]:	1				
D ₁₀ (Effective Diam. in mm):	0.10	Estimated Infiltration Rate [mm/hr] :	150 to 300	Estimated Permeability, k [cm/s]	10 ⁻²
		Coefficient of Uniformity C _U :	5.1	Coefficient of Curvature C _C :	1.5
SOIL-MAT ENGINEERS & CONSULTANTS LTD.					
75 Woolwich Street East, Elora ON					
August 2021		Grain Size Analysis No. 1		Project No.: SM 301951-T	

Mechanical & Hydrometer Analyses



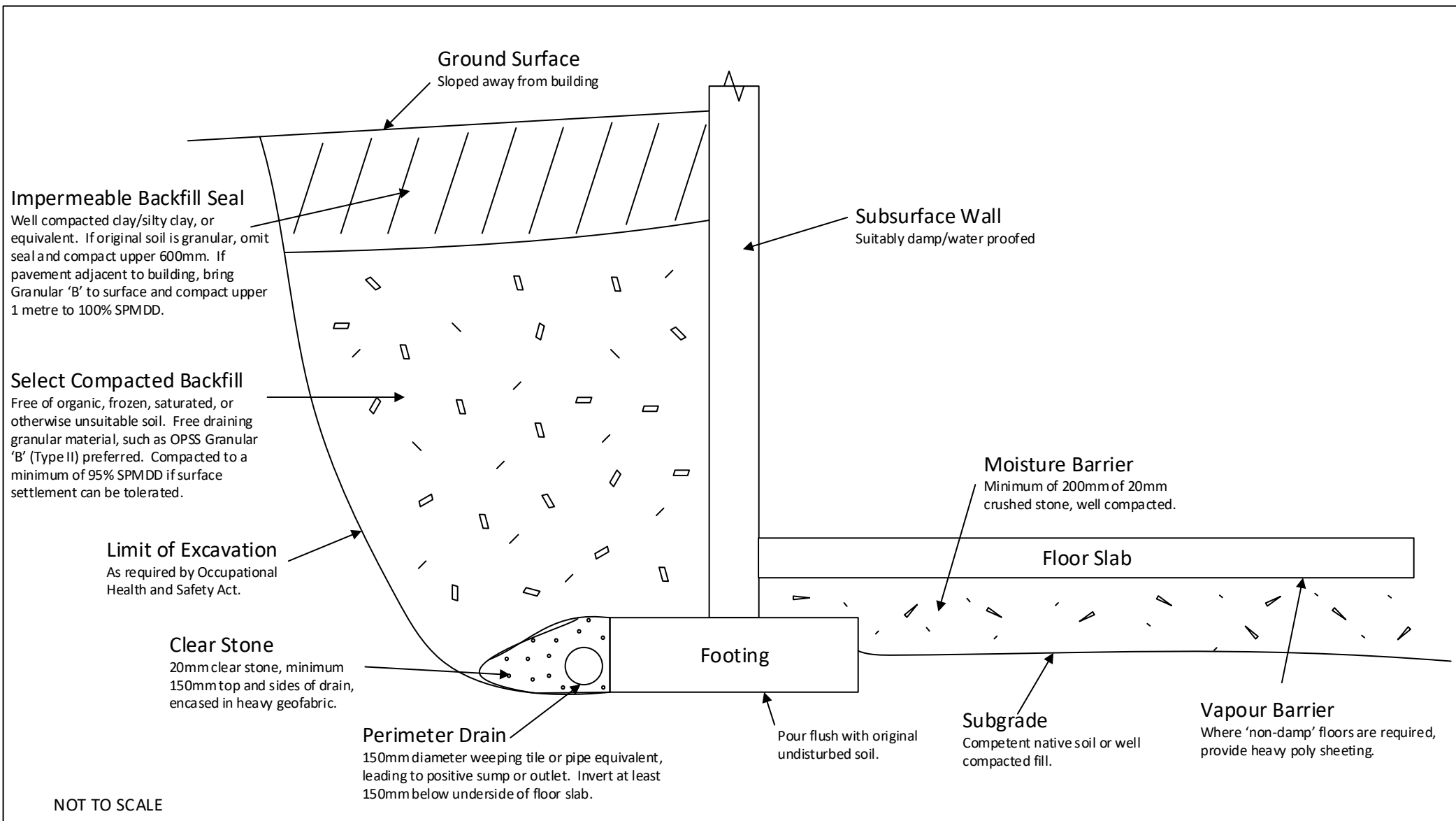
Lab No.:	21-338	Notes: Depth: 5'			
Sample No.:	3				
Borehole No.:	3				
CLAY [%]:	14	Soil Description: Brown Sandy Silt w/ some Clay and trace Gravel M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity			
SILT [%]:	45				
SAND [%]:	34				
GRAVEL [%]:	7				
D ₁₀ (Effective Diam. in mm):	0.00100	Estimated Infiltration Rate [mm/hr] :	< 10	Estimated Permeability, k [cm/s]	10 ⁻⁶
		Coefficient of Uniformity C _U :	80.0	Coefficient of Curvature C _C :	2.1
SOIL-MAT ENGINEERS & CONSULTANTS LTD.					
75 Woolwich Street East, Elora ON					
August 2021		Grain Size Analysis No. 2		Project No.: SM 301951-T	

Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.:	21-337	Notes: Depth: 7.5'				
Sample No.:	4					
Borehole No.:	4					
CLAY [%]:	2	Soil Description: Brown Sand w/ traces of Silt and Clay S.P. - Poorly graded sands, little or no fines				
SILT [%]:	9					
SAND [%]:	89	Estimated Infiltration Rate [mm/hr] : 100 to 150				
GRAVEL [%]:	0					
D ₁₀ (Effective Diam. in mm):	0.0600	Coefficient of Uniformity C _U :		Estimated Permeability, k [cm/s] 10⁻³ to 10⁻²		
		Coefficient of Curvature C _C :		1.9		
SOIL-MAT ENGINEERS & CONSULTANTS LTD.						
75 Woolwich Street East, Elora ON						
August 2021		Grain Size Analysis No. 3		Project No.: SM 301951-T		



Soil-Mat Engineers & Consultants Ltd.

Typical Design Requirements Drainage and Backfill for Basement Walls

Project No.: SM 301951-G

Date: September 2021

Drawing No. 2

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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PROJECT No.: SM 301951A-G

October 14, 2021

CACHET DEVELOPMENTS
361 CONNIE CRESCENT, SUITE 200
Concord, Ontario
L4K 5R2

Attention: Marcus Gagliardi
Development Planner

**PRELIMINARY GEOTECHNICAL AND HYDROGEOLOGICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
7581 SIDEROAD 15
ELORA, ONTARIO**

Dear Mr. Gagliardi,

Further to your authorisation and subsequent discussions with Mr. Michael DeBiasio, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has completed the fieldwork, laboratory testing, and report preparation in connection with the above noted project. The scope of work was completed in general accordance with our proposal P301951, dated July 1, 2021, later revised and confirmed through email communication on August 3, 2021. This report should be read in conjunction with the formal report for the Clayton Lands to the west SM 301951B-G, dated October 5, 2021. Our comments and recommendations based on our findings at the seven [7] borehole locations are presented in the following paragraphs.

1. INTRODUCTION

We understand that the project will involve the construction of a residential development consisting of single-family dwellings and townhouses along asphalt paved roadways, including the installation of associated underground municipal services, located at 7581 Sideroad 15 [Gibson Farms] in Elora, Ontario. The purpose of this preliminary geotechnical investigation work was to assess the subsurface soil and groundwater conditions, and to provide our comments and recommendations with respect to the design and construction of the proposed development, from a geotechnical point of view.

SOIL-MAT ENGINEERS was provided with a sub-watershed study that encompasses the surrounding area – including the subject site – prepared by Aquafor Beech Limited, dated February 2008. The results of this investigation have been considered in preparation of this geotechnical report.

This report is based on the above summarised project description, and on the assumption that the design and construction will be performed in accordance with applicable codes and standards. Any significant deviations from the proposed project design may void the recommendations given in this report. If significant changes are made to the proposed design, this office must be consulted to review the new design with respect to the results of this investigation. It is noted that SOIL-MAT ENGINEERS has also conducted Phase One and Two Environmental Site Assessments (ESAs) for the subject site, which have been reported under a separate cover.

2. PROCEDURE

A total of seven [7] sampled boreholes were advanced at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment on August 5 and 6, 2021 under the direction and supervision of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD., to termination at depths of between approximately 2.1 and 5.2 metres below the existing ground surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings. Selected samples were also subjected to laboratory grain size analyses.

Upon completion of drilling, a groundwater monitoring well was installed at Borehole No. 4 to allow for the future monitoring of the groundwater level. The monitoring well consisted of 50-millimetre PVC pipe screened in the lower 1.5 metres. The monitoring well was encased in well filter sand up to approximately 0.3 metres above the screened portion, then with bentonite 'hole plug' to the surface and fitted with a protective steel 'stick up' casing. The remaining boreholes were backfilled in general accordance with

Ontario Regulation 903, and the ground surface was reinstated even with the surrounding grade.

The boreholes were located in the field by representatives of SOIL-MAT ENGINEERS, based on accessibility over the site, clearance of underground utilities, and the drawing that was forwarded to our office. Best efforts were made to minimize crop damage by locating the majority of the boreholes to the perimeter of the fields. The ground surface elevation at the borehole locations has been referenced to a geodetic benchmark, described as North American 1983 CSRS, as per the survey plan completed by POI Aerial, dated August 10, 2021, which was provided to our office.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Borehole Nos. 1 to 7, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed at the exact depths of geological change.

3. SITE DESCRIPTION AND SUBSURFACE CONDITIONS

The subject site is currently an undeveloped agricultural property located at 7581 Sideroad 15 in Elora, Ontario. There is a single-family dwelling and an existing barn structure near the middle of the site, setback approximately 200 metres from Sideroad 15. The parcel is bordered to the south by an existing agricultural field, to the east by Gerrie Road, to the north by Sideroad 15, and to the west by Irvine Street, assuming a north-south orientation of Irvine Street. The field is bisected by a tributary of the Irvine Creek – a ditch-like drainage feature – at the north eastern portion of the site. West of the tributary, the two parcels generally slope down to the north, with a relief of approximately 6 metres, as measured across the boreholes. The grade is relatively flat and even with Gerrie Road on the east side of the tributary descending towards the creek with an approximate relief of 15 metres measured across the boreholes.

The subsurface conditions encountered at the borehole locations are summarised as follows:

Topsoil

A surficial veneer of topsoil approximately 150 to 250 millimetres in thickness was encountered at all borehole locations. It is noted that the depth of topsoil may vary across the site and from the depths encountered at the borehole locations. It is also noted that the term 'topsoil' has been used from a geotechnical point of view, and does not necessarily reflect its nutrient content or ability to support plant life. Given the property has been historically used for agricultural purposes the upper levels of the soils would be expected to have a reworked nature resulting in more variable depths of topsoil over the site. As such, it is recommended that a conservative approach be taken when estimating topsoil quantities across the site for stripping, i.e. account for slightly greater stripping depth than those specifically noted at the borehole locations.

Sandy Silt/Clayey Silt

Native sandy silt/clayey silt was encountered beneath the topsoil in the majority of the boreholes, and beneath a sand deposit in Borehole Nos. 3 and 6. The fine-grained granular to slightly cohesive soils were brown in colour, transitioning to grey below about 2.5 metres in Borehole No. 2, with trace to some clay and gravel, with a notable increasing clay content with depth in some of the boreholes. The native sandy silt/clayey silt soils were generally noted to have a reworked or weathered appearance in the upper levels, and were generally noted to have a loose to compact state. The sandy silt/clayey silt deposit was present to depths of approximately 1.1 to 1.9 metres in Borehole Nos. 1 and 4, and was proven to termination at depths of approximately 2.1 to 3.7 metres below the existing ground surface in Borehole Nos. 2, 3, 5, 6, and 7.

Sand

A native sand deposit was encountered beneath the topsoil in Borehole Nos. 3 and 6, and beneath the sandy silt/clayey silt layer in Borehole Nos. 1 and 4. The fine to medium grained soils were brown in colour, with a noted to transition to grey at a depth of approximately 4.8 metres in Borehole No. 4, contained trace amounts of clay, silt, and gravel, and was generally in a compact to dense state. The native sand soils were proven to a depth of approximately 1.5 and 1.8 metres within Borehole Nos. 3 and 6, and proven to termination at depths of between approximately 3.6 and 5.2 metres below the existing ground surface in Borehole Nos. 1 and 4.

Grain Size Analyses

Grain size analyses were conducted on three [3] selected samples of the native soils recovered from the boreholes. The results of this grain size testing can be found appended to the end of this report, and are summarized as follows:

TABLE A
GRAIN SIZE ANALYSES

Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Hydraulic Conductivity, k [cm/s]	Estimated Infiltration Rate, [mm/hr]
BH3 SS3	1.5 m	22	44	28	6	10^{-7}	<10
BH4 SS5	3.0 m	2	7	80	11	10^{-2}	150 to 300
BH6 SS5	3.0 m	11	44	36	9	10^{-6}	10 to 15

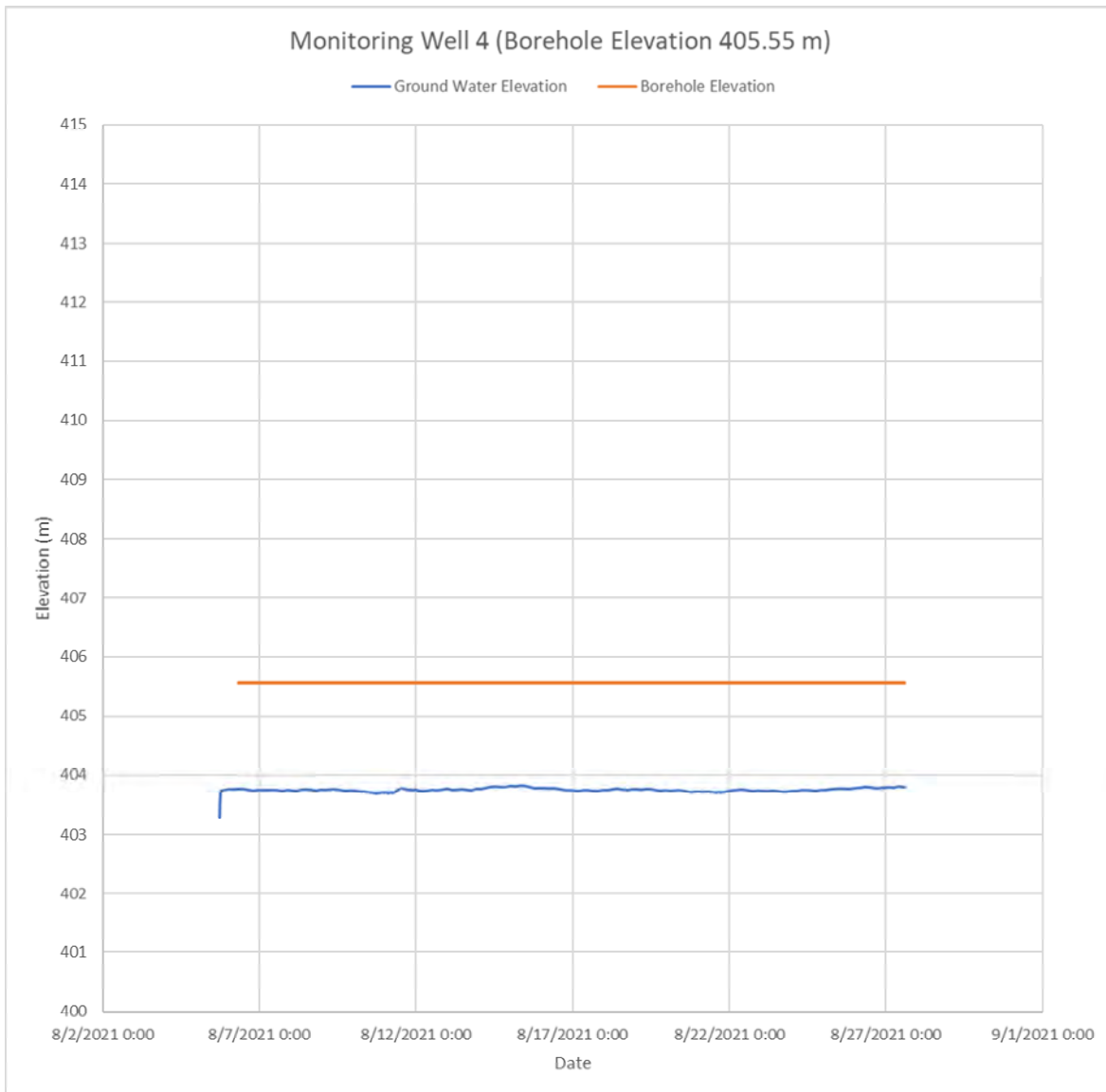
The field and laboratory testing demonstrate the native soils to generally consist of a sandy silt/clayey silt with some clay and traces of gravel in the upper levels, transitioning to a highly permeable sand with traces of clay, silt, and gravel at depth. According to the Unified Soil Classification System (USCS), the soils are classified as M.L. – inorganic silts and very fine sands, clayey silts with slight plasticity in the upper levels overlying S.P. – poorly graded sands, with little to no fines at depth. The sandy silt/clayey silt in the upper levels would generally behave as a low permeable material, but would not be considered as an impermeable material, and would be highly frost susceptible. The underlying sand deposit is highly permeable, relatively free draining.

A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to be in areas noting to consist of stone-poor sandy silt to silty sand-textured till, ice-contact stratified deposits of sand and gravel, with minor silt and clay, as well as river deposits of coarse gravel. These conditions are consistent with the observations during drilling.

Groundwater Observations

Borehole No. 6 was noted to have 'caved' to a depth of approximately 2.4 metres and 'wet' at a depth of approximately 2.0 metres, while Borehole No. 4 was noted to be open and 'wet' at a depth of 2.7 metres upon completion. Borehole Nos. 1 was noted to have cave to a depth of 1.5 metres, and dry upon completion. The remainder of the boreholes were noted as being open and 'dry' [i.e. no free groundwater present] upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes.

As noted above, a monitoring well was installed at Borehole No. 4, to allow for future measurements of the static groundwater level. Furthermore, it is noted that 3 additional monitoring wells were installed on the abutting parcel of land to the west, the work of which was completed in concert with the fieldwork on the Gibson Farm lands. A data logger was installed in Borehole No. 4 to allow for continuous monitoring of the groundwater level between August 6 and August 27, 2021, the readings of which have been illustrated in the following graph:



In addition to this, manual monitoring well readings were also taken from all of the installed monitoring well locations across the site on August 6 and August 27, 2021 and have been summarized in the following chart:

TABLE B
SUMMARY OF GROUNDWATER LEVELS

Monitoring Well	Ground Surface Elevation [m]	August 6, 2021		August 27, 2021	
		Groundwater Depth [m]	Groundwater Elevation [m]	Groundwater Depth [m]	Groundwater Elevation [m]
MW4	405.55	2.74	402.81	1.75	403.80

The groundwater level observed at this monitoring well location, as well as the monitoring wells installed on the adjacent property [summarised in our geotechnical report SM 301951B-G under a separate cover] indicate a groundwater level on the order of approximately 2 to 7 metres below the existing grade, at an elevation of roughly 403.8 to 410.5 metres, varying with the physical topography, and shallower closer the tributary. As noted above this estimate is based on the groundwater data collected from Borehole No. 4, as well as the monitoring wells installed on the Clayton Lands to the west. There is an evident drop in the groundwater level from southwest to northeast, generally following the topography towards the Irvine Creek Tributary. It is noted that the groundwater level would be expected to fluctuate seasonally. It is also noted that the observed groundwater levels may be influenced by more localised shallower 'perched' deposits in more permeable seams within the sandy silt/clayey silt. Further long-term monitoring may allow for a more accurate estimate of the static groundwater level, including more data during the 'wet' and 'dry' seasons.

As noted above, SOIL-MAT ENGINEERS was also provided a sub-watershed study by Aquafor Beech, which included a number of monitoring wells to the east to monitor the groundwater elevations. The conditions and groundwater levels described in this geotechnical report are consistent with those encountered during our fieldwork as described above.

General Soil Conditions

As noted above the subsurface conditions are generally characterized as sandy silt/clayey silt deposit in the upper levels, underlain by a permeably cohesionless sand deposit. The grain size analyses indicate the sandy silt/clayey silt soils to have 10 to 20 percent clay content, lending a slightly cohesive characteristic. The sandy silt/clayey silt soils are relatively consistent in terms of its constituents but are noted to contain an increasing clay content with depth in some of the boreholes, as noted above. Where the material transitions into a sand the native soils are generally fine in gradation in the upper levels, becoming medium to coarse with depth. As demonstrated above the subsurface conditions exhibit a relatively inconsistent layered structure across the large area, but can be generally distinguished by a layer of slightly cohesive sandy silt overlying a cohesionless sand. The conditions will be best assessed during excavations on an area-by-area basis. As such it may also be prudent to advance a series of test excavations in the area of proposed deeper excavations and/or stormwater management ponds to confirm soil composition and groundwater conditions in the area of deep excavations.

4. EXCAVATIONS

Excavations for the installation of foundations and underground services are anticipated to extend to depths of up to approximately 2 to 5 metres below the existing grade. Excavations through the native sandy silt/clayey silt and sand soils, as well as any engineered fill placed as part of site grading works, should be relatively straightforward, with the sides remaining stable for short construction periods at inclinations of up to 45 degrees to the horizontal, and possibly steeper depending on moisture condition and clay content. Where wet or more permeable seams are encountered, during periods of extended precipitation, or where excavations extend below the static groundwater level, the sides of excavations should be expected to 'slough in' to as flat as 3 horizontal to 1 vertical, or flatter.

Nevertheless, all excavations must comply with the current Occupational Health and Safety Act and Regulations for Construction Projects. The native sandy silt/clayey silt and sand soils would generally be considered a Type 2 or 3 soil, depending on the moisture content and relative compact to dense condition, as outlined in the Ontario Health and Safety Act III – Excavations. Excavation slopes steeper than those required in the Safety Act must be supported and a senior geotechnical engineer from this office should monitor the work.

As noted above, the groundwater level varies between depths of approximately 2 to 7 metres below the existing grade, roughly elevation 403.8 to 410.5 metres. The majority of excavations are anticipated to be above the groundwater level. Nevertheless, some infiltration of water from more permeable seams and surface runoff into the open excavations should be anticipated. Such infiltration should be readily controlled using typical construction dewatering methods. 'Perched' deposits of water may be encountered within more permeable pockets, which may require greater initial dewatering efforts and instability in the excavations, especially during the 'wet' times of the year. Where excavations extend to greater depths, to and below the groundwater level, especially within the sand deposit, the rate of infiltration will be much greater and additional pumping or more sophisticated dewatering methods should be anticipated. In this regard, ongoing monitoring of the groundwater levels, and careful review of the design servicing elevations, is recommended. As noted above, the advancement of test excavations in the area of proposed deep services and stormwater management ponds would allow for a first hand look at how groundwater levels may affect such excavations. More water should be expected when connections are made to existing services. Surface water should be directed away from the excavations.

The base of the excavations in the native soils, above the groundwater level, encountered in the boreholes should generally remain firm and stable. Where excavations extend to greater depths, to or below the groundwater level, or where 'perched' water is encountered, some base instability should be expected, especially during 'wet' times of the year. This will be especially likely in the high silt content sandy silt/clayey silt soils. Areas of base instability may be stabilised with the placement of additional bedding or ballast stone, the use of coarser stone material, etc. The appropriate measures are best assessed based on the actual conditions at the time of construction. With a firm and stable base condition, stabilised where warranted, standard pipe bedding material as specified by the Ontario Provincial Standard Specification [OPSS] or County of Wellington should be satisfactory. The bedding should be well compacted to provide sufficient support to the pipes and components (i.e. valve chambers, manholes etc.), and to minimize settlements of the roadway above the service trenches. Special attention should be paid to compaction under the pipe haunches.

We recommend that the invert elevations of any storm sewer pipes for rear yard catch basins be located above the proposed underside of footing elevations of adjacent residential structures, or that the trench excavations should be filled with 5 MPa 'lean mix' concrete product to the proposed underside of footing level where the excavations

extend below an imaginary 10 horizontal to 7 vertical line extending outwards and down from a point 0.3 metres beyond the proposed townhouse foundations.

Any utility poles, light poles, etc. located within 3 metres of the top of an excavation slope should be braced to ensure their stability. Likewise, temporary support might be required for other existing above and below ground structures, including existing underground services, roadways, etc. depending on their proximity to the trench excavations.

5. BACKFILL CONSIDERATIONS

The excavated material will consist primarily of the sandy silt/clayey silt and sand soils encountered in the boreholes as described above. These soils are generally considered suitable for use as engineered fill, trench backfill, etc., provided that they are free of organics, construction debris, or other deleterious material, and that its moisture content can be controlled to within 3 per cent of its standard Proctor optimum moisture content.

It is noted that the sandy silt/clayey silt soils encountered are not considered to be free draining and should not be used where this characteristic is necessary. It is also noted that these fine grained granular soils will present difficulties in achieving effective compaction when they become 'wet' of optimum, and where access with compaction equipment is restricted. The sandy silt/clayey silt soils encountered are generally considered to be near to slightly 'dry' of their standard Proctor optimum moisture content, with some noted 'wet' seams. Some moisture conditioning will be required depending upon the weather conditions at the time of construction. It is noted that these silty soils will become nearly impossible to compact when wet of its optimum moisture content. Any material that becomes wet to saturated should be spread out to allow to dry, or removed and discarded, or utilised in non-settlement sensitive areas. The sand soils are generally well draining, and tend to be near optimum moisture content. At depth, approaching or below the water level, the sand soils will be expected to be saturated, requiring time to drain excess moisture or other drying efforts in order to achieve effective compaction.

We note that where backfill material is placed near or slightly above its optimum moisture content, the potential for long term settlements due to the ingress of groundwater and collapse of the fill structure is reduced. Correspondingly, the shear strength of the 'wet' backfill material is also lowered, thereby reducing its ability to support construction traffic and therefore impacting roadway construction. If the soil is

well dry of its optimum value, it will appear to be very strong when compacted, but will tend to settle with time as the moisture content in the fill increases to equilibrium condition. The fine grained to cohesive soils encountered may require high compaction energy to achieve acceptable densities if the moisture content is not close to its standard Proctor optimum value. It is therefore very important that the moisture content of the backfill soils be within 3 per cent of its standard Proctor optimum moisture content during placement and compaction to minimise long term subsidence [settlement] of the fill mass. Any imported fill required in service trenches or to raise the subgrade elevation should have its moisture content within 3 per cent of its optimum moisture content and meet the necessary environmental guidelines.

A representative of SOIL-MAT should be present on-site during the backfilling and compaction operations to confirm the uniform compaction of the backfill material to project specification requirements. Close supervision is prudent in areas that are not readily accessible to compaction equipment, for instance near the end of compaction 'runs'. Backfill within service trenches, areas to be paved, etc., should be placed in loose lifts not exceeding 300 millimetres in thickness and compacted to a minimum of 95 per cent of its standard Proctor maximum dry density [SPMDD], and to 100 per cent of its SPMDD in the upper 1 metre below the design subgrade level. All structural fill should be compacted to 100 per cent of its SPMDD. The appropriate compaction equipment should be employed based on soil type, i.e. pad-toe for cohesive soils and smooth drum/vibratory plate for granular soils. A method should be developed to assess compaction efficiency employing the on-site compaction equipment and backfill materials during construction.

6. MANHOLES, CATCH BASINS AND THRUST BLOCKS

Properly prepared bearing surfaces for manholes, valve chambers, etc. in the native competent soils, stabilised where required, will be practically non-yielding under the anticipated loads. Proper preparation of the founding soils will tend to accentuate the protrusion of these structures above the pavement surface if compaction of the fill around these structures is not adequate, causing settlement of the surrounding paved surfaces. Conversely, the pavement surfaces may rise above the valve chambers and around manholes under frost action. To alleviate the potential for these types of differential movements, free-draining, non-frost susceptible material should be employed as backfill around the structures located within the paved roadway limits, and compacted to 100 per cent of its standard Proctor maximum dry density. A geofabric separator

should be provided between the free draining material and the on-site silt soils to prevent the intrusion of fines.

The thrust blocks in the native soils or engineered fill may be conservatively sized as recommended by the applicable Ontario Provincial Standard Specification conservatively using a horizontal allowable bearing pressure of up to 150 kPa [$\sim$ 2,000 psf]. Any backfill required behind the blocks should be a well-graded granular product and should be compacted to 100 per cent of its standard Proctor maximum dry density.

7. PAVEMENT STRUCTURE DESIGN CONSIDERATIONS

All areas to be paved must be cleared of all organic and otherwise unsuitable materials, and the exposed subgrade proof rolled with 3 to 4 passes of a loaded tandem-axle truck in the presence of a representative of SOIL-MAT ENGINEERS & CONSULTANTS LTD., immediately prior to the placement of the sub-base material. Any areas of distress revealed by this or other means should be subexcavated and replaced with suitable backfill material. Where the subgrade condition is poorer it may be necessary to implement more aggressive stabilisation methods, such as the use of coarse aggregate [50-millimetre clear stone, 'rip rap', etc.] 'punched' into the soft areas.

Good drainage provisions will optimise the long-term performance of the pavement structure. The subgrade must be properly crowned and shaped to promote drainage to the subdrain system. Subdrains should be installed to intercept excess subsurface water and to prevent softening of the subgrade material. Surface water should not be allowed to pond adjacent to the outer limits of the paved areas.

The most severe loading conditions on the subgrade typically occur during the course of construction, therefore precautionary measures may have to be taken to ensure that the subgrade is not unduly disturbed by construction traffic. SOIL-MAT should be given the opportunity to review the final pavement structure design and subdrain scheme prior to construction to ensure that they are consistent with the recommendations of this report.

If construction is conducted under adverse weather conditions, additional subgrade preparation may be required. During wet weather conditions, such as during the fall and spring months, it should be anticipated that additional subgrade preparation will be required, such as additional depth of Ontario Provincial Standard Specification [OPSS] Granular 'B', Type II (crushed limestone bedrock) sub-base material. It is also important

that the sub-base and base granular layers of the pavement structure be placed as soon as possible after exposure, preparation and approval of the subgrade level.

The roadways through the residential subdivision would be required to adequately support cars, trucks and intermittent delivery and garbage trucks. A typical generic pavement structure would consist of 350 millimetres of OPSS Granular 'B', Type II (crushed bedrock) sub-base course, 150 millimetres of OPSS Granular 'A' base course, 60 millimetres of HL8 or HL4 binder course asphaltic concrete, and 40 millimetres of HL3 surface course asphaltic concrete. Where a pit run, Granular B Type I, aggregate is utilised in the granular base, it should be increased to a minimum thickness of 450 millimetres. It is our opinion that this design is suitable for use on a residential roadway section, provided that the subgrade has been prepared as specified and is good and firm before the sub-base course material is placed. Notwithstanding, the pavement structure should conform to the relevant County of Wellington requirements where they are to be assumed by the County. If the subgrade is soft, remedial measures as discussed above may have to be implemented and/or the sub-base thickness may have to be increased. The granular sub-base and base courses and asphaltic concrete layers should be compacted to OPSS or County of Wellington requirements. A program of in-place density testing must be carried out to monitor that compaction requirements are being met. We note that this pavement structure is not to be considered as a construction roadway design.

To minimise segregation of the finished asphalt mat, the asphalt temperature must be maintained uniform throughout the mat during placement and compaction. All too often, significant temperature gradients exist in the delivered and placed asphalt with the cooler portions of the mat resisting compaction and presenting a honeycomb surface. As the spreader moves forward, a responsible member of the paving crew should monitor the pavement surface, to ensure a smooth uniform surface. The contractor can mitigate the surface segregation by 'back-casting' or scattering shovels of the full mix material over the segregated areas and raking out the coarse particles during compaction operations. Of course, the above assumes that the asphalt mix is sufficiently hot to allow the 'back-casting' to be performed.

Asphalt paving of driveways should be consistent with the general recommendations provided above. Proper preparation of the subgrade soils is essential to good long-term performance of the pavement. Likewise, sufficient depth and compaction of granular base materials and adequate drainage will be important in achieving good long-term performance, i.e. preventing/limiting premature cracking, subgrade failure, rutting, etc. A typical recommended light duty pavement structure for residential driveways would

consist of a minimum of 200 millimetres of OPSS Granular 'A' base course, compacted to 100 percent standard Proctor maximum dry density, followed by a minimum of 50 millimetres of HL3 or HL3F asphaltic concrete, compacted to a minimum of 92 per cent of their Marshall maximum relative density [MRD].

8. HOUSE AND TOWNHOUSE CONSTRUCTION

The native soils encountered at the borehole locations are considered capable of supporting the loads associated with typical residential dwelling and townhouse structures on conventional spread footings, below any fill, organic, or otherwise unsuitable materials. Bearing pressures of up to 150 kPa [~3,000 psf] SLS and 225 kPa [~4,500 psf] ULS may be considered in the competent native soils. In areas where 'wet' seams are present, or the native soils present in less compact condition, reduced bearing values of 100 kPa [~2,000 psf] SLS and 150 kPa [~3,000 psf] are recommended. The founding surfaces must be hand cleaned of any loose or disturbed material, along with any ponded water, immediately prior to placement of foundation concrete.

In the event that site grading works result in engineered fill below founding elevations, the general recommendations presented in the Backfill Considerations above should be strictly adhered to, with compaction to 100 percent standard Proctor maximum dry density, verified by monitoring and testing by a representative of SOIL-MAT ENGINEERS present on a full time basis. If there is a short fall in the volume of fill required, then the source of imported fill should be reviewed for gradation, Proctor value, compatibility with existing fill, environmental characteristics and be approved by this office prior to use. The design bearing capacity for footings within the engineered fill should be limited to 100 kPa [~2,000 psf] SLS and 150 kPa [~3,000 psf] ULS.

The support conditions afforded by the native soils and/or engineered fill are generally not uniform across the building footprint, nor are the loads on the various foundation elements. As such it is recommended that consideration be given to the provision of nominal reinforcement in the footings and foundation walls to account for variable support and loading conditions. The use of nominal reinforcement is considered good construction practice as it will act to reduce the potential for cracking in the foundation walls due to minor settlements, heaving, shrinkage, etc. and will assist in resisting the pressures generated against the foundation walls by the backfill. Such nominal reinforcement is an economical approach to the reduction and prevention of costly foundation repairs after completion and later in the life of the buildings. This

reinforcement would typically consist of two continuous 15M steel bars placed in the footings [directly below the foundation wall], and similarly two steel bars placed approximately 300 millimeters from the top of the foundation walls at a minimum, depending on ground conditions exposed during construction. These reinforcement bars would be bent to reinforce all corners and under basement windows, and be provided with sufficient overlap at staggered splice locations. At 'steps' in the foundations and at window locations, the reinforcing steel should transition diagonally, rather than at 90 degrees, to maintain the continuous tensile capacity of the reinforcement. Where footings are founded on, or partially on, engineered fill the above provision for nominal reinforcement would be required.

All basement foundation walls should be suitably damp proofed, including the provision of a 'dimple board' type drainage product, and provided with a perimeter drainage tile system outlet to a gravity sewer connection or positive sump pit a minimum of 150 millimetres below the basement floor slab. The clear stone material surrounding the weeping tile should be encased with a geotextile material to prevent the migration of fines from the foundation wall backfill into the clear stone product. In the event that sump pit systems are required we would recommend that the sump pump system should be constructed with an 'oversized' reservoir and a 'back-flow' prevention valve so that the sump pump will not cycle repeatedly within short time periods.

All footings exposed to the environment must be provided with a minimum of 1.2 meters of earth or equivalent insulation to protect against frost penetration. This frost protection would also be required if construction were undertaken during the winter months. All footings must be proportioned to satisfy the requirements of the Ontario Provincial Building Code.

It is imperative that a soils engineer be retained from this office to provide geotechnical engineering services during the excavation and foundation construction phases of the project. This is to observe compliance with the design concepts and recommendations outlined in this report, and to allow changes to be made in the event that subsurface conditions differ from the conditions identified at the borehole locations.

9. PRELIMINARY HYDROGEOLOGICAL CONSIDERATIONS

As noted above, it is understood that the development will consist of single family dwellings and townhouse blocks, including the installation of associated underground municipal services along asphalt paved roadways. Excavations for the proposed development services are expected to extend to depths of up to approximately 2 to 5 metres below the existing ground surface, while excavations for foundations would be expected to extend to up to approximately 2 metres. Measurements of the groundwater level at the monitoring well locations indicate a groundwater level on the order of approximately 2 to 7 metres below the existing ground surface, however further groundwater monitoring may be conducted to more accurately assess the static groundwater level.

The short term excavations for the proposed servicing are generally anticipated to extend into the sandy silt/clayey silt and sand soils to depths above the static groundwater level. Such excavations would be expected to be subject to relatively minor groundwater infiltration, such that it should be possible to adequately control such infiltration using conventional construction dewatering techniques such as pumping from sumps in the base of the excavation. During wet times of year, some instability of the excavations may be experienced. The rate of dewatering would be expected to be below 50,000 L/day, and certainly below 400,000 L/day, such that an EASR or PTTW should not be required. Where deeper excavations are identified to be required, extending below the static groundwater level, the need for temporary dewatering controls during construction should be more closely evaluated. Depending on the proposed depths of excavations for the proposed footings and site services, the rate of dewatering could approach or be greater than 50,000 L/day, potentially requiring an EASR. As such, once available, the site servicing and grading plans detailing depths of construction should be forwarded onto our office for further review and comments.

The generally permeable condition of the native sand deposit present over the site will generally allow for natural drainage and movement of groundwater. As such, it is not considered likely that service trenches would present any conflict or impact to the natural groundwater conditions. As such, the provision of clay 'cut-offs' within trench backfill is not expected to be required.

Excavations for the proposed basement levels should be well above the groundwater level, and so would not be expected to require significant ongoing groundwater control, other than typical perimeter weeping tile and sump pump as noted above.

The final grading of the site should appropriately consider the groundwater levels in order to minimise or avoid conflict or impact to the groundwater during and post construction. In this regard the grading and storm water management plan should accommodate surface runoff that follows the existing overall drainage patterns as much as possible.

It is also noted that the use of Low Impact Design [LID] methods as part of the stormwater management for the proposed development would be viable for much of the site and should be considered. The permeable sand deposit, above the groundwater level, would afford an opportunity for natural infiltration of surface runoff, such as in 'dry' ponds, infiltration galleries, etc.

Based on our observations and details of the proposed development, it is not anticipated that the proposed construction will have an adverse impact on the groundwater condition in the area, and further detailed hydrogeological assessment is not considered warranted at this time. As the detailed design of the proposed development proceeds, this office should be consulted to review the hydrogeological conditions and assess the potential for concern, or need for additional study.

10. GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

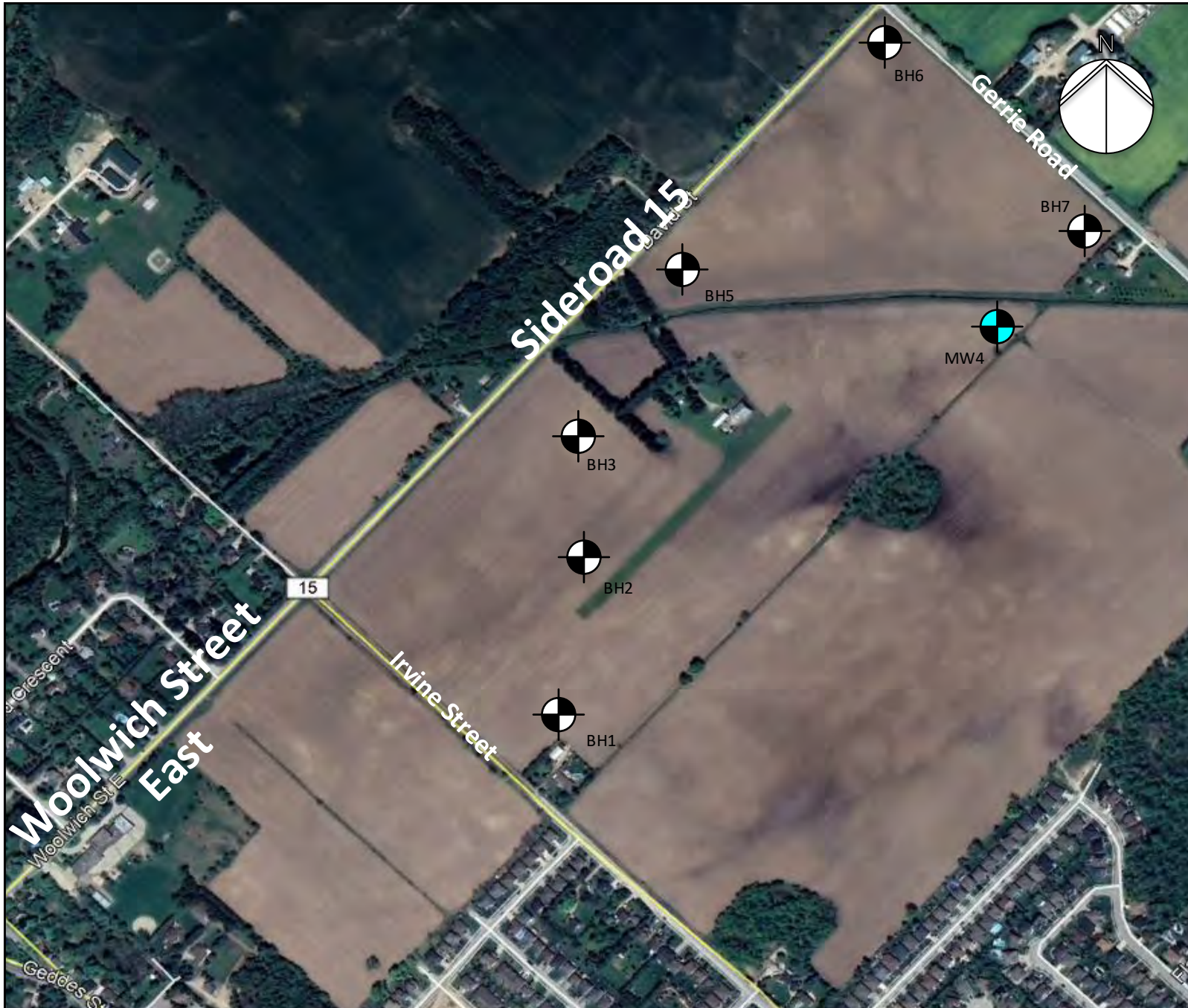
We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.


Scott Wylie, B.Eng., EIT.
Ian Shaw, P. Eng.
Senior Engineer

Enclosures: Drawing No. 1, Borehole Location Plan
Log of Borehole Nos. 1 to 7, inclusive
Grain Size Analyses
Drawing No. 2, Recommended Design Requirements for Basement Construction

Distribution: Cachet Developments [pdf]



LEGEND

-  Borehole Location
BH#
-  Monitoring Well Location
MW#

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301951A-G.
2. Borehole locations are approximate.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Residential
Development
7581 Sideroad 15
Elora, Ontario

Borehole Location Plan

Project No. SM 301591A-G

Date: September 2021

Drawn: SW | Checked: KR

SM 301591A-G Borehole Location Plan

Drawing No. 1

Log of Borehole No. 1

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838268

E: 545454



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w% ▲ 10 20 30 40 ▲				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test ● blows/300mm ●			
												20	40	60	80
0	413.05		Ground Surface												
1	412.80		Topsoil Approximately 250 millimetres of topsoil.		SS	1	4 5 7 6	12							
2															
3	411.90		Sandy Silt Brown, trace clay, trace gravel, reworked in upper levels, compact.		SS	2	6 7 6 6	13							
4															
5															
6			Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, compact.		SS	3	5 8 12 14	20							
7															
8															
9					SS	4	12 10 13 10	23							
10															
11															
12	409.40				SS	5	6 11 13 15	24							
13			End of Borehole												
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															

NOTES:

- Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.
- Borehole was recorded as dry and caved to a depth of 1.5 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 6, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 2

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838469

E: 545516



Depth ftm	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w% ▲10203040▲				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm ●20406080●			
0	415.00		Ground Surface												
1	414.80		Topsoil Approximately 250 millimetres of topsoil.		SS	1	2 4 4 5	8							
2															
3			Sandy Silt Brown, reworked in upper levels, trace clay, silt, and gravel, loose.		SS	2	4 3 6 8	9							
4	413.50														
5			Clayey Silt Brown, trace to some sand and gravel, stiff to very stiff.		SS	3	6 6 6 7	12		3.5					
6															
7															
8	412.50		Transition to grey.		SS	4	3 7 6 7	13		4.0					
9															
10															
11					SS	5	9 7 15 18	22		>4.5					
12	411.30		End of Borehole												
13															
14															
15															
16															
17															
18															
19															
20															
21															
22			NOTES:												
23			1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.7 metres.												
24			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.												
25															
26			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
27															
28															
29															

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

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Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 3

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838652

E: 545505



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
												Standard Penetration Test blows/300mm			
20	40	60	80												
ft m	409.93		Ground Surface												
0			Topsoil Approximately 150 millimetres of topsoil.		SS	1	4 6 10 8	16							
1			Sand Brown, reworked in upper levels, trace clay, silt, and gravel, compact.												
2															
3	1			SS	2	6 10 10 7	20								
4															
5															
6	408.10		Sandy Silt Brown, trace to some gravel and clay, compact.		SS	3	6 8 10 11	18							
7	407.80														
8			End of Borehole												
9															
10	3														
11															
12															
13	4														
14															
15															
16	5														
17															
18															
19															
20	6														
21															
22			NOTES:												
23	7		1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 2.1 metres.												
24			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.												
25															
26	8		3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
27															
28															
29	9														

NOTES:

- Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 2.1 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 6, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

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Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 4

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838792

E: 546044



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
Standard Penetration Test															
blows/300mm															
20 40 60 80															

ft	m	405.55	Ground Surface													
0	0	405.35	Topsoil Approximately 200 millimetres of topsoil.		SS	1	2 3 5 6	8								
1																
2																
3	1		Sandy Silt Brown, trace to some clay, trace gravel, reworked in upper levels, loose.		SS	2	4 3 3 5	6								
4																
5																
6		403.70	Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, wet, compact to dense.		SS	3	8 10 12 15	22								
7	2															
8																
9																
10	3															
11					SS	4	8 10 11 10	21								
12																
13	4				SS	5	8 10 23 30	33								
14																
15																
16		400.70	Transition to grey.		SS	6	3 11 18 23	29								
17	5	400.40														
18			End of Borehole													
19																
20	6															
21			NOTES: 1. Borehole was advanced using hollow stem auger equipment on August 5, 2021 to termination at a depth of 5.2 metres. 2. Borehole was recorded as open and 'wet' at a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client. 4. A monitoring well was installed. The following free groundwater level readings have been measured: August 6, 2021 - 2.74 metres below ground surface. August 27, 2021 - 1.75 metres below ground surface.													
22																
23	7															
24																
25																
26	8															
27																
28																
29	9															

Drill Method: Hollow Stem Augers

Drill Date: August 5, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

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Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 5

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838939

E: 545636



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
												Standard Penetration Test blows/300mm			
				20	40	60	80								
ft	m														
0	412.10		Ground Surface												
0	411.90		Topsoil Approximately 200 millimetres of topsoil.		SS	1	2 4 5 7	9							
1			Sandy Silt Brown, reworked in upper levels, trace to some clay, increasing clay content with depth, occasional gravel, loose to compact.												
2															
3	1			SS	2	1 3 3 5	6								
4															
5															
6	2	410.00			SS	3	3 5 7 9	12							
7			End of Borehole												
8															
9															
10	3														
11															
12															
13	4														
14															
15															
16	5														
17															
18															
19															
20	6														
21															
22			NOTES:												
23	7		1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 2.1 metres.												
24			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.												
25			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
26	8														
27															
28															
29	9														

NOTES:

- Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 2.1 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

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Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 6

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4839162

E: 545871



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt.(kN/m3)	w%			
												10	20	30	40
Standard Penetration Test															
blows/300mm															
20 40 60 80															

ft	m	420.91		Ground Surface											
0	0	420.70	~	Topsoil											
1			~	Approximately 200 millimetres of topsoil.	SS	1	4 4 4 4	8							
2															
3	1														
4			~	Sand											
5		419.40			Brown, reworked in upper levels, trace rootlets, loose to compact.	SS	2	3 5 6 6	11						
6															
7	2		~	Sandy Silt											
8					Brown, trace clay, increasing clay content with depth, loose to compact.	SS	3	5 6 6 7	12						
9															
10	3		~												
11															
12		417.30				SS	4	3 4 4 4	8						
13	4		~	End of Borehole											
14															
15															
16	5		~												
17															
18															
19	6		~												
20															
21															
22	7		~	NOTES:											
23					1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.6 metres.										
24					2. Borehole was recorded as wet at depth of 2.0 metres, and caved to a depth of 2.4 metres upon completion and backfilled as per Ontario Regulation 903.										
25	8		~												
26					3. Soil samples will be discarded after 3 months unless otherwise directed by our client.										
27															
28			~												
29	9														

NOTES:

- Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.6 metres.
- Borehole was recorded as wet at depth of 2.0 metres, and caved to a depth of 2.4 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

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Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 7

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838910

E: 546126



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲ 10 20 30 40 ▲			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test ● blows/300mm ● 20 40 60 80			
0	408.39		Ground Surface												
1	408.10		Topsoil Approximately 250 millimetres of topsoil.	SS	1	3 5 6 7	11								
2			Sandy Silt Brown, trace rootlets, trace clay, reworked in upper levels, increasing clay content with depth, compact.	SS	2	10 8 10 10	18								
3			Clayey Silt Brown, trace to some sand and gravel, stiff to hard.	SS	3	3 5 6 6	11		2.0						
4				SS	4	5 7 10 18	17		2.5						
5				SS	5	24 36 50/5"	100		>4.5						
6			End of Borehole												
7			NOTES: 1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.0 metres. 2. Borehole was recorded as open and dry upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												

NOTES:

- Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.0 metres.
- Borehole was recorded as open and dry upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

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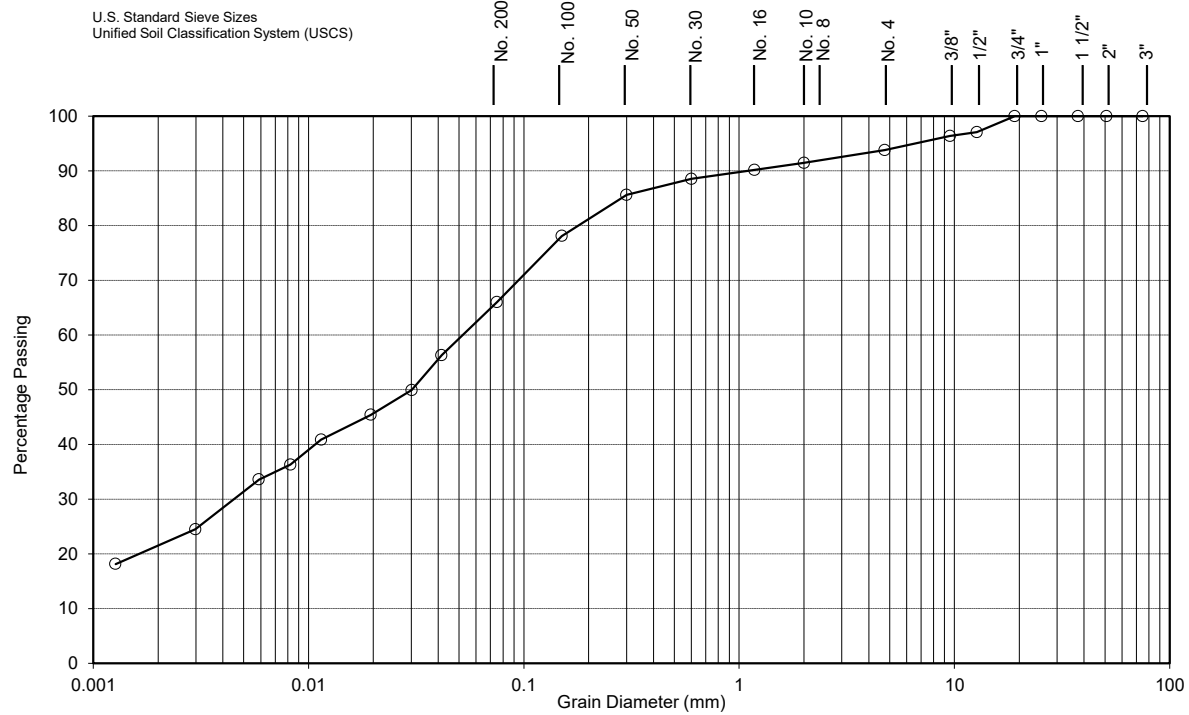
Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

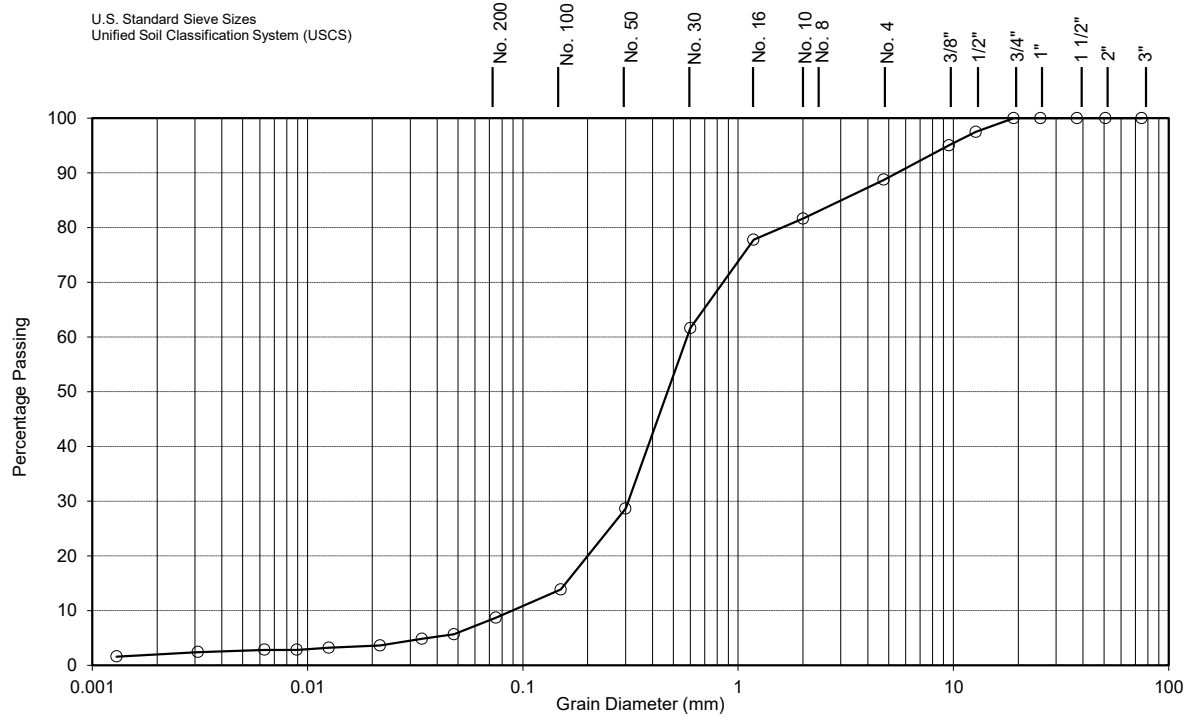
Mechanical & Hydrometer Analyses



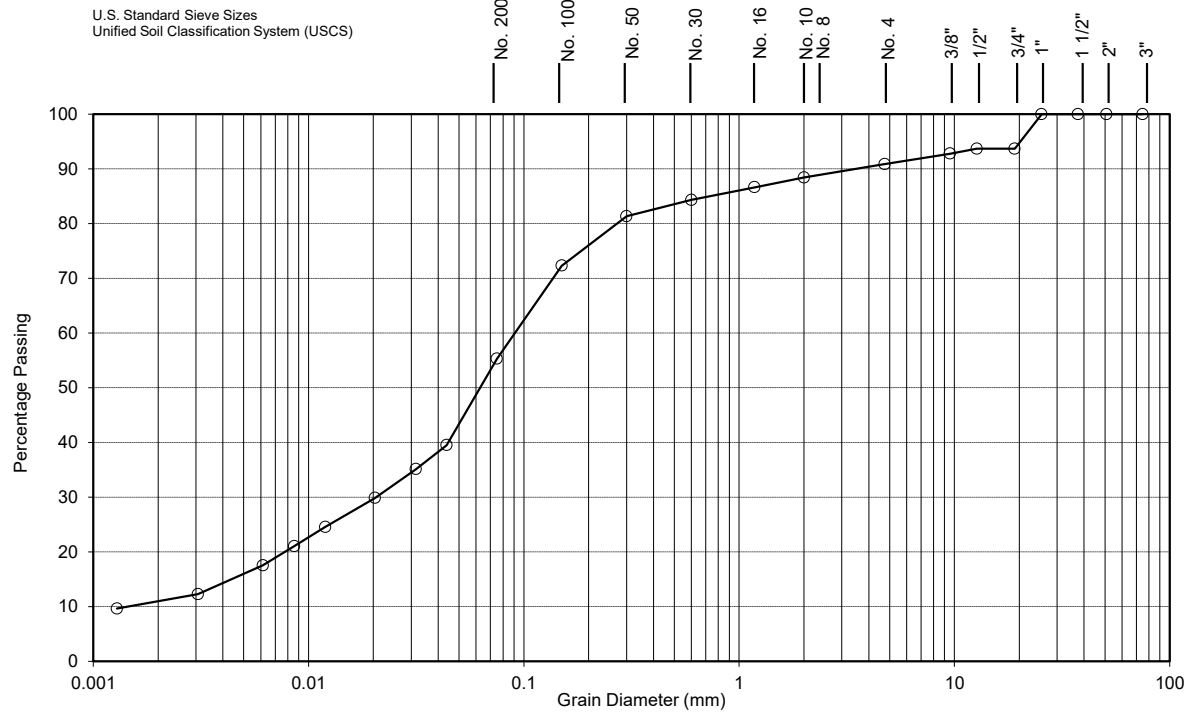
Lab No.:	21-335	Notes: Depth: 5'			
Sample No.:	3				
Borehole No.:	3				
CLAY [%]:	22	Soil Description: Brown Sandy Silt w/ some Clay and trace Gravel M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity			
SILT [%]:	44				
SAND [%]:	28	Estimated Infiltration Rate [mm/hr] : < 10 Estimated Permeability, k [cm/s] 10⁻⁷			
GRAVEL [%]:	6				
D ₁₀ (Effective Diam. in mm):	0.0005	Coefficient of Uniformity C _U : 102.0	Coefficient of Curvature C _C : 0.8		
SOIL-MAT ENGINEERS & CONSULTANTS LTD.					
7581 Sideroad 15, Elora ON					
August 2021		Grain Size Analysis No. 1		Project No.: SM 301951-T	



Mechanical & Hydrometer Analyses

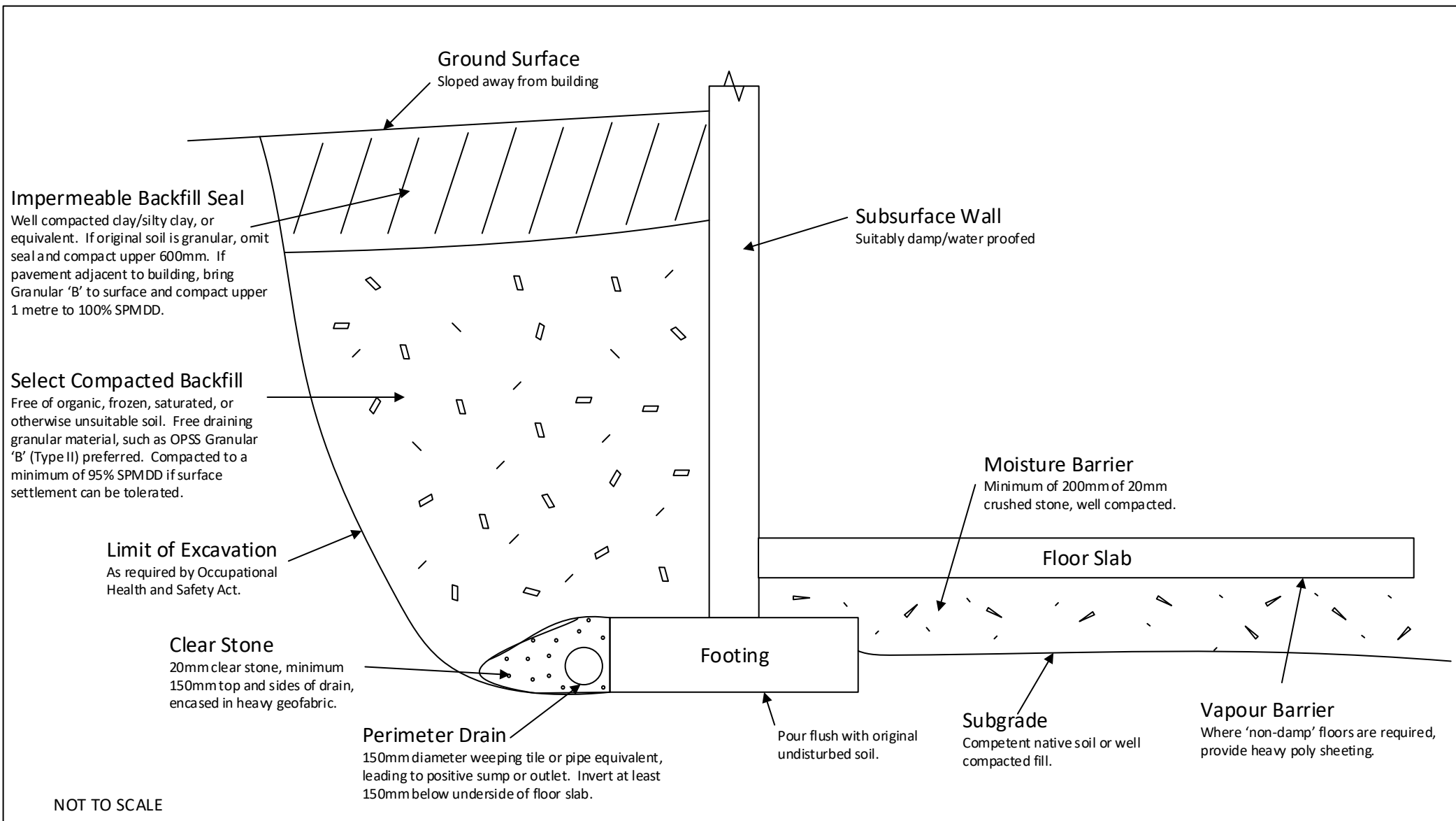


Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.:	21-336	Notes: Depth: 10'			
Sample No.:	5				
Borehole No.:	6				
CLAY [%]:	11	Soil Description: Brown Sandy Silt w/ some Clay and trace Gravel M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity			
SILT [%]:	44				
SAND [%]:	36				
GRAVEL [%]:	9	Estimated Infiltration Rate [mm/hr] :		Estimated Permeability, k [cm/s]	
D ₁₀ (Effective Diam. in mm):	0.0015	Coefficient of Uniformity C _U :		Coefficient of Curvature C _C :	
		10 to 15		10 ⁻⁶	
		60.0		3.3	
SOIL-MAT ENGINEERS & CONSULTANTS LTD.					
7581 Sideroad 15, Elora ON					
August 2021		Grain Size Analysis No. 3		Project No.: SM 301951-T	



Soil-Mat Engineers & Consultants Ltd.

Typical Design Requirements Drainage and Backfill for Basement Walls

Project No.: SM 301951-G

Date: September 2021

Drawing No. 2

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

www.soil-mat.ca info@soil-mat.ca TF: 800.243.1922

Hamilton: 130 Lancing Drive L8W 3A1 T: 905.318.7440 F: 905.318.7455

Milton: PO Box 40012 Derry Heights PO L9T 7W4 T: 800.243.1922



PROJECT No.: SM 301951-G

March 11, 2022

CACHET DEVELOPMENTS
361 CONNIE CRESCENT, SUITE 200
Concord, Ontario
L4K 5R2

Attention: Marcus Gagliardi
Development Planner

**PRELIMINARY HYDROGEOLOGICAL CONSIDERATIONS
PROPOSED RESIDENTIAL DEVELOPMENT
CLAYTON LANDS
ELORA, ONTARIO**

Dear Mr. Gagliardi,

Further to your recent correspondence and discussions, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has prepared the following preliminary hydrogeological considerations memo. These comments are further to our Preliminary Geotechnical and Hydrogeological Investigation reports for the subject lands [SM 301951A-G and SM 301951B-G, dated October 14, 2021], and recent discussions with the design team. It is also noted that further more detailed hydrogeological assessment works are presently underway, and will be formally reported once complete.

1. INTRODUCTION

We understand that the project will involve the construction of a residential development on the Clayton Lands located at 75 Woolwich Street East [Clayton Lands] in Elora, Ontario, along with potential future development on the Elora Sands [Gibson Lands] to the east. The development details are to be established, but are anticipated to consist of single-family dwellings and townhouses along asphalt paved roadways, including the installation of associated underground municipal services. The purpose of these preliminary hydrogeological considerations is to provide initial information and comments to support the assessment of site servicing options for the proposed development, from a geotechnical point of view.

2. PROCEDURE

A total of eleven [11] sampled boreholes were advanced at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment on August 5 and 6, 2021 under the direction and supervision of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD., to termination at depths of between approximately 3.6 and 7.6 metres below the existing ground surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings. Selected samples were also subjected to laboratory grain size analyses.

Upon completion of drilling, groundwater monitoring wells were installed at Borehole Nos. 004, 101, 102, and 104 to allow for the future monitoring of the groundwater level. The monitoring well consisted of 50-millimetre PVC pipe screened in the lower 1.5 to 3.0 metres. The monitoring well was encased in well filter sand up to approximately 0.3 metres above the screened portion, then with bentonite 'hole plug' to the surface and fitted with a protective steel 'stick up' casing. The remaining boreholes were backfilled in general accordance with Ontario Regulation 903, and the ground surface was reinstated even with the surrounding grade.

The boreholes were located in the field by representatives of SOIL-MAT ENGINEERS, based on accessibility over the site, clearance of underground utilities, and the drawing that was forwarded to our office. Best efforts were made to minimize crop damage by locating the majority of the boreholes to the perimeter of the fields. The ground surface elevation at the borehole locations has been referenced to a geodetic benchmark, described as North American 1983 CSRS, as per the survey plan completed by POI Aerial, dated August 10, 2021, which was provided to our office.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Borehole Nos. 001 to 007, and 101 to 104, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed at the exact depths of geological change.

3. SITE DESCRIPTION AND SUBSURFACE CONDITIONS

The subject site is currently two [2] undeveloped agricultural properties located at 7581 Sideroad 15 and 75 Woolwich Street East in Elora, Ontario. The eastern parcel, 7581 Sideroad 15, is bordered to the south by an existing agricultural field, to the east by Gerrie Road, to the north by Sideroad 15, and to the west by Irvine Street, assuming a north-south orientation of Irvine Street. The field is bisected by a tributary of the Irvine Creek [Nichol Drain] at the north eastern corner of the site. There is also a single-family dwelling and an existing barn structure near the middle of the site, setback approximately 200 metres from Sideroad 15.

The western parcel, located at 75 Woolwich Street East, is bordered to the east by Irvine Street, to the south by Bricker Avenue, to the west by residential dwellings and a public school, and to the north by Woolwich Street East. West of the tributary, the two parcels generally slope down to the north, with a relief of approximately 6 metres measured across the boreholes. The grade is relatively flat and even with Gerrie Road on the east side of the tributary but quickly descends towards it with an approximate relief of 15 metres measured across the boreholes.

The subsurface conditions encountered at the borehole locations are summarised as follows:

Topsoil

A surficial veneer of topsoil approximately 100 to 250 millimetres in thickness was encountered at all borehole locations. It is noted that the depth of topsoil may vary across the site and from the depths encountered at the borehole locations. It is also noted that the term 'topsoil' has been used from a geotechnical point of view, and does not necessarily reflect its nutrient content or ability to support plant life.

Sandy Silt/Clayey Silt

Native sandy silt/clayey silt was encountered beneath the topsoil in the majority of the boreholes, and beneath a sand deposit in Borehole Nos. 003, 006, and 002. The fine-grained granular to slightly cohesive soils were brown in colour, transitioning to grey below about 2.5 metres in Borehole No. 002, with trace to some clay and gravel, with a notable increasing clay content with depth in some of the boreholes. The native sandy silt/clayey silt soils were generally noted to have a reworked or weathered appearance in the upper levels, and were generally noted to have a loose to compact state. The sandy silt/clayey silt deposit was present to depths of approximately 0.9 to 2.2 metres in Borehole Nos. 103, 102, 001 and 004, and was proven to termination at depths of approximately 2.1 to 6.1 metres below the existing ground surface in Borehole Nos. 101, 003, 005, 006, 002, and 007.

Sand

A native sand deposit was encountered beneath the topsoil in Borehole Nos. 003, 006, and 104 and beneath the sandy silt/clayey silt layer in Borehole Nos. 103, 102, 001, and 004. The fine to medium grained soils were brown in colour, with a noted to transition to grey at a depth of approximately 4.8 metres in Borehole No. 10, contained trace amounts of clay, silt, and gravel, and was generally in a compact to dense state. The native sand soils were proven to a depth of approximately 1.5 and 1.8 metres within Borehole Nos. 003 and 006, and proven to termination at depths of between approximately 3.6 and 7.6 metres below the existing ground surface in Borehole Nos. 104, 103, 102, 001 and 004.

Grain Size Analyses

Grain size analyses were conducted on six [6] selected samples of the native soils recovered from the boreholes. The results of this grain size testing can be found appended to the end of this report, and are summarized as follows:

TABLE A
GRAIN SIZE ANALYSES

Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Hydraulic Conductivity, k [cm/s]	Estimated Infiltration Rate, [mm/hr]
BH003 SS3	1.5 m	22	44	28	6	10^{-7}	<10
BH006 SS5	3.0 m	11	44	36	9	10^{-6}	10 to 15
BH104 SS4	2.3 m	2	9	89	0	10^{-3} to 10^{-2}	100 to 150
BH103 SS3	1.5 m	14	45	34	7	10^{-6}	<10
BH102 SS6	4.6 m	2	6	91	1	10^{-2}	150 to 300
BH004 SS5	3.0 m	2	7	80	11	10^{-2}	150 to 300

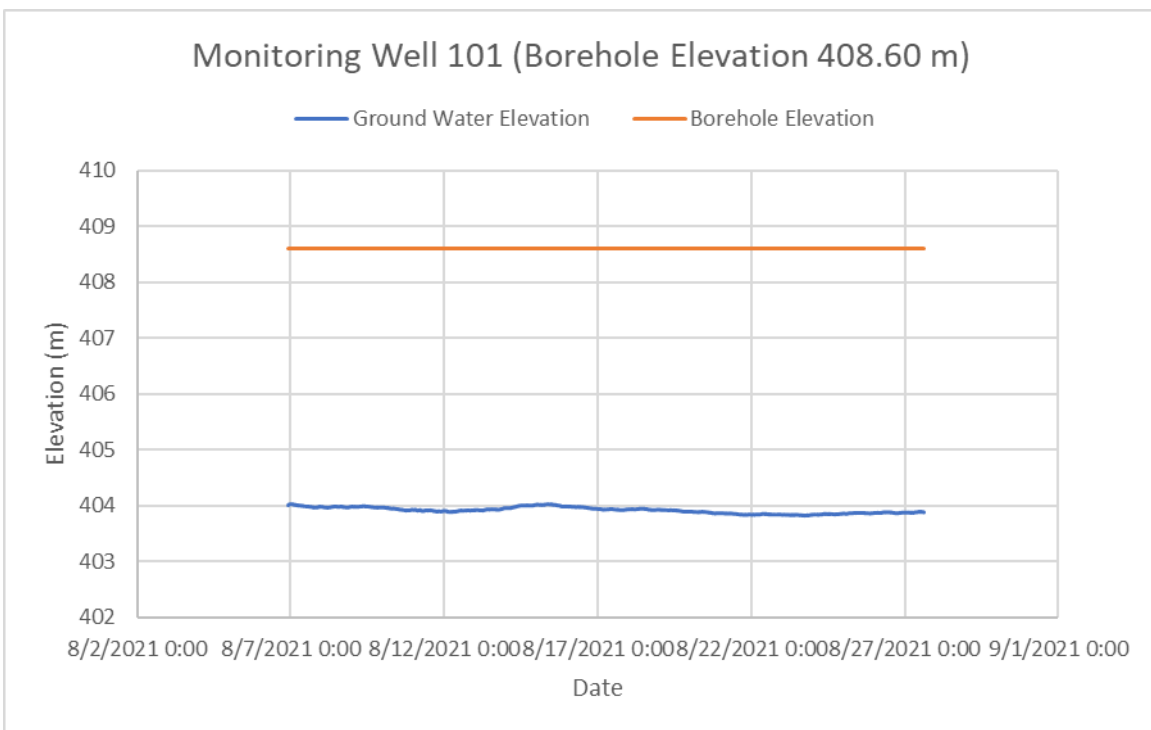
The field and laboratory testing demonstrate the native soils to generally consist of a sandy silt/clayey silt with some clay and traces of gravel in the upper levels, transitioning to a highly permeable sand with traces of clay, silt, and gravel at depth. According to the Unified Soil Classification System (USCS), the soils are classified as M.L. – inorganic silts and very fine sands, clayey silts with slight plasticity in the upper levels overlying S.P. – poorly graded sands, with little to no fines at depth. The sandy silt/clayey silt in the upper levels would generally behave as a low permeable material, but would not be considered as an impermeable material, and would be highly frost susceptible. The underlying sand deposit is highly permeable, relatively free draining.

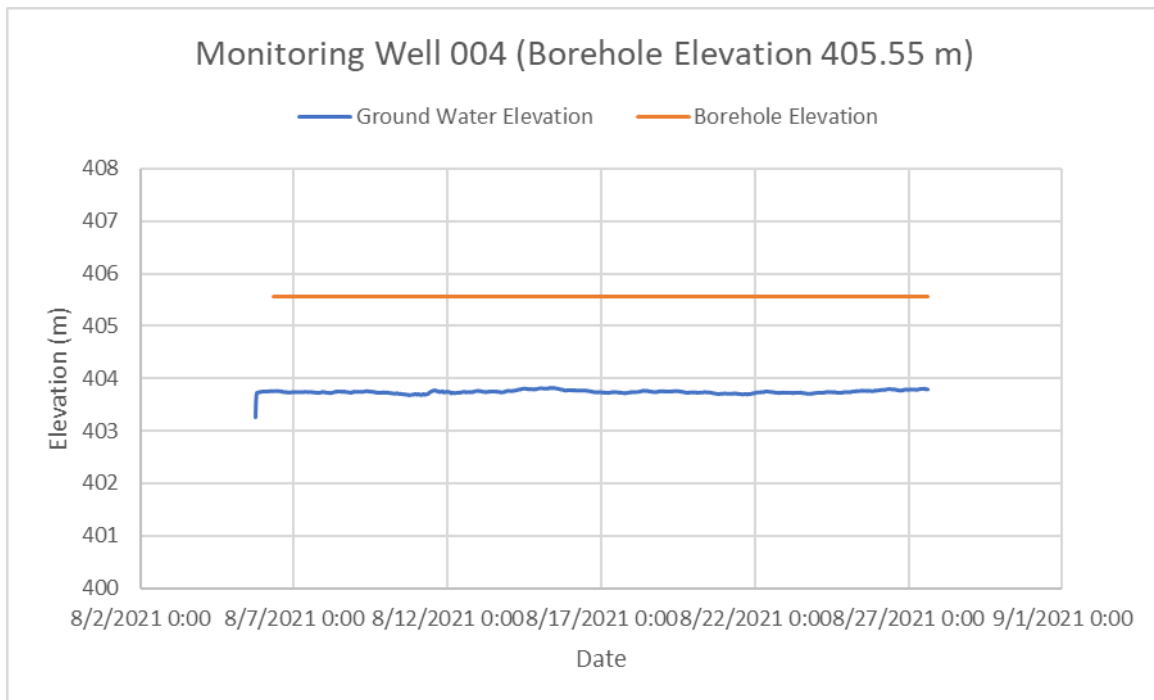
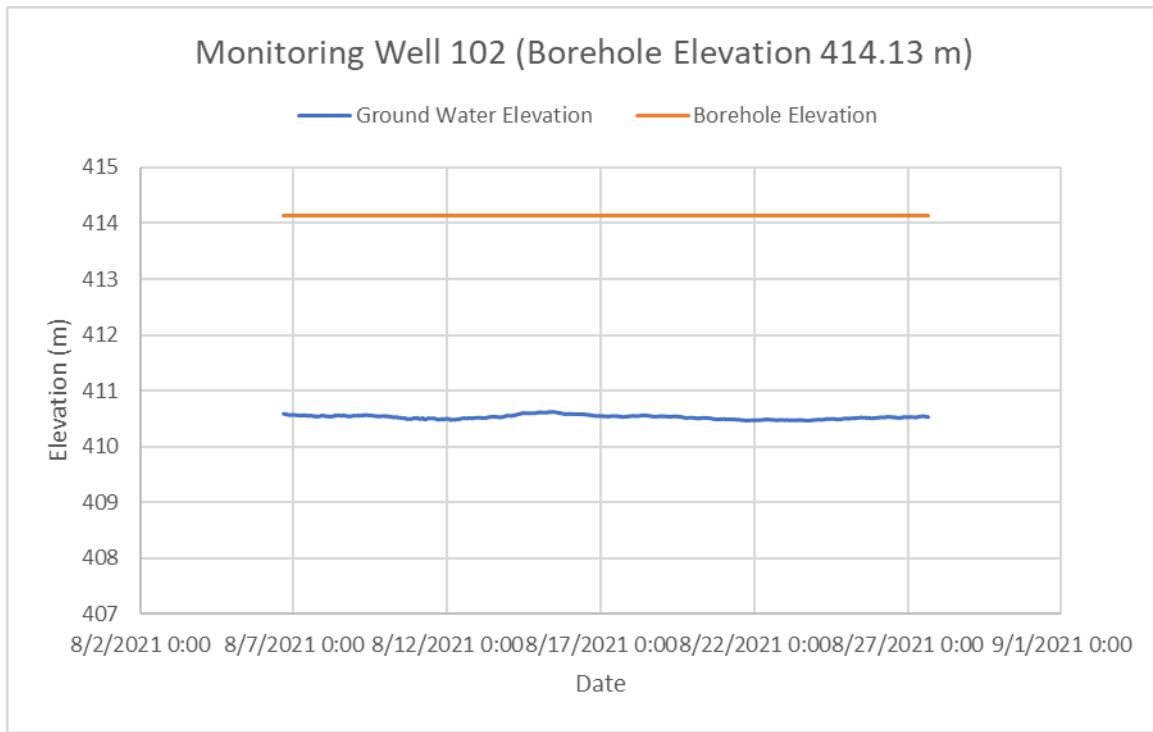
A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to be in areas noting to consist of stone-poor sandy silt to silty sand-textured till, ice-contact stratified deposits of sand and gravel, with minor silt and clay, as well as river deposits of coarse gravel. These conditions are consistent with the observations during drilling.

Groundwater Observations

Borehole Nos. 006, 102, and 004 were noted to have 'caved' to depths of between approximately 2.4 to 3.8 metres and 'wet' at depths of between approximately 2.0 to 3.4 metres, while Borehole No. 104 was noted to be open and 'wet' at a depth of 7.0 metres upon completion. Borehole Nos. 103 and 001 were noted to have cave to depths of 2.7 and 1.5 metres, respectively, and dry upon completion. The remainder of the boreholes were noted as being open and 'dry' [i.e. no free groundwater present] upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes.

As noted above, a monitoring well was installed at Borehole Nos. 101, 102, 104, and 004, to allow for future measurements of the static groundwater level. A data logger was installed in Borehole Nos. 101, 102, and 004 to allow for continuous monitoring of the groundwater level between August 6 and August 27, 2021, the readings of which have been illustrated in the following graphs:





In addition, manual monitoring well readings were also taken from all of the installed monitoring well locations across the site on August 6 and 27, 2021 and February 23, 2022. These have been summarized in the following chart:

TABLE B
SUMMARY OF GROUNDWATER LEVELS

	MW 101		MW 102		MW 104		MW 004	
Surface Elevation [m]	408.60		414.13		414.87		405.55	
	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.
Aug 6, 2021	4.78	403.82	3.58	410.55	6.78	408.09	2.74	402.81
Aug 27, 2021	4.71	403.89	3.61	410.52	6.96	407.91	1.75	403.80
Feb 23, 2022	4.31	404.29	3.50	410.63	6.83	408.04	1.33	404.22

The groundwater level observed indicates a stabilized groundwater level on the order of approximately 2 to 7 metres below the existing grade, at an elevation of roughly 403.8 to 410.5 metres, varying with the physical topography. There is an evident drop in the groundwater level with a groundwater flow direction of NNE, generally following the topography towards the Irvine Creek Tributary. The approximate groundwater contours are illustrated in the attached Drawing No. 2.

Given the time of year of monitoring, the observed levels in August of 2021 would be considered reasonably representative of a seasonal 'low'. The readings in February show seasonal fluctuation, but would not be considered representative of the seasonal 'high'. However, the present data does provide an indication that the static groundwater level remains relatively steady over the year, with seasonal fluctuations on the order of perhaps 0.5 to 1.0 metre.

General Discussion of Subsurface Conditions

As noted above the subsurface conditions are generally characterized as sandy silt/clayey silt deposit in the upper levels, underlain by a permeably cohesionless sand deposit. The static groundwater level is within the permeable sand deposit, generally following the topography dropping to the north down to the Irvine Creek tributary. Representative geological cross sections are illustrated in Drawing Nos. 3, 4 and 5, attached.

4. PRELIMINARY HYDROGEOLOGICAL CONSIDERATIONS

As noted above, it is understood that the development is anticipated to consist of single family dwellings and townhouse blocks, including the installation of associated underground municipal services along asphalt paved roadways. Excavations for the proposed development services are expected to extend to depths of up to approximately 2 to 5 metres below the existing ground surface, while excavations for foundations would be expected to extend up to approximately 2 metres. Measurements of the groundwater level at the monitoring well locations indicate a groundwater level on the order of approximately 2 to 7 metres below the existing ground surface, generally 3.5 to 7 metres over the Clayton lands presently proposed for development. The groundwater level is shallower to the east, approaching the Irvine Creek tributary, generally following the drop in topography toward the creek.

These conditions, with relatively permeable soil conditions at depth, and groundwater at sufficient depth, are well suited to proposed development. Site earthworks and servicing should be readily designed to avoid or limit encountering the natural groundwater level and thus minimise any potential interaction with the groundwater. The generally permeable condition of the native sand deposit present over the site will generally allow for natural drainage and movement of groundwater. As such, it is not considered likely that service trenches would present any conflict or impact to the natural groundwater conditions. The exception might be deeper trunk sewers, which would warrant closer assessment as the detailed design proceeds. As noted above, additional detailed hydrogeological assessment work is presently underway to help further inform the design and construction.

The short-term excavations for the proposed servicing are generally anticipated to extend into the sandy silt/clayey silt and sand soils to depths above the static groundwater level. Such excavations would be expected to be subject to relatively minor groundwater infiltration, such that it should be possible to adequately control such infiltration using conventional construction dewatering techniques such as pumping from sumps in the base of the excavation. During wet times of year, some instability of the excavations may be experienced. The rate of dewatering would be expected to be below 50,000 L/day for most shallow excavations, and certainly below 400,000 L/day, such that an EASR or PTTW should not be required. Where deeper excavations are identified to be required, extending below the static groundwater level, [i.e. deeper sewer mains, pumping chambers, etc.] the need for temporary dewatering controls during construction should be more closely evaluated. Depending on the proposed depths of excavations for the proposed footings and site services, the rate of dewatering could be

greater than 50,000 L/day, potentially requiring an EASR. As such, once available, the site servicing and grading plans detailing depths of construction should be forwarded onto our office for further review and comments.

The final grading of the site should appropriately consider the groundwater levels in order to minimise or avoid conflict or impact to the groundwater during and post construction. In this regard the grading and storm water management plan should accommodate surface runoff that follows the existing overall drainage patterns as much as possible. This would suggest SWM pond as best located to the north of the site, adjacent to Woolwich Street and ideally as far east as possible.

It is also noted that the use of Low Impact Design [LID] methods as part of the stormwater management for the proposed development would be viable for much of the site and should be considered. The permeable sand deposit, above the groundwater level, would afford an opportunity for natural infiltration of surface runoff, such as in 'dry' ponds, infiltration galleries, etc. As noted above, the sand deposit would have hydraulic conductivity on the order of 10^{-2} to 10^{-3} cm/sec, correlating to design infiltration rates on the order of 100 to 300 mm/hr. The use of infiltration systems could be readily utilised for lot level infiltration of rain water from downspouts, and also within the overall SWM pond.

Based on our present observations and available information, it is not anticipated that the proposed development will have an adverse impact on the groundwater condition in the area. As noted, further detailed hydrogeological assessment is presently underway, and will be formally reported to support the detailed design processes. As the detailed design of the proposed development proceeds, this office should be consulted to review the hydrogeological conditions and assess the potential for concern.

5. GENERAL COMMENTS

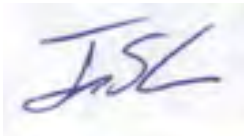
The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.



Scott Wylie, B.Eng., EIT.



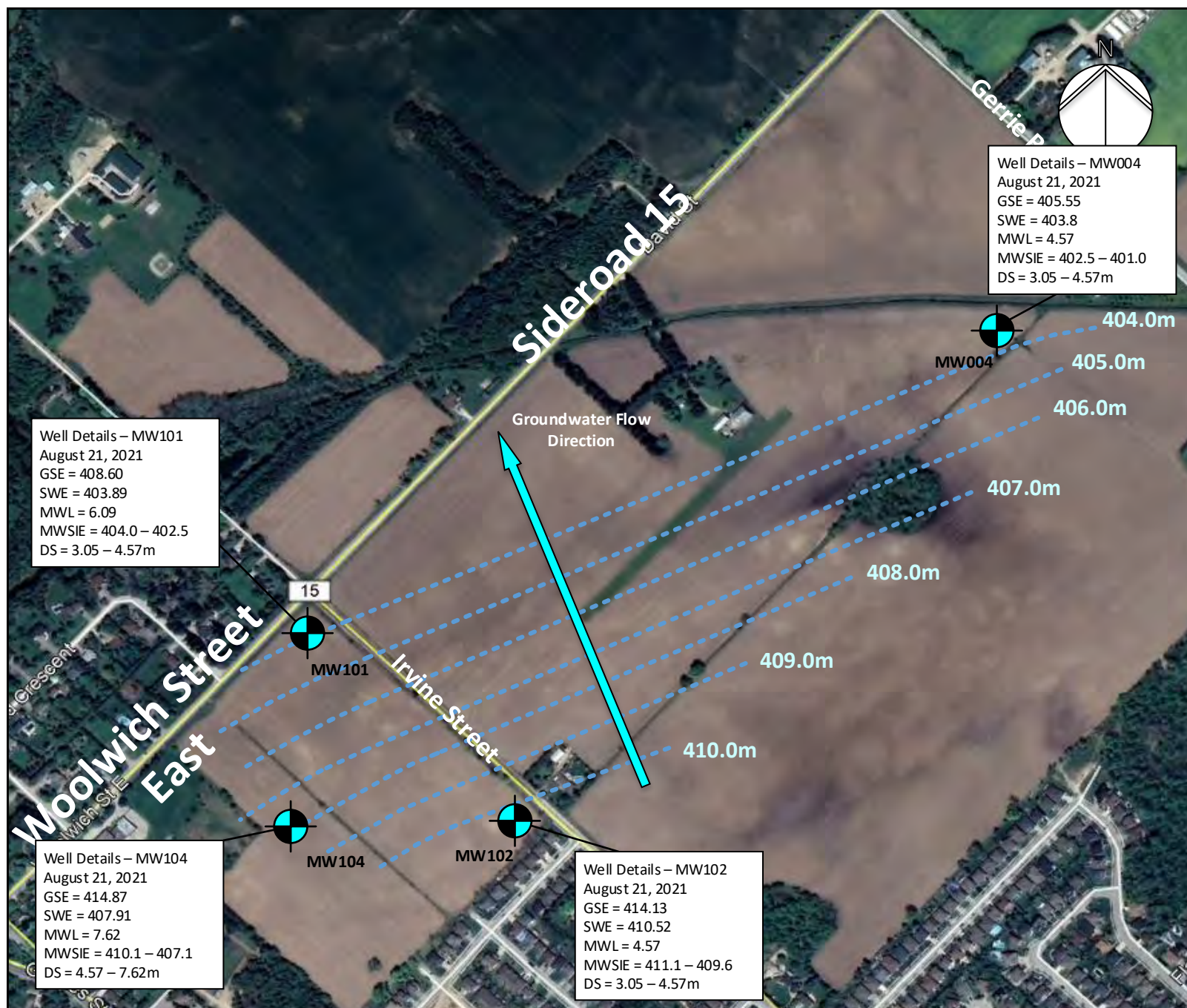
Ian Shaw, P. Eng., QP_{ESA}
Senior Engineer

Enclosures: Drawing No. 1, Borehole Location Plan
 Drawing No. 2, Groundwater Contour Map
 Drawing Nos. 3, 4 and 5, Geological Cross-Sections
 Log of Borehole Nos. 101 to 104, and 001 to 007 inclusive
 Grain Size Analyses

Distribution: Cachet Developments [pdf]



LEGEND  Borehole Location BH#  Monitoring Well Location MW#  Geological Cross Section Location	
NOTES 1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301951-G. 2. Borehole locations are approximate.	
SOIL-MAT ENGINEERS & CONSULTANTS LTD.	
Geotechnical Investigation Proposed Residential Development 7581 Sideroad 15 and 75 Woolwich Street East Elora, Ontario	
Borehole Location Plan	
Project No. SM 301591-G	
Date: February 2022	
Drawn: SW	Checked: IS
SM 301591-G Borehole Location Plan	
Drawing No. 1	



LEGEND

Monitoring Well
Location

GSE = Monitoring Well Ground Surface Elevation
SWE = Static Water Elevation [taken on Aug. 21, 2021]
MWL = Monitoring Well Length
MWSIE = Monitoring Well Screen Interval Elevation
DS = Depth of Screen

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301951-G.
2. Borehole locations are approximate.

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
Proposed Residential
Development
7581 Sideroad 15 and 75
Woolwich Street East
Elora, Ontario

Groundwater Contour Map

Project No. SM 301591-G

Date: February 2022

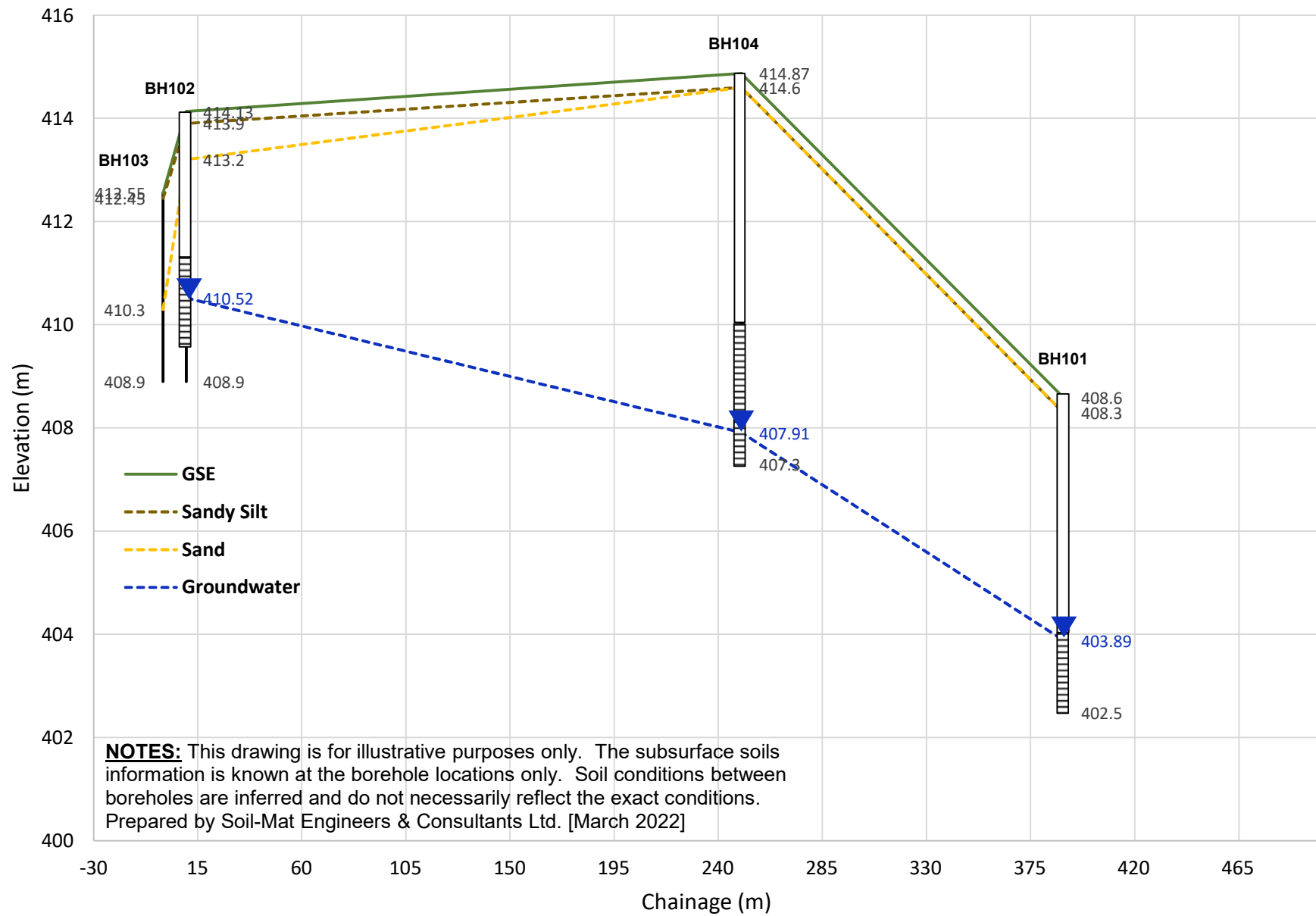
Drawn: SW

Checked: IS

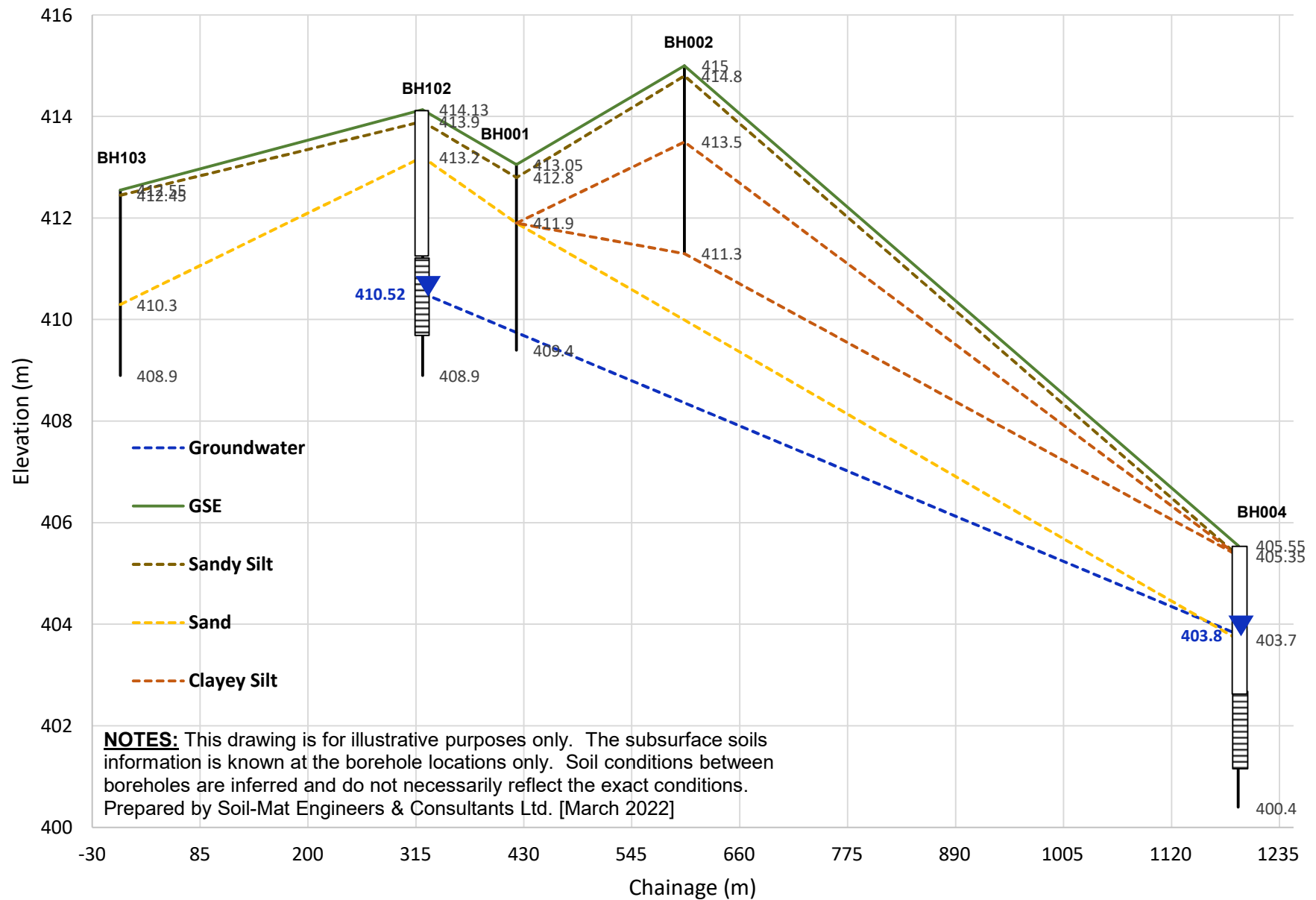
SM 301591-G Groundwater Contour Map

Drawing No. 2

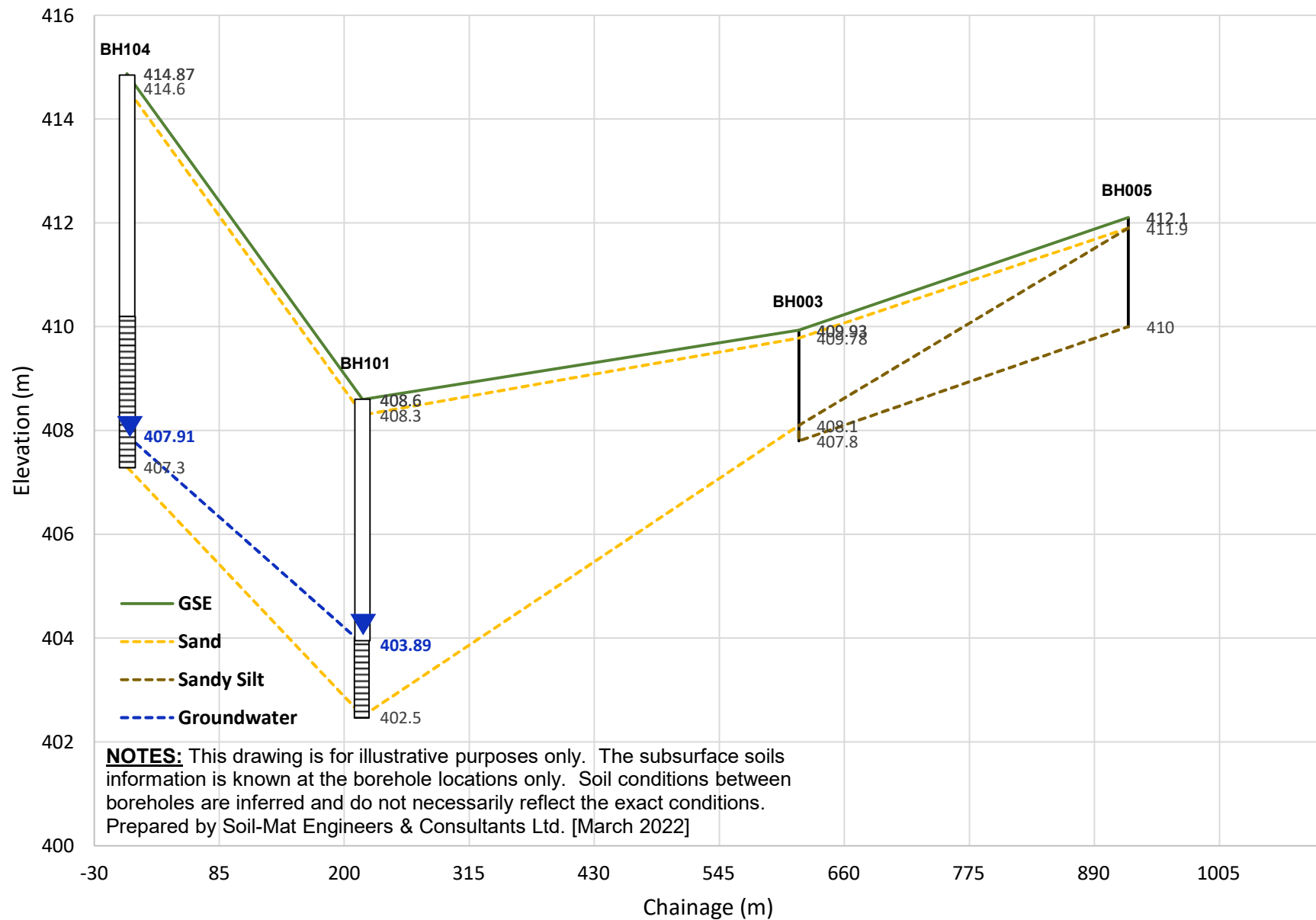
Geological Cross Section A-A



Geological Cross Section B-B



Geological Cross Section C-C



Log of Borehole No. 101

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838437

E: 545149



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲ 10 20 30 40 ▲			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test ● blows/300mm ● 20 40 60 80			
0	408.60		Ground Surface												
1	408.30		Topsoil Approximately 250 millimetres of topsoil.												
2			Sand Brown, trace gravel.												
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18	403.10		Transition to grey in colour												
19															
20	402.50		End of Borehole												
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															

NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 6.10 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. No soil samples were retrieved. The following free groundwater level readings have been measured:

August 6, 2021 - 4.78 metres below ground surface.

August 27, 2021 - 4.71 metres below ground surface.

October 14, 2021 - 4.33 metres below ground surface.

February 23, 2021 - 4.31 metres below ground surface.

NOTES:

- Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 6.10 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.
- A monitoring well was installed. No soil samples were retrieved. The following free groundwater level readings have been measured:
August 6, 2021 - 4.78 metres below ground surface.
August 27, 2021 - 4.71 metres below ground surface.
October 14, 2021 - 4.33 metres below ground surface.
February 23, 2021 - 4.31 metres below ground surface.

Drill Method: Hollow Stem Augers

Drill Date: August 6, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 102

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838180

E: 545422



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w%				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm			
												10	20	30	40
0	414.13		Ground Surface												
0	413.90		Topsoil 250 millimetres of topsoil.		SS	1	4 5 7 8	12							
1			Sandy Silt Brown, trace clay, trace gravel, reworked in upper levels, loose to compact.		SS	2	2 3 6 5	9							
2			Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, loose to compact.		SS	3	3 9 12 14	21							
3					SS	4	7 8 11 10	19							
4					SS	5	6 9 11 17	20							
5	408.90		End of Borehole		SS	6	7 5 4 9	9							
6			NOTES: 1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 5.2 metres. 2. Borehole was recorded as caved to a depth of 3.8 metres and 'wet' at a depth of 3.6 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client. 4. A monitoring well was installed. The following free groundwater level readings have been measured: August 6, 2021 - 3.58 metres below ground surface. August 27, 2021 - 3.61 metres below ground surface. October 14, 2021 - 3.62 metres below ground surface. February 23, 2021 - 3.5 metres below ground surface.												

NOTES:

- Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 5.2 metres.
- Borehole was recorded as caved to a depth of 3.8 metres and 'wet' at a depth of 3.6 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.
- A monitoring well was installed. The following free groundwater level readings have been measured:
August 6, 2021 - 3.58 metres below ground surface.
August 27, 2021 - 3.61 metres below ground surface.
October 14, 2021 - 3.62 metres below ground surface.
February 23, 2021 - 3.5 metres below ground surface.

Drill Method: Hollow Stem Augers

Drill Date: August 6, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 103

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4837942

E: 545194



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲ 10 20 30 40 ▲			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm ● 20 40 60 80 ●			
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 0 1 2 3 4 5 6 7 8 9	412.55														

NOTES:

- Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.
- Borehole was recorded dry and caved to a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 6, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 104

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838174

E: 545084



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
Standard Penetration Test															
blows/300mm															
20 40 60 80															

0	ft	m	414.87	Ground Surface												
1			414.60	Approximately 250 millimetres of topsoil. Sand Brown, reworked in upper levels, trace clay, silt, and gravel, fine to medium gradation, compact.	SS	1	5 5 6 7	11								
2					SS	2	8 9 9 7	18								
3		1			SS	3	2 5 8 7	13								
4					SS	4	6 11 16 13	27								
5					SS	5	10 12 11 13	23								
6		2														
7																
8																
9																
10		3														
11																
12																
13		4														
14																
15																
16		5			SS	6	5 10 13 15	23								
17																
18																
19																
20		6	408.80	Wet spoon												
21					SS	7	9 9 8 6	17								
22																
23		7														
24			407.30	End of Borehole												
25				NOTES:				4. A monitoring well was installed. The following free groundwater level readings have been measured:								
26		8		1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 7.6 metres.				August 6, 2021 - 6.78 metres below ground surface.								
27				2. Borehole was recorded as open and 'wet' at depth of 7.0 metres upon completion and backfilled as per Ontario Regulation 903.				August 27, 2021 - 6.96 metres below ground surface.								
28				3. Soil samples will be discarded after 3 months unless otherwise directed by our client.				October 14, 2021 - 7.09 metres below ground surface.								
29		9						February 23, 2022 - 6.83 metres below ground surface.								
30																
31																

Drill Method: Hollow Stem Augers

Drill Date: August 6, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 001

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838268

E: 545454



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w% 10203040				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm 20406080			
0	413.05		Ground Surface												
1	412.80		Topsoil Approximately 250 millimetres of topsoil.		SS	1	4 5 7 6	12							
2															
3	411.90		Sandy Silt Brown, trace clay, trace gravel, reworked in upper levels, compact.		SS	2	6 7 6 6	13							
4															
5			Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, compact.		SS	3	5 8 12 14	20							
6															
7															
8					SS	4	12 10 13 10	23							
9															
10					SS	5	6 11 13 15	24							
11	409.40														
12			End of Borehole												
13															
14															
15															
16															
17															
18															
19															
20															
21			NOTES:												
22			1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.												
23			2. Borehole was recorded as dry and caved to a depth of 1.5 metres upon completion and backfilled as per Ontario Regulation 903.												
24			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
25															
26															
27															
28															
29															

NOTES:

- Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.
- Borehole was recorded as dry and caved to a depth of 1.5 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 6, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

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E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 002

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838469

E: 545516



Depth ftm	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w% ▲10203040▲				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm ●20406080●			
0	415.00		Ground Surface												
1	414.80		Topsoil Approximately 250 millimetres of topsoil.		SS	1	2 4 4 5	8							
2															
3			Sandy Silt Brown, reworked in upper levels, trace clay, silt, and gravel, loose.		SS	2	4 3 6 8	9							
4	413.50														
5			Clayey Silt Brown, trace to some sand and gravel, stiff to very stiff.												
6					SS	3	6 6 6 7	12		3.5					
7															
8	412.50														
9			Transition to grey.		SS	4	3 7 6 7	13		4.0					
10															
11															
12	411.30				SS	5	9 7 15 18	22		>4.5					
13			End of Borehole												
14															
15															
16															
17															
18															
19															
20															
21															
22			NOTES:												
23			1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.7 metres.												
24			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.												
25															
26			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
27															
28															
29															

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

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E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 003

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838652

E: 545505



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
												Standard Penetration Test blows/300mm			
20	40	60	80												

0	ft	m	409.93	Ground Surface												
1				Topsoil Approximately 150 millimetres of topsoil.	SS	1	4 6 10 8	16								
2																
3		1														
4			408.10	Sand Brown, reworked in upper levels, trace clay, silt, and gravel, compact.	SS	2	6 10 10 7	20								
5																
6		2	407.80													
7				Sandy Silt Brown, trace to some gravel and clay, compact.	SS	3	6 8 10 11	18								
8																
9																
10		3		End of Borehole												
11																
12																
13		4														
14																
15																
16		5														
17																
18																
19																
20		6														
21																
22				NOTES: 1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 2.1 metres. 2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
23		7														
24																
25																
26		8														
27																
28																
29		9														

NOTES:

1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 2.1 metres.
2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 6, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 004

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838792

E: 546044



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
Standard Penetration Test															
blows/300mm															
20 40 60 80															

ft	m	405.55	Ground Surface												
0	0	405.35	Topsoil												
1			Approximately 200 millimetres of topsoil.		SS	1	2 3 5 6	8							
2			Sandy Silt Brown, trace to some clay, trace gravel, reworked in upper levels, loose.												
3	1				SS	2	4 3 3 5	6							
4															
5			Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, wet, compact to dense.												
6	2	403.70			SS	3	8 10 12 15	22							
7															
8					SS	4	8 10 11 10	21							
9															
10	3		Transition to grey.												
11					SS	5	8 10 23 30	33							
12															
13	4														
14															
15			End of Borehole												
16	5	400.70			SS	6	3 11 18 23	29							
17		400.40													
18															
19															
20	6														
21															
22															
23	7														
24															
25															
26	8														
27															
28															
29	9														

NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 5, 2021 to termination at a depth of 5.2 metres.

2. Borehole was recorded as open and 'wet' at a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

August 6, 2021 - 2.74 metres below ground surface.

August 27, 2021 - 1.75 metres below ground surface.

February 23, 2021 - 1.33 metres below ground surface.

NOTES:

- Borehole was advanced using hollow stem auger equipment on August 5, 2021 to termination at a depth of 5.2 metres.
- Borehole was recorded as open and 'wet' at a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.
- A monitoring well was installed. The following free groundwater level readings have been measured:
August 6, 2021 - 2.74 metres below ground surface.
August 27, 2021 - 1.75 metres below ground surface.
February 23, 2021 - 1.33 metres below ground surface.

Drill Method: Hollow Stem Augers

Drill Date: August 5, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 005

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838939

E: 545636



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
												Standard Penetration Test blows/300mm			
				20	40	60	80								
ft	m		Ground Surface												
0	412.10		Topsoil Approximately 200 millimetres of topsoil.		SS	1	2 4 5 7	9							
1	411.90														
2															
3	1														
4			Sandy Silt Brown, reworked in upper levels, trace to some clay, increasing clay content with depth, occasional gravel, loose to compact.		SS	2	1 3 3 5	6							
5															
6															
7	2														
8	410.00		End of Borehole												
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22			NOTES:												
23			1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 2.1 metres.												
24			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.												
25			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
26															
27															
28															
29															
9															

NOTES:

- Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 2.1 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 006

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4839162

E: 545871



Depth ftm	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲10203040▲			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm ●20406080●			
0	420.91		Ground Surface												
1	420.70		Topsoil Approximately 200 millimetres of topsoil.	SS	1	4 4 4 4	8								
2			Sand Brown, reworked in upper levels, trace rootlets, loose to compact.												
3				SS	2	3 5 6 6	11								
4	419.40		Sandy Silt Brown, trace clay, increasing clay content with depth, loose to compact.												
5				SS	3	5 6 6 7	12								
6															
7				SS	4	3 4 4 4	8								
8															
9															
10				SS	5	5 11 10 15	21								
11	417.30		End of Borehole												
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															

NOTES:

- Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.6 metres.
- Borehole was recorded as wet at depth of 2.0 metres, and caved to a depth of 2.4 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 007

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838910

E: 546126



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲ 10 20 30 40 ▲			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test ● blows/300mm ●			
												20	40	60	80
0	408.39		Ground Surface												
1	408.10		Topsoil Approximately 250 millimetres of topsoil.	SS	1	3 5 6 7	11								
2			Sandy Silt Brown, trace rootlets, trace clay, reworked in upper levels, increasing clay content with depth, compact.	SS	2	10 8 10 10	18								
3	406.90		Clayey Silt Brown, trace to some sand and gravel, stiff to hard.	SS	3	3 5 6 6	11		2.0						
4				SS	4	5 7 10 18	17		2.5						
5	404.70			SS	5	24 36 50/5"	100		>4.5						
6			End of Borehole												
7			NOTES: 1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.0 metres. 2. Borehole was recorded as open and dry upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												

NOTES:

- Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.0 metres.
- Borehole was recorded as open and dry upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

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E: info@soil-mat.ca

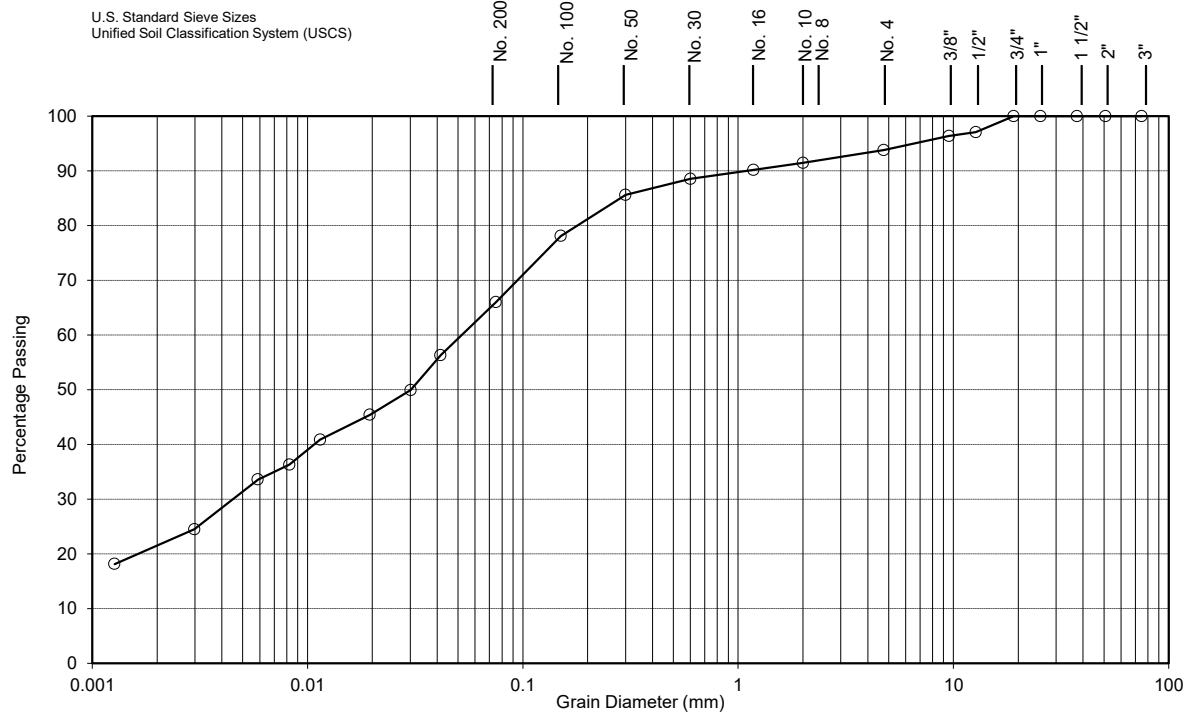
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Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Mechanical & Hydrometer Analyses

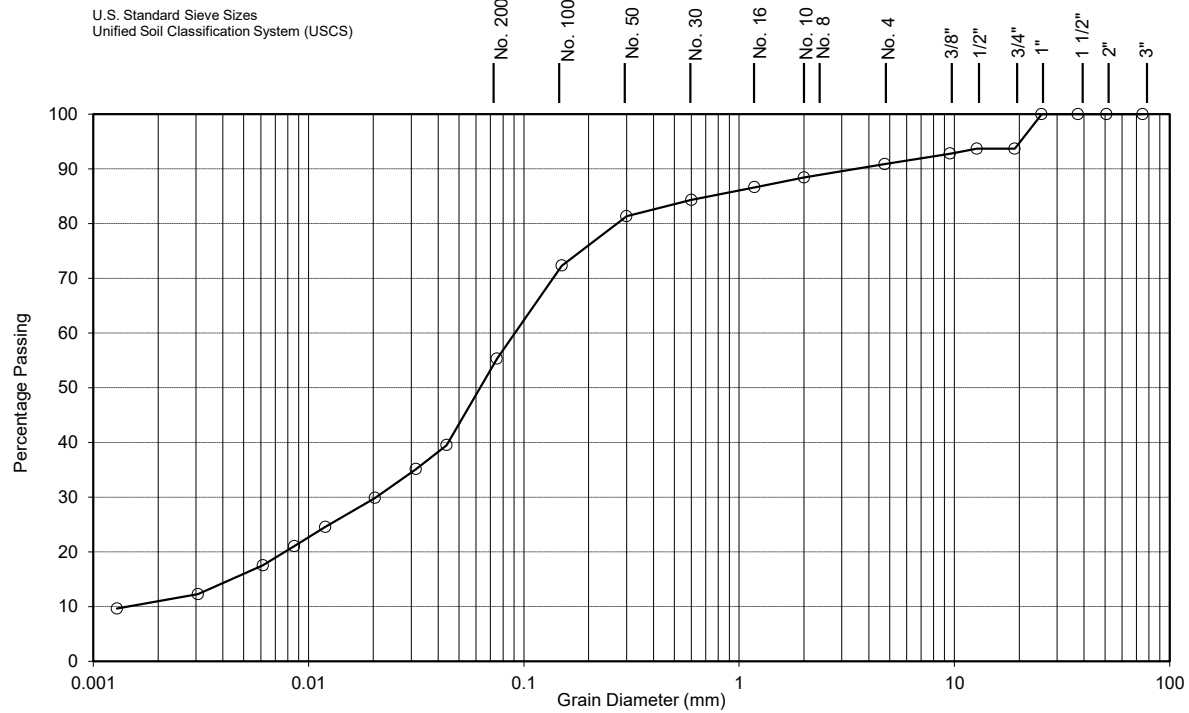


CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.: 21-335	Notes: Depth: 5'	
Sample No.: 3		
Borehole No.: 2		
CLAY [%]: 22	Soil Description: Brown Sandy Silt w/ some Clay and trace Gravel M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity	
SILT [%]: 44		
SAND [%]: 28		
GRAVEL [%]: 6		
D ₁₀ (Effective Diam. in mm): 0.0005	Estimated Infiltration Rate [mm/hr] : < 10	Estimated Permeability, k [cm/s] 10⁻⁷
	Coefficient of Uniformity C _u : 102.0	Coefficient of Curvature C _c : 0.8
SOIL-MAT ENGINEERS & CONSULTANTS LTD.		
7581 Sideroad 15, Elora ON		
August 2021	Grain Size Analysis No. 1	Project No.: SM 301951-T



Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.:	21-336	Notes: Depth: 10'	
Sample No.:	5		
Borehole No.:	4		
CLAY [%]:	11	Soil Description: Brown Sandy Silt w/ some Clay and trace Gravel M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity	
SILT [%]:	44		
SAND [%]:	36		
GRAVEL [%]:	9		
D ₁₀ (Effective Diam. in mm):	0.0015	Estimated Infiltration Rate [mm/hr] :	10 to 15
		Estimated Permeability, k [cm/s]	10 ⁻⁶
		Coefficient of Uniformity C _u :	60.0
		Coefficient of Curvature C _c :	3.3

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Sideroad 15, Elora ON

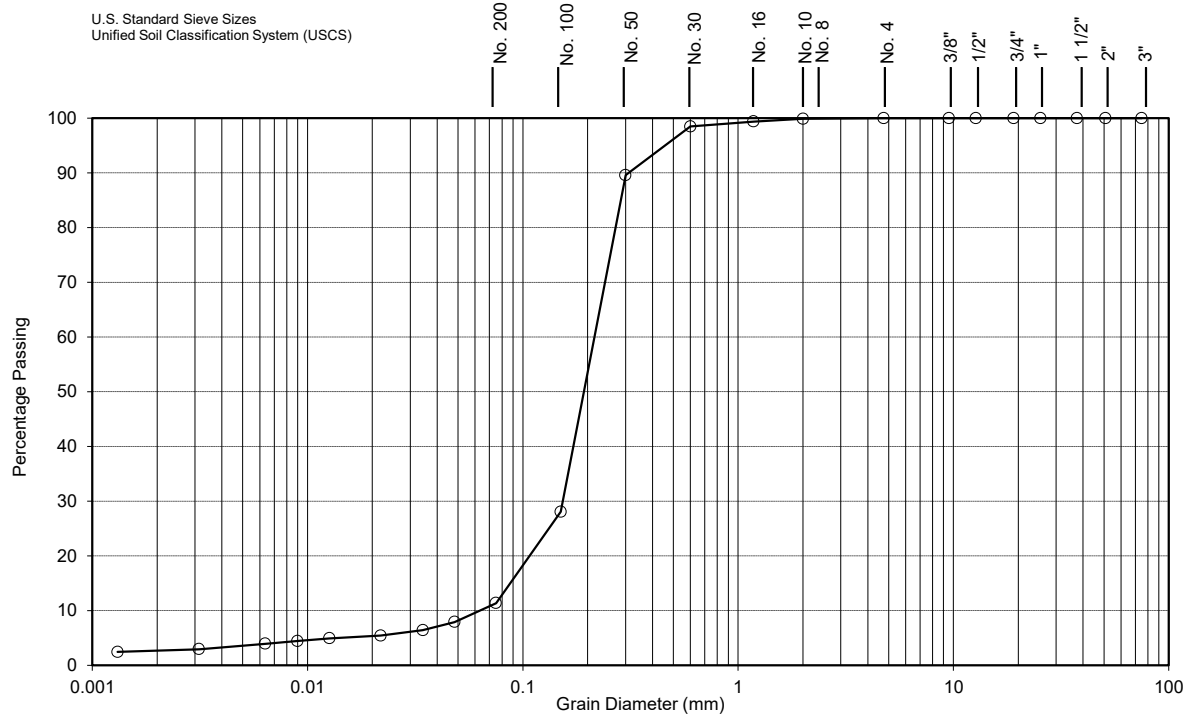


August 2021

Grain Size Analysis No. 2

Project No.: SM 301951-T

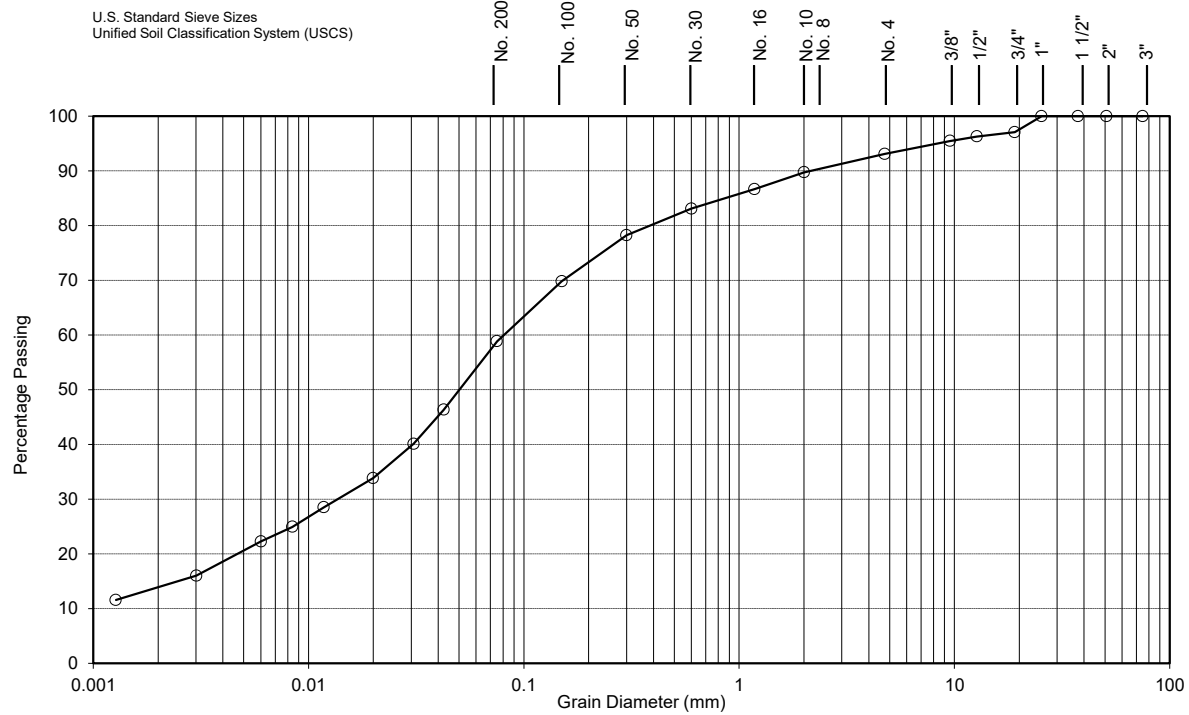
Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.:	21-337	Notes: Depth: 7.5'					
Sample No.:	4						
Borehole No.:	5						
CLAY [%]:	2	Soil Description: Brown Sand w/ traces of Silt and Clay S.P. - Poorly graded sands, little or no fines					
SILT [%]:	9						
SAND [%]:	89						
GRAVEL [%]:	0	Estimated Infiltration Rate [mm/hr] :		100 to 150	Estimated Permeability, k [cm/s]	10 ⁻³ to 10 ⁻²	
D ₁₀ (Effective Diam. in mm):	0.0600	Coefficient of Uniformity C _U :		3.7	Coefficient of Curvature C _C :		1.9
SOIL-MAT ENGINEERS & CONSULTANTS LTD.							
75 Woolwich Street East, Elora ON							
August 2021		Grain Size Analysis No. 3		Project No.: SM 301951-T			

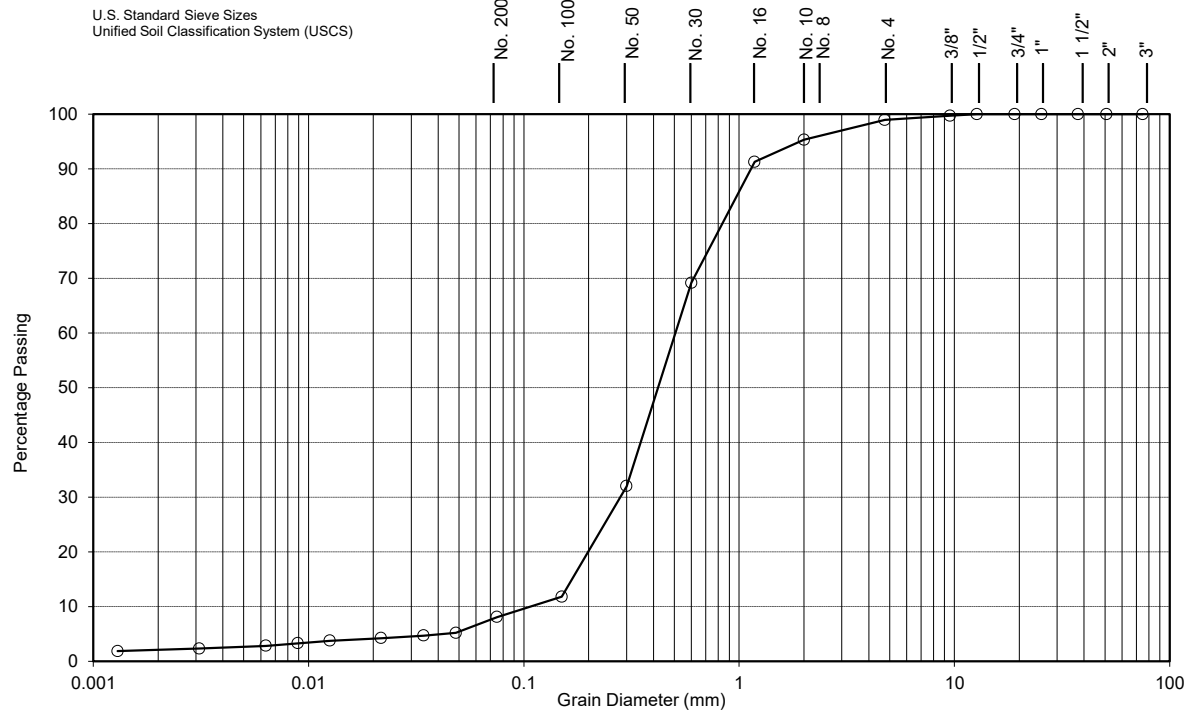
Mechanical & Hydrometer Analyses



Lab No.:	21-338	Notes: Depth: 5'			
Sample No.:	3				
Borehole No.:	7				
CLAY [%]:	14	Soil Description: Brown Sandy Silt w/ some Clay and trace Gravel M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity			
SILT [%]:	45				
SAND [%]:	34	Estimated Infiltration Rate [mm/hr] : < 10 Estimated Permeability, k [cm/s] 10⁻⁶			
GRAVEL [%]:	7				
D ₁₀ (Effective Diam. in mm):	0.00100	Coefficient of Uniformity C _U : 80.0	Coefficient of Curvature C _C : 2.1		
SOIL-MAT ENGINEERS & CONSULTANTS LTD.					
75 Woolwich Street East, Elora ON					
August 2021	Grain Size Analysis No. 4		Project No.: SM 301951-T		



Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.:	21-339	Notes: Depth: 15'	
Sample No.:	6		
Borehole No.:	8		
CLAY [%]:	2	Soil Description: Brown Sand w/ traces of Silt, Clay and Gravel S.P. - Poorly graded sands, little or no fines	
SILT [%]:	6		
SAND [%]:	91		
GRAVEL [%]:	1		
D ₁₀ (Effective Diam. in mm):	0.10	Estimated Infiltration Rate [mm/hr] :	150 to 300
		Coefficient of Uniformity C _u :	5.1
		Estimated Permeability, k [cm/s]	10 ⁻²
		Coefficient of Curvature C _c :	1.5

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

75 Woolwich Street East, Elora ON

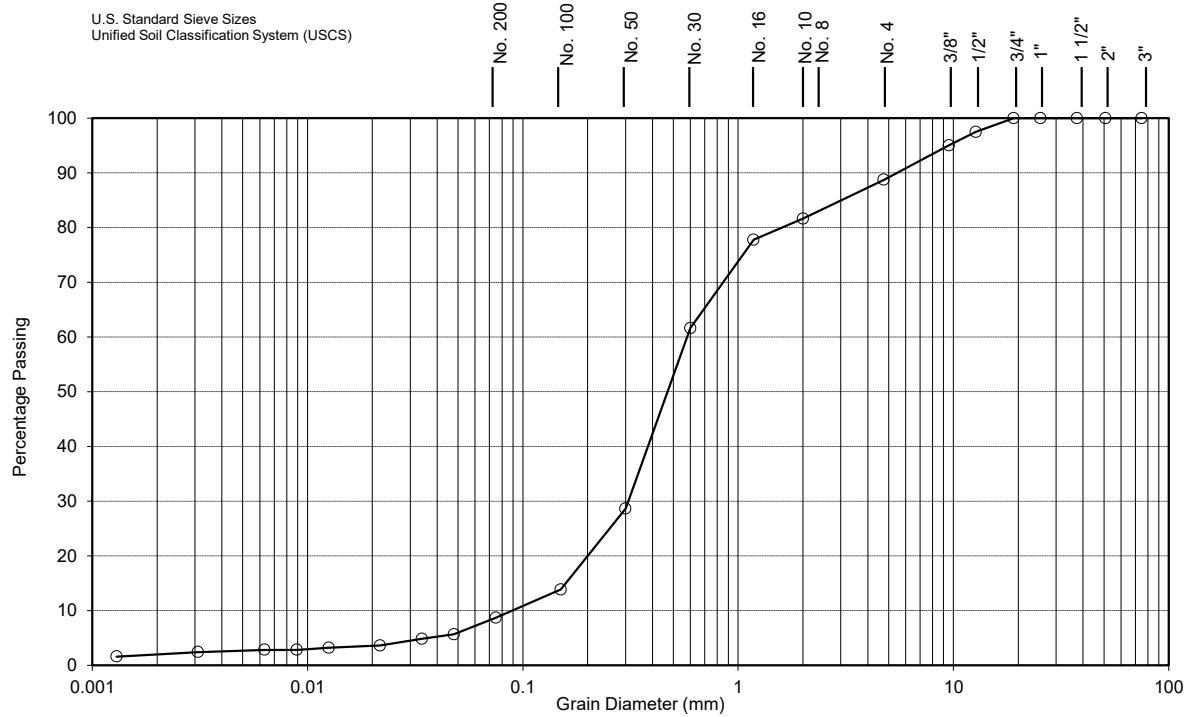


August 2021

Grain Size Analysis No. 5

Project No.: SM 301951-T

Mechanical & Hydrometer Analyses



SOIL-MAT ENGINEERS & CONSULTANTS LTD.

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PROJECT No.: SM 301951-G

July 20, 2022

CACHET DEVELOPMENTS
361 CONNIE CRESCENT, SUITE 200
Concord, Ontario
L4K 5R2

Attention: Marcus Gagliardi
Development Planner

**DRAFT HYDROGEOLOGICAL ASSESSMENT
PROPOSED RESIDENTIAL DEVELOPMENT
CLAYTON AND ELORA SANDS
ELORA, ONTARIO**

Dear Mr. Gagliardi,

Further to your recent correspondence and discussions, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has prepared the following hydrogeological assessment based on the updated groundwater information to date. These comments are further to our Preliminary Geotechnical and Hydrogeological Investigation reports for the subject lands [SM 301951A-G and SM 301951B-G, dated October 14, 2021 and March 11, 2022], and recent discussions with the design team. As such, this hydrogeological report should be read in conjunction with our previous reports stated above. It is also noted that this report marks the completion of all of the proposed drilling fieldwork, and as such a new borehole numbering system has been implemented.

1. INTRODUCTION

We understand that the project will involve the construction of a residential development on the Clayton Lands located at 75 Woolwich Street East [Clayton Lands] in Elora, Ontario, along with potential future development on the Elora Sands [Elora Sands] to the east. The development details are to be established, but are anticipated to consist of single-family dwellings and townhouses along asphalt paved roadways, including the installation of associated underground municipal services. The purpose of this hydrogeological assessment is to provide additional and more detailed information and comments to support the assessment of site servicing options for the proposed development, from a geotechnical point of view.

2. PROCEDURE

Ten [10] and fifteen [15] sampled boreholes were advanced on the Clayton and Elora Sands respectively, totalling twenty-five [25] boreholes at the locations illustrated in the attached Drawing No. 1, Borehole Location Plan. The boreholes were advanced using continuous flight power auger equipment between August 5, 2021 and April 18, 2022 under the direction and supervision of a staff member of SOIL-MAT ENGINEERS & CONSULTANTS LTD., to termination at depths of between approximately 2.1 and 8.2 metres below the existing ground surface.

Representative samples of the subsoils were recovered from the borings at selected depth intervals using split barrel sampling equipment driven in accordance with the requirements of ASTM test specification D1586, Standard Penetration Resistance Testing. After undergoing a general field examination, the soil samples were preserved and transported to the SOIL-MAT laboratory for visual, tactile, and olfactory classifications. Routine moisture content tests were performed on all soil samples recovered from the borings. Selected samples were also subjected to laboratory grain size analyses to allow for an estimate of the hydraulic conductivity of the subsurface soils. It is noted that slug testing will be performed on a number of the monitoring wells to get a more accurate in-situ measurement of the hydraulic conductivity, results of which will be summarised in a subsequent supplemental report.

Upon completion of drilling, groundwater monitoring wells were installed at Borehole Nos. 004, 101, 102, 104, 201, 201A, 202, 203, 204, 205, 206, 301 through 305, and 401 to allow for the future monitoring of the groundwater level. The monitoring well consisted of 50-millimetre PVC pipe screened in the lower 1.5 to 3.0 metres. The monitoring wells were encased in well filter sand up to approximately 0.3 metres above the screened portion, then with bentonite 'hole plug' to the surface and fitted with a protective steel 'stick up' casing. The remaining boreholes were backfilled in general accordance with Ontario Regulation 903, and the ground surface was reinstated even with the surrounding grade. The depths screening intervals for each monitoring well has been summarized below.

Monitoring Well ID	Depth (m)	Screening Interval (m)
MW004	4.6	3.0 – 4.6
MW101	6.1	4.6 – 6.1
MW102	4.6	3.8 – 4.6
MW104	7.6	4.6 – 7.6
MW201	4.6	3.8 – 4.6
MW201A	3.0	2.2 – 3.0
MW202	6.1	4.6 – 6.1

Monitoring Well ID	Depth (m)	Screening Interval (m)
MW203	6.1	4.6 – 6.1
MW204	4.6	3.0 – 4.6
MW205	4.6	3.0 – 4.6
MW206	7.6	6.1 – 7.6
MW301	7.6	6.1 – 7.6
MW302	7.6	6.1 – 7.6
MW303	7.6	6.1 – 7.6
MW304	6.1	4.6 – 6.1
MW305	3.0	2.3 – 3.0
MW401	6.1	4.6 – 6.1

The boreholes were located in the field by representatives of SOIL-MAT ENGINEERS, based on accessibility over the site, clearance of underground utilities, and the drawing that was forwarded to our office. Best efforts were made to minimize crop damage by locating the majority of the boreholes to the perimeter of the fields. The ground surface elevation at all of the borehole locations with the exception of Borehole Nos. 301 through 307 have been referenced to a geodetic benchmark, described as North American 1983 CSRS, as per the survey plan completed by POI Aerial, dated August 10, 2021, which was provided to our office. The ground surface elevations at Borehole Nos. 301 through 307 have been linearly interpolated based on the topographic survey provided by BSR&D (Reference No. 21-14-573-00-topo) dated January 4, 2022 which was provided to our office. Once a complete topographic survey has been completed with up-to-date geodetic elevations of Borehole Nos. 301 through 307, this report will be updated.

Details of the conditions encountered in the boreholes, together with the results of the field and laboratory tests, are presented in Log of Borehole Nos. 001 to 007, 101 to 104, 201 to 206, 301 to 307, and 401, inclusive, following the text of this report. It is noted that the boundaries of soil types indicated on the borehole logs are inferred from non-continuous soil sampling and observations made during drilling. These boundaries are intended to reflect transition zones for the purpose of geotechnical design and therefore should not be construed at the exact depths of geological change.

2. SUBSURFACE CONDITIONS

The subsurface are presented in detail in our referenced Preliminary Geotechnical Investigation report. To summarize, the soil conditions encountered on the Elora Sands generally consisted of a sandy silt/silty sand deposit in the upper levels with some areas and layers of clayey sandy silt till with depth. The soils encountered on the perimeter of the site were highly variable, often encountering layered deposits of clayey sandy silt till

or sand. Occasional deposits of gravelly sand were encountered within some of the boreholes. As such, the presence of permeable granular deposits or 'veins' should be expected across the site. In areas where the presence of a predominately clayey material is expected or would be beneficial, such as in the area of the proposed SWM pond, it may be prudent to advance a series of test excavations to confirm the condition of the subsurface soils including composition, groundwater conditions, suitability for use as an impermeable SWM pond liner, etc.

The Clayton Lands was generally characterised by an upper layer consisting of a clayey sandy silt till underlain by a sand deposit that extended to deep depths. Some isolated areas were encountered that contained a more impermeable clayey sandy silt till. Representative geological cross sections are illustrated in Drawing Nos. 3, 4 and 5, attached.

A review of available published information [Quaternary Geology of Ontario, Southern Sheet Map 2556] indicate the subsurface soils to be in areas noting to consist of stone-poor sandy silt to silty sand-textured till, ice-contact stratified deposits of sand and gravel, with minor silt and clay, as well as river deposits of coarse gravel. These conditions are consistent with the observations during drilling.

Grain size analyses were conducted on sixteen [16] selected samples of the native soils recovered from the boreholes. The results of this grain size testing can be found appended to the end of this report, and are summarized as follows:

TABLE A
GRAIN SIZE ANALYSES

Elora Sands							
Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Hydraulic Conductivity, k [cm/s]	Estimated Infiltration Rate, [mm/hr]
BH003 SS3	1.5 m	22	44	28	6	10^{-7}	<10
BH004 SS5	3.0 m	2	7	80	11	10^{-2}	150 to 300
BH006 SS5	3.0 m	11	44	36	9	10^{-6}	10 to 15
BH201 SS2	1.5 m	5	17	76	2	10^{-4}	50
BH202 SS2	1.5 m	30	38	26	0	10^{-8}	<10
BH202 SS5	6.1 m	10	51	39	0	10^{-6}	10 to 15
BH203 SS2	1.5 m	3	17	37	43	10^{-4}	50 to 60
BH203 SS5	6.1 m	3	8	87	2	10^{-3}	125 to 150
BH204 SS2	1.5 m	16	34	30	20	10^{-7}	10
BH205 SS3	3.0 m	2	4	94	0	10^{-3}	150 to 300

Clayton Lands							
Sample ID	Depth	% Clay	% Silt	% Sand	% Gravel	Hydraulic Conductivity, k [cm/s]	Estimated Infiltration Rate, [mm/hr]
BH102 SS6	4.6 m	2	6	91	1	10^{-2}	150 to 300
BH103 SS3	1.5 m	14	45	34	7	10^{-6}	10
BH104 SS4	2.3 m	2	9	89	0	10^{-3} to 10^{-2}	100 to 150
BH302 SS2	1.5 m	2	3	95	0	10^{-2}	150 to 300
BH304 SS2	1.5 m	16	40	33	11	10^{-7}	10
BH305 SS2	1.5 m	7	16	77	0	10^{-4}	50 to 60

The field and laboratory testing demonstrate the native soils to generally consist of a sandy silt/clayey silt with some clay and traces of gravel in the upper levels, transitioning to a highly permeable sand with traces of clay, silt, and gravel at depth. According to the Unified Soil Classification System (USCS), the soils are classified as M.L. – inorganic silts and very fine sands, clayey silts with slight plasticity in the upper levels overlying S.P. – poorly graded sands, with little to no fines to S.M. – Sand-silt mixtures at depth.

The clay and silt soils would generally behave as a cohesive material with slight to medium plasticity, and low hydraulic conductivity, on the order of 10^{-6} to 10^{-7} cm/sec, and would be of low permeability to effectively impermeable. The on-site clayey soils would generally be considered suitable for use as an impermeable clay liner for the stormwater management (SWM) pond, however should be confirmed with more specific testing and assessment, and would require selecting sorting to separate out from more sandy deposits. Further testing should be conducted within the area of the proposed stormwater management pond [SWM] in order to confirm the suitability of the clayey material for use as an impermeable liner.

The sand deposit would tend to yield a highly permeable characteristic. Provided that the low impact development (LID) stormwater management systems are located within the highly permeable sand deposits, the hydraulic conductivity for this material would be on the order of 10^{-2} to 10^{-4} cm/sec yielding infiltrations rates in the range of 50 to 300 mm/hr. LID systems such as rear yard catch basins, infiltration swales, etc. will be highly effective within the permeable sand soils and will be able to help with natural groundwater recharge as well as maintain pre and post development runoff volumes, specifically on the Clayton Lands. As noted previously, slug testing is slated to be performed within a number of the monitoring wells across the site to yield a more accurate estimate of the hydraulic conductivity of the native soils. Once available,

information on the location of these LID systems should be forwarded to our office in order to target specific areas with the slug testing.

Groundwater Observations

Borehole Nos. 006, 102, and 004 were noted to have 'caved' to depths of between approximately 2.4 to 3.8 metres and 'wet' at depths of between approximately 2.0 to 3.4 metres, while Borehole No. 104 was noted to be open and 'wet' at a depth of 7.0 metres upon completion. Borehole Nos. 103 and 001 were noted to have cave to depths of 2.7 and 1.5 metres, respectively, and dry upon completion. The remainder of the boreholes were noted as being open and 'dry' [i.e. no free groundwater present] upon completion of drilling. It is noted that insufficient time would have passed for the static groundwater level to stabilise in the open boreholes.

As noted above, monitoring wells were installed at Borehole Nos. 004, 101, 102, 104, 201, 201A, 202, 203, 204, 205, 206, 301 through 305, and 401, to allow for future measurements of the static groundwater level. A data logger was in each of the monitoring wells to allow for continuous monitoring of the groundwater level between August 2021 to June 2022, the readings of which have been illustrated in graphs which can be found appended to the end of this report.

In addition, manual monitoring well readings were also taken from all of the installed monitoring well locations across the site on various dates, ranging from August 2021 to June 2022. These have been summarized in the following charts:

TABLE B
SUMMARY OF MANUAL GROUNDWATER READINGS (ELORA SANDS)

Borehole No. 004 (Ground Surface Elevation of 405.55 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	2.74	402.8
August 27, 2021	1.75	403.8
February 23, 2022	1.33	404.2
April 22, 2022	1.47	404.1
June 1, 2022	1.78	403.8

Borehole No. 201 (Ground Surface Elevation of 404.80 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.69	402.1
April 22, 2022	1.88	402.9
June 1, 2022	2.44	402.4

Borehole No. 201A (Ground Surface Elevation of 404.75 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	Dry	<401.8
April 22, 2022	2.05	402.7
June 1, 2022	2.43	402.3

Borehole No. 202 (Ground Surface Elevation of 406.59 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	5.5	401.1
April 22, 2022	4.76	401.8
June 1, 2022	5.43	401.2

Borehole No. 203 (Ground Surface Elevation of 407.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	Dry	<401.0
April 22, 2022	5.90	401.2
June 1, 2022	5.91	401.2

Borehole No. 204 (Ground Surface Elevation of 409.56 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.81	406.7
April 22, 2022	1.16	408.4
June 1, 2022	1.53	408.0

Borehole No. 205 (Ground Surface Elevation of 412.99 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.56	410.4
April 22, 2022	2.25	410.7
June 1, 2022	2.39	410.6

Borehole No. 206 (Ground Surface Elevation of 412.88 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	6.83	406.1
April 22, 2022	4.60	408.3
June 1, 2022	4.66	408.2

Borehole No. 401 (Ground Surface Elevation of 420.91 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
April 22, 2022	2.29	418.6
June 1, 2022	2.39	418.5

TABLE C
SUMMARY OF MANUAL GROUNDWATER READINGS (CLAYTON LANDS)

Borehole No. 101 (Ground Surface Elevation of 408.60 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	4.78	403.8
August 27, 2021	4.71	403.9
October 14, 2021	4.33	404.3
February 23, 2022	4.31	404.3
April 22, 2022	4.07	404.5
June 1, 2022	4.15	404.5

Borehole No. 102 (Ground Surface Elevation of 414.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	3.58	410.6
August 27, 2021	3.61	410.5
October 14, 2021	3.62	410.5
February 23, 2022	3.50	410.6
April 22, 2022	2.89	411.2
June 1, 2022	3.05	411.1

Borehole No. 103 (Ground Surface Elevation of 414.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	6.78	408.1
August 27, 2021	6.96	407.9
October 14, 2021	7.09	407.8
February 23, 2022	6.83	408.0
April 22, 2022	6.13	408.7
June 1, 2022	6.28	408.6

Borehole No. 301 (Ground Surface Elevation of 412.75 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	6.29	406.5
April 22, 2022	5.65	407.1
June 1, 2022	5.71	407.0

Borehole No. 302 (Ground Surface Elevation of 413.00 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	6.62	406.4
April 22, 2022	6.06	406.9
June 1, 2022	6.12	406.9

Borehole No. 303 (Ground Surface Elevation of 414.00 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	5.40	408.6
April 22, 2022	6.04	407.9
June 1, 2022	6.11	407.9

Borehole No. 304 (Ground Surface Elevation of 407.90 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	2.87	405.0
April 22, 2022	2.60	405.3
June 1, 2022	2.96	404.9

Borehole No. 305 (Ground Surface Elevation of 408.60 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	Dry	<405.6
April 22, 2022	Dry	<405.6
June 1, 2022	Dry	<405.6

*Ground surface elevations have been interpolated based on contours from current topographic survey

The available data to date presented above illustrates a variable groundwater level, ranging from about 3 to 6 metres (elevations of between 407 to 411 metres) below the existing ground surface at Borehole Nos. 102, 104, 301, 302, and 303, at the southern half of the Clayton Lands, with the highest groundwater levels during the wet spring months. The groundwater drops to the southwest and to the north, as illustrated on Drawing No. 2, Groundwater Contour Map. The groundwater level drops to ranges of between 3 to 4 metres (elevations of between 404.5 to 405.3 metres) below the existing ground surface at the northern limits of the Clayton Lands. Based on the visual data displayed within the groundwater graphs, the data indicates a relatively stable groundwater level with small fluctuations between the 'wet' and 'dry' months of the year. This can be attributed to highly permeable fine to coarse grained sand and silty sand deposits within the southern half of the Clayton lands. The groundwater level within Borehole No. 304 was noted to be higher in comparison to the other wells, however may be more susceptible to precipitation, resulting in 'perched deposits' of water within the

more permeable above the clayey soils. The groundwater was noted to be deepest on the southern portion of the Clayton Lands, where the soil conditions at the borehole conditions generally indicated more permeable sandy soils until termination. The groundwater was shallowest at the northern portion of the Clayton lands, generally following the physical topography. Where encountered within the boreholes, the clayey deposits would tend to 'trap' the water within the low permeable layer and present a high groundwater condition than would otherwise be found within areas of permeable sandy soils. The manual readings gathered in April 2022 would be considered representative of a seasonal 'high'

The groundwater data gathered on the Elora Sands to date indicate a groundwater level on the order of 1.2 to 4.6 metres (elevations of between 408.5 to 410.7 metres) below the existing ground surface at Borehole Nos. 204, 205, and 206, predominantly located south of the landing strip within the farmer's field. The groundwater drops to the east towards a tributary of the Irvine Creek [also identified as Nichol Drain] with a groundwater elevation of between 402.8 to 404.2 metres measured manually periodically within Borehole No. 004 from August 2021 to June 2022. The groundwater level drops to the north as well towards Nichol Road 15 and where the storm water management pond is proposed. The groundwater level at this location is noted to be stabilizing at an elevation of between roughly 401 to 403 metres. The magnitude of fluctuations demonstrated within these areas are on the order of approximately 2 metres, according to the groundwater data graphs and may be attributed to the soil conditions, which is noted to be more layered.

It is also noted that the groundwater levels and elevations would tend to vary with the elevation changes across the site, which varies significantly. As such, it would be prudent to advance a series of test pits or additional boreholes across the site, specifically in the areas of notably higher groundwater levels and areas of large excavations for deeper services or pumping stations, in order to assess first hand how the groundwater will affect the excavations during site earthworks and servicing.

The direction of groundwater flow has been inferred from these groundwater levels, and has been illustrated on the groundwater contour map Drawing No. 2, Groundwater Contour Map. The direction of groundwater is locally flowing towards the Irvine Creek to the north and west on the Clayton Lands. The groundwater is flowing towards the tributary of the Irvine Creek [Nichol Drain] on the east side of the Elora Sands and to the north towards the Irvine Creek on the west side of the site. As such, the shallow groundwater is contributing to the base flow to the Nichol Drain. Best efforts should be exercised to maintain the overall natural drainage as part of the site grading, stormwater management plan and water balance across the site.

The subsurface soil and groundwater conditions described above are illustrated in the attached geological cross sections, Drawing Nos. 3, 4 and 5.

3. HYDROGEOLOGICAL SETTING AND WATER WELL STUDY

A review of available information, including water well records within an approximate 250 metre radius, was undertaken to inform the hydrogeological setting of the subject lands.

3.1.1 METHODS

Information was compiled for this hydrogeological assessment from sources including:

- Topographic, Bedrock Geology, and Soils maps.
- Ministry of Environment, Conservation and Parks [MOE] Water Well Records.
- Site visit of the property and review of adjacent lands.
- Site specific geotechnical investigation program involving a series of boreholes.

3.1.2 LIMITATIONS AND CONDITIONS

Information for this study was compiled from geological maps and well records for water wells drilled in the study area. Water well locations are approximated in well records using the UTM coordinate system and in some instances may be in error by more than 50 metres. Potential for mapping error therefore exists in correlation of well registration numbers with street addresses. Soils and bedrock descriptions in the well records are limited and generalized regarding formation lithology. Stratigraphic interpretation in this report is based on information from water well records, topographic maps, Paleozoic Geology maps of the area, and geotechnical investigations performed by SOIL-MAT ENGINEERS in the area.

3.2.1 GEOLOGY – OVERBURDEN SOIL

Local soils identified in the Ministry of Northern Development and Mine's "Quaternary Geology of Ontario, Southern Sheet Map M2556" are described predominantly as a silt to sandy silt 'till'. This is consistent with our geotechnical investigation, which found the overburden soils to consist primarily of sandy silt with some areas of sand with trace silt. Grain size analyses of representative soil samples yielded clay content in the range of 2 to 22 percent, silt content of 6 to 45 percent, sand content of 28 to 91 percent, and gravel content of 0 to 11 percent.

3.2.2 GEOLOGY – BEDROCK

Bedrock in the vicinity of the Site is recorded from the Ministry of Northern Development and Mine's "Bedrock Geology of Ontario, Southern Sheet Map M2344," as Limestone and Dolostone of the Guelph Formation. The depth to bedrock, as reported

in MOE water well records for wells in the proximity of the Site, is on the order of approximately 0.3 to 22.6 metres below ground surface.

3.2.3 GROUNDWATER CONDITIONS

The referenced geotechnical investigation for the site provides an estimate of the static groundwater level at approximately 2 to 7 metres below the existing grade. This is consistent with our experience on other nearby development projects. It is noted that the groundwater conditions within the overburden soils would be influenced by prevailing weather conditions and would experience seasonal fluctuation.

3.2.4 WATER WELL INVENTORY

MOE water well records revealed forty-four [44] wells located within an approximate 250 metre radius of the limits of the Site. The location of these available well records is illustrated in the attached Drawing No. 3. The water well records [<https://www.ontario.ca/environment-and-energy/map-well-records>] locations are approximated in well records using the UTM co-ordinate system and in some instances may be in error by more than 50 metres. Potential for mapping error therefore exists in correlation of well registration numbers with street addresses. Soils and bedrock descriptions in the well records are limited and generalized regarding formation lithology.

It is understood that the existing residential properties to the west and north are privately serviced with water wells or cisterns and septic systems, with the existing residential properties to the south and east are serviced with municipal water, storm and sanitary sewers.

The data contained in the water well records suggests that there are two [2] predominant aquifers in the Study Area, one which is considered a confined aquifer within the limestone bedrock at an estimated depth between 17.7 to 79.0 m bgs, with an average static water level of 11.3m. The other is an unconfined aquifer within the sandy silt, situated at an estimated depth between 2 and 7 m bgs. Data contained in MOE Water Well Records for forty-four [44] water wells within the *Study Area* are presented for statistical observations in Table A below.

The information gathered from the records indicates the following:

- Ground water was encountered as shallow as 17.7 metres below ground surface ["m bgs"] and as deep as 79.0 m bgs, with an average depth of 52.5 m bgs during the well drilling.
- Static water levels varied from 0.3 to 41.2 m bgs, with an average static level of 11.3 m bgs, and;
- The Pressure Head varied from 13.4 to 71.0 metres with an average of 41.2 metres.
- Recommended available pumping rates ranging between 3.5 and 25 gpm.
- The water bearing formation lithology reported in the majority of the wells was within the limestone bedrock.

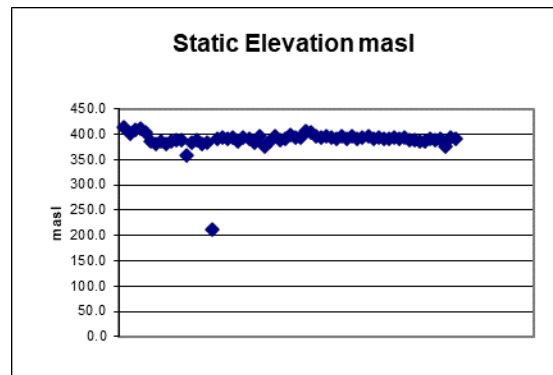
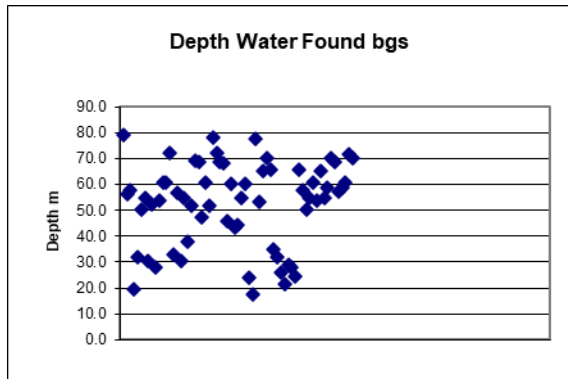
Table 1: Water Well Records – Statistical Observations
Part Lots 15-17 **Total wells =**
Concessions 8-10 **44**

Surface Elevation		Depth found bgs		Elevation found		Static depth bgs		Static Elevation		Pressure Head
fasl	masl	fasl	masl	fasl	masl	ft	m	fasl	masl	m
1380	420.7	259	79.0	1121	341.8	26	7.9	1354	412.8	71.0
1380	420.7	184	56.1	1196	364.6	65	19.8	1315	400.9	36.3
1358	414.0	189	57.6	1169	356.4	20	6.1	1338	407.9	51.5
1355	413.1	64	19.5	1291	393.6	5	1.5	1350	411.6	18.0
1350	411.6	104	31.7	1246	379.9	23	7.0	1327	404.6	24.7
1320	402.4	165	50.3	1155	352.1	57	17.4	1263	385.1	32.9
1300	396.3	180	54.9	1120	341.5	47	14.3	1253	382.0	40.5
1300	396.3	100	30.5	1200	365.9	30	9.1	1270	387.2	21.3
1300	396.3	172	52.4	1128	343.9	53	16.2	1247	380.2	36.3
1298	395.7	91	27.7	1207	368.0	30	9.1	1268	386.6	18.6
1305	397.9	176	53.7	1129	344.2	30	9.1	1275	388.7	44.5
1314	400.6	200	61.0	1114	339.6	35	10.7	1279	389.9	50.3
1314	400.6	200	61.0	1114	339.6	135	41.2	1179	359.5	19.8
1314	400.6	237	72.3	1077	328.4	55	16.8	1259	383.8	55.5
1315	400.9	108	32.9	1207	368.0	36	11.0	1279	389.9	22.0
1300	396.3	186	56.7	1114	339.6	48	14.6	1252	381.7	42.1
1290	393.3	100	30.5	1190	362.8	35	10.7	1255	382.6	19.8
1295	394.8	180	54.9	1115	339.9	60	18.3	1235	376.5	36.6
1300	396.3	125	38.1	1175	358.2	20	6.1	1280	390.2	32.0
1325	404.0	170	51.8	1155	352.1	30	9.1	1295	394.8	42.7
1335	407.0	227	69.2	1108	337.8	50	15.2	1285	391.8	54.0
1335	407.0	226	68.9	1109	338.1	44	13.4	1291	393.6	55.5
1335	407.0	155	47.3	1180	359.8	66	20.1	1269	386.9	27.1
1335	407.0	200	61.0	1135	346.0	45	13.7	1290	393.3	47.3
1330	405.5	170	51.8	1160	353.7	46	14.0	1284	391.5	37.8
1330	405.5	257	78.4	1073	327.1	73	22.3	1257	383.2	56.1
1330	405.5	237	72.3	1093	333.2	33	10.1	1297	395.4	62.2
1325	404.0	225	68.6	1100	335.4	89	27.1	1236	376.8	41.5
1325	404.0	223	68.0	1102	336.0	61	18.6	1264	385.4	49.4
1325	404.0	150	45.7	1175	358.2	27	8.2	1298	395.7	37.5
1325	404.0	198	60.4	1127	343.6	47	14.3	1278	389.6	46.0
1325	404.0	142	43.3	1183	360.7	38	11.6	1287	392.4	31.7
1350	411.6	145	44.2	1205	367.4	39	11.9	1311	399.7	32.3
1345	410.1	180	54.9	1165	355.2	57	17.4	1288	392.7	37.5
1345	410.1	198	60.4	1147	349.7	53	16.2	1292	393.9	44.2
1340	408.5	78	23.8	1262	384.8	4	1.2	1336	407.3	22.6
1325	404.0	58	17.7	1267	386.3	1	0.3	1324	403.7	17.4
1325	404.0	255	77.7	1070	326.2	23	7.0	1302	397.0	70.7

1315	400.9	175	53.4	1140	347.6	24	7.3	1291	393.6	46.0
1320	402.4	214	65.2	1106	337.2	19	5.8	1301	396.6	59.5
1310	399.4	230	70.1	1080	329.3	15	4.6	1295	394.8	65.5
1305	397.9	215	65.5	1090	332.3	22	6.7	1283	391.2	58.8
1305	397.9	114	34.8	1191	363.1	1	0.3	1304	397.6	34.5
1310	399.4	105	32.0	1205	367.4	23	7.0	1287	392.4	25.0
1305	397.9	85	25.9	1220	372.0	6	1.8	1299	396.0	24.1
1310	399.4	70	21.3	1240	378.0	26	7.9	1284	391.5	13.4
1310	399.4	95	29.0	1215	370.4	22	6.7	1288	392.7	22.3
1315	400.9	91	27.7	1224	373.2	14	4.3	1301	396.6	23.5
1315	400.9	81	24.7	1234	376.2	35	10.7	1280	390.2	14.0
1315	400.9	215	65.5	1100	335.4	24	7.3	1291	393.6	58.2
1310	399.4	190	57.9	1120	341.5	30	9.1	1280	390.2	48.8
1305	397.9	165	50.3	1140	347.6	24	7.3	1281	390.5	43.0
1310	399.4	179	54.6	1131	344.8	20	6.1	1290	393.3	48.5
1320	402.4	200	61.0	1120	341.5	34	10.4	1286	392.1	50.6
1320	402.4	176	53.7	1144	348.8	30	9.1	1290	393.3	44.5
1320	402.4	214	65.2	1106	337.2	43	13.1	1277	389.3	52.1
1315	400.9	180	54.9	1135	346.0	38	11.6	1277	389.3	43.3
1305	397.9	193	58.8	1112	339.0	40	12.2	1265	385.7	46.6
1305	397.9	230	70.1	1075	327.7	39	11.9	1266	386.0	58.2
1315	400.9	225	68.6	1090	332.3	34	10.4	1281	390.5	58.2
1305	397.9	188	57.3	1117	340.5	26	7.9	1279	389.9	49.4
1310	399.4	192	58.5	1118	340.9	30	9.1	1280	390.2	49.4
1310	399.4	200	61.0	1110	338.4	77	23.5	1233	375.9	37.5
1325	404.0	235	71.6	1090	332.3	35	10.7	1290	393.3	61.0
1325	404.0	230	70.1	1095	333.8	44	13.4	1281	390.5	56.7
		Avg.=	52.5	Avg.=	350.1	Avg.=	11.3	Avg.=	391.3	41.2
		SdevP=	16.2	SdevP=	16.3	SdevP=	6.6	SdevP=	8.4	14.6

Water bearing formation

<i>Formation</i>	#	%
Overburden	0	0
Bedrock	44	100

**Table D – MOE Water Well Record Statistical Observations**

The term aquifer here generally refers to a geologic unit(s) or formation permeable enough to yield economic quantities of water to wells. The term aquitard refers to a geologic unit(s) or formation with insufficient permeability to supply production wells. Aquifers and aquitards are interpreted here based on statistical observation of data contained in the MOE water well records. Hydrographs of water levels are normally not kept for private wells, therefore historical fluctuations in water levels are not known.

3.3 HYDROGEOLOGICAL SETTING

Based on the available information the following comments can be made:

- There are two [2] predominant aquifers in the Study Area, one which is considered a confined aquifer within the limestone bedrock at an estimated depth between 17.7 to 79.0 m bgs, with an average static water level of 11.3m. The other is an unconfined aquifer within the sandy silt, situated at an estimated depth between 2 and 7 m bgs.;
- In each case the aquifer within the limestone bedrock exhibited a positive pressure head [i.e., the static water level is above the elevation where the groundwater was encountered] in each well record, indicating the aquifer was under confined artesian conditions with respect to the confining layer.
- Pressure head (hydraulic head above aquifer) ranged from 13.4 to 71.0 metres with an average of 41.2 metres;
- Recommended available pumping rates ranging between 3.5 and 25 gpm.

Given the above, any active potable water wells in the area would be at greater depths as drilled bedrock wells. Such wells would be drawing water from within the limestone bedrock aquifer. The overburden soils consist of primarily sand and silty sands, with less permeable clayey silt. The shallow groundwater condition on the site is typical of an unconfined near surface aquifer, which would be influenced by seasonal weather conditions, drainage, and the presence of variable more permeable seams in the overburden soils.

4. EARTHWORKS AND SITE GRADING OPERATIONS

Based on the provided preliminary grading plan forwarded to our office by MTE (Project No. 50250-100, F16-FG.dwg) dated April 7, 2022 some cut and fill on the order of 2 to 4 metres will take place. Despite the moderate cut and fill operations, the preliminary grading plan has taken into consideration the groundwater elevations across this parcel of land, such that fill operations will take place on the northern portion of the site where groundwater was noted to be highest and cut operations in the middle and south portions of the site, where groundwater was observed to be deepest. It would be expected that natural surface drainage would result in pooling of water in low spots across the site, which are noted to be within the areas of fill. The predominantly sandy soils on the Clayton Lands will promote natural infiltration and will make site servicing easier, provided that contractors work their way from the low end of the site to the high end of the site.

At this time a preliminary site servicing and grading plan for the Elora Sands has not been provided to our office, as the potential development of those lands is a future

consideration. However, the existing topography of this parcel of land contains larger undulations and changes in elevations. Therefore, it is anticipated that the cut and fill operations for this parcel of land will require more significant regrading. It is recommended that the cut/fill operations be handled in a similar manner as the Clayton Lands, such that fill operations take place where groundwater is shallowest at the northern portion of the site and cut operations take place where the deepest groundwater was encountered at the southern end of the site. As noted above, the Elora Sands generally consists of sandy silt/silty sand within the upper levels, transitioning to a clayey sandy silt with depth, however is more variable at times with clayey or gravelly deposits. As such, 'perched' water deposits within the permeable seams may yield 'wet' excavated material. Contractors should anticipate difficulties with base stabilisation and engineered fill works when work is conducted during the 'wet' times of the year. It is recommended that where possible, earthworks be conducted during the dry summer months. Where engineered fill occurs during the 'wet' times of the year, considerable delays and challenges in achieving effective compaction associated with wet soil conditions may be incurred and should be anticipated. It may be necessary to spread a thin lift of wet backfill to 'air dry' for several days or more if engineered fill is undertaken during the 'wet' times of the year.

5. HYDROGEOLOGICAL CONSIDERATIONS

As noted above, it is understood that the development is anticipated to consist of single-family dwellings and townhouse blocks, including the installation of associated underground municipal services along asphalt paved roadways. Excavations for the proposed development services are expected to extend to depths of up to approximately 2 to 5 metres below the existing ground surface, while excavations for foundations would be expected to extend up to approximately 1.5 to 2 metres. Measurements of the groundwater level at the monitoring well locations indicate a groundwater level on the order of approximately 2 to 7 metres below the existing ground surface, generally 3.5 to 7 metres over the Clayton lands presently proposed for development. The groundwater level is shallower to the east, approaching the Irvine Creek tributary [Nichol Drain], generally following the drop in topography toward the creek. As the conditions consisted mostly of the permeable sand on the Clayton Lands, the groundwater level between the 'wet' and 'dry' seasons of the year was relatively consistent with little to no fluctuation. These conditions, with relatively permeable soil conditions at depth, and groundwater at sufficient depth, are well suited to proposed development. The generally permeable condition of the native sand deposit present over the site will generally allow for natural drainage and movement of groundwater. As such, it is not considered likely that service trenches would present any conflict or impact to the natural groundwater conditions.

The exception might be deeper trunk sewers, which would warrant closer assessment as the detailed design proceeds.

Shallower groundwater was observed on the Elora Sands at the northern portion of the site where more clayey and gravelly deposits were encountered, as noted above. These deposits are likely to trap and create a 'perched' water condition which may exacerbate the infiltration of groundwater into open excavations, however would likely be able to be handled with conventional dewatering methods and techniques. Furthermore, the fluctuations in groundwater level were higher on the Elora Sands as the soils conditions encountered within the boreholes consisted of more clayey deposits.

The short-term excavations for the proposed servicing are generally anticipated to extend through the permeable sandy soils and into the clayey sandy silt till where deeper excavations are required. Where the site calls for the placement of engineered fill, raising the grade, it would create an even larger separation between the groundwater table and the proposed servicing and foundation construction. Excavations would be expected to be subject to relatively minor groundwater infiltration, such that it should be possible to adequately control such infiltration using conventional construction dewatering techniques such as pumping from sumps in the base of the excavation. However, during wet times of year and in deeper excavations, some instability of the excavations should be expected. In the event that deeper excavations are required below the groundwater level or where more permeable sand and gravel seams are encountered, a greater rate of infiltration should be anticipated, requiring multiple pumps and possibly more sophisticated dewatering techniques for deeper excavations.

The rate of dewatering would be a function of the time of year, depth of excavation, length of trench opened by the contractor, etc. In most cases it is expected to be below 50,000 L/day, though for deeper excavations may be as much as up to 400,000 L/day. Where dewatering rates of greater than 50,000 L/day are anticipated it would be necessary to file an EASR notice for construction dewatering. However, it is not anticipated that dewatering would be greater than 400,000 L/day, and so the need for a permit to take water [PTTW] is not expected. As noted above, the advancement of a number of test pits, would be prudent to assist in refining the anticipated construction dewatering requirements as the design of the site grading and servicing proceeds.

The layering of sandy and clayey soils encountered specifically on the Elora Sands would allow for some natural drainage and movement of groundwater, however given the high silt content this should not be solely relied upon. As such, excavations may have the potential to intercept shallow groundwater on parts of the site and thus create a "French Drain" within the bedding material, with possible affect to the groundwater.

Consequently, if groundwater is encountered during digging of the service trenches, measures may need to be implemented to mitigate/eliminate groundwater interference. These would include clay cut-offs within the service trench fill encasing the pipe/service. Such clay cut-offs should be installed in accordance with OPSD 80.095, using a suitable clay soil or alternatively a blend of 1 part bentonite chips to 3 parts OPSS Granular A, or suitably clayey soil encountered on site. The need for such measures is best assessed as the detailed design proceeds, and in the field during construction. Regardless, any such locally lowering of the groundwater associated with site servicing would be limited to the near surface soils, and would not be expected to significantly impact the regional groundwater conditions.

Excavations for the proposed basement levels should be well above the groundwater level, pending review of the final site grading plans and foundation depths, along with more detailed assessment such as test pits in the area of observed shallow groundwater levels. With proper consideration to the site grading and design founding elevations, it is not anticipated that foundation excavations would require ongoing groundwater control, other than typical perimeter weeping tile and sump pumps.

The final grading of the site should appropriately consider the groundwater levels in order to minimise or avoid conflict or impact to the groundwater during pre and post construction. In this regard the grading and storm water management plan should accommodate surface runoff that follows the existing overall drainage patterns as much as possible.

It is also noted that the use of Low Impact Design [LID] methods as part of the stormwater management for the proposed development would be viable for much of the site and should be considered. The permeable sand deposit predominantly on the Clayton Lands, above the groundwater level, would afford an opportunity for natural infiltration of surface runoff, such as in 'dry' ponds, infiltration galleries, rear yard infiltration swales or galleries, etc. As noted above, the sand deposit would have hydraulic conductivity on the order of 10^{-2} to 10^{-3} cm/sec, correlating to design infiltration rates on the order of 100 to 300 mm/hr. The use of infiltration systems could be readily utilised for lot level infiltration of rain water from downspouts, and also within the overall SWM plan. The soil conditions on the Elora Sands are more variable and contain more clayey deposits which are considered to have a low permeability characteristic. Preliminary grain size analyses on the clayey sandy silt till indicate a hydraulic conductivity on the order of 10^{-6} to 10^{-8} cm/sec, correlating to design infiltration rates on the order of less than 10 to 15 mm/hr. As such, LID systems aren't recommended where areas of clayey sandy silt till are encountered [generally the lower areas of the site, towards the tributary to Irvine Creek] but should be considered in areas consisting

of the more permeable sandy deposits [generally the higher portions of the site, to the south]. This would be better addressed during the detailed design process, supported with the advancement of test pits at specific locations proposed for LID measures. It is noted that single well response testing will be performed in a number of the monitoring wells installed which will allow for a more accurate estimate of the hydraulic conductivity for the various soil layers.

Based on our observations and details of the proposed development, it is not anticipated that the proposed construction will have an adverse impact on the groundwater condition in the area, provided the comments and recommendations provided in this report are adhered to. There is not expected to be a significant or long-term impact on the development, such as ongoing dewatering, etc., provided the above discussion and recommendations are considered in the site grading, servicing and stormwater design.

As outlined above, the hydrogeological setting of the site is such that potable wells in the area would be drawing from a deep confined bedrock aquifer, and would be largely unaffected by potential construction activities encountering the shallow near surface groundwater regime. Construction of the proposed development would involve relatively shallow excavations only, with limited interaction with the shallow groundwater regime, and would not have an impact on deeper supply aquifers. As such, there would be no anticipated negative impact from the proposed development on nearby potable wells, including municipal supply wells. Further, as the proposed development would be provided with municipal water supply, there would be no impact to potential supply aquifers or associated water wells in the area, if any.

It is noted that the subject lands are within a Wellhead Protection Area (WHPA). However, based on the comments noted above, there will be no anticipated negative impact with respect to the deep bedrock aquifer serving as the potable supply source for private and municipal potable wells within the area.

6. STORMWATER MANAGEMENT (SWM) POND DESIGN CONSIDERATIONS

As noted above, the static groundwater level at the northern portion of the Elora Sands is on the order of 0.5 to 4.5 metres below the existing ground surface, at a relative elevation of roughly 403 to 401 metres, based on the available groundwater data to date. The groundwater charts for the monitoring wells at these locations have illustrated the large fluctuations that are experienced during the 'wet' and 'dry' seasons of the year. At this time the design details of the proposed SWM pond proposed at the north edge of the Elora Sands are not known, however it is anticipated that the pool will have a

permanent pool elevation near the observed groundwater level, and the use of an impermeable liner would be expected to be required.

In general, where the permanent pool elevation is below the static groundwater elevation, it will be necessary to provide a low permeability layer over the base of the pond to resist the infiltration of natural groundwater, and of sufficient weight to resist the hydrostatic uplift pressures. Conversely, where the permanent pool elevation is above the static groundwater level, a low permeability liner will be required to prevent the exfiltration of water out of the pond. This could be accomplished through the use of a compacted clay liner, or with a weighed down proprietary liner system, etc. The weight of the liner system would have to exceed the uplift pressure of the ground water during the most severe periods of the year, likely when maximum storage is required. In approximate terms for example, one metre of clay liner, or equivalent, would be required for about every two meters of water storage below static ground water level, i.e., when the water level in the pond is 2 metres below the static ground water table, the clay liner would have to be at least one metre thick; if 3 metres below the static level, then 1.5 metres thick, etc.

Where the permanent pool elevation is below the static groundwater elevation, it will be necessary to provide a low permeability layer over the base of the pond to resist the infiltration of natural groundwater, and of sufficient weight to resist the hydrostatic uplift pressures. Conversely, where the permanent pool elevation is above the static groundwater level, a low permeability liner will be required to prevent the exfiltration of water out of the pond. This could be accomplished through the use of a compacted clay liner, or with a weighed down proprietary liner system, etc. The weight of the liner system would have to exceed the uplift pressure of the ground water during the most severe periods of the year, likely when maximum storage is required. In approximate terms for example, one metre of clay liner, or equivalent, would be required for about every two meters of water storage below static ground water level, i.e., when the water level in the pond is 2 metres below the static ground water table, the clay liner would have to be at least one metre thick; if 3 metres below the static level, then 1.5 metres thick, etc. It is recommended that best efforts be made to design the static pool elevation close to the static groundwater elevation so that the natural seasonal fluctuations of the groundwater elevation dictate the permanent pool elevation. This would eliminate the need to construct a weighted liner to resist the hydrostatic uplift pressures of the static groundwater elevation. That being said, this would only work if the former solution could be achieved whilst attaining the required water storage volume for the development.

An impermeable compacted clay liner would consist of a sufficiently plastic clay soil, with a recommended minimum clay content of 20 per cent and plasticity index of 7. Based on the current laboratory testing of the native soils, the majority of the clayey silt soils are generally suitable for use as an impermeable liner for the proposed SWM ponds, however any sandy deposits or silt material encountered should be selectively sorted and separated from its distinctly different counterpart to avoid use of the more permeable material. As such, during site grading and servicing activities, it would be prudent to stockpile such clayey soil near the area of the proposed SWM pond for use as such an impermeable liner. Additional testing may then be conducted on the stockpiled material, to confirm its suitability for use as an impermeable clay liner.

As noted above, the clayey soils encountered might be suitable for use as an impermeable clay liner but would require additional testing on at the specific location of the SWM pond. The base of the SWM pond may be prepared by scarifying or 'discing' in the upper perhaps 0.3 to 0.5 metres to destroy any natural layering structure, moisture conditioned to within -2 to +4 per cent of its optimum moisture content, and recompacted in place, however the soils present at the proposed base of the SWM pond should be confirmed. In the event that an imported clayey soil is required for use as an impermeable liner, the clay liner should be placed in nominal lifts of 300 millimetres, sufficiently worked and moisture conditions as noted above, and compacted to 95 per cent of its SPMDD. It is noted as well, regardless of the provision of an impermeable liner, the sides of the pond should be well worked or scarified to destroy any natural layers or seams, specifically any more permeable sandy or gravelly seams. Where such layers are encountered, a layer of available on-site clayey soil should be placed and compacted, as outlined above, to restrict the natural infiltration of groundwater into the pond through these more permeable horizontal seams.

Alternatively, weighed down proprietary liners could be considered, however the suppliers of such materials (such as Layfield, Terrafix, Suprema) would have to be consulted for recommendations on the appropriate product and installation methods for the site conditions. Such artificial liners would not require compaction efforts and could be weighed down with practically any available soil or granular material.

Interior pond slopes beneath the permanent pool elevation should be limited to inclinations no steeper than 4 horizontal to 1 vertical, with interior slopes above permanent pool elevation and exterior slopes no steeper than 3 horizontal to 1 vertical. Should steeper slopes be required, it will be necessary to provide some form of stabilisation such as the placement of coarse 'rip rap' stone, or proprietary product such as Turfstone or Cable-Crete, or construction as a reinforced earth embankment. It is recommended that all interior pond slopes be provided with at least some form of

nominal stabilisation/protection to control loss erosion/loss of ground. Above the pond level this may consist of appropriate vegetation.

Material utilised in construction of pond slopes must be free of significant organic deposits, construction debris, or any other deleterious materials which would affect stability of the pond walls. Our office should be retained to review any imported material to the site, as well as to provide quality control services during construction.

It is also noted that appropriate care and effort will be required by the contractor around inlet and outlet structures to ensure the impermeable liner is continuous and avoid the potential of 'piping'. In this regard the clay liner should be completely constructed prior to the installation of inlet/outlet structures. A bentonite clay material could be utilised within the fill around any structures to provide a continuous impermeable seal.

7. GENERAL COMMENTS

The comments provided in this document are intended only for the guidance of the design team. The material in it reflects SOIL-MAT ENGINEERS' best judgement in light of the information available at the time of preparation. The subsurface descriptions and borehole information are intended to describe conditions at the borehole locations only. It is the contractors' responsibility to determine how these conditions will affect the scheduling and methods of construction for the project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SOIL-MAT ENGINEERS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.



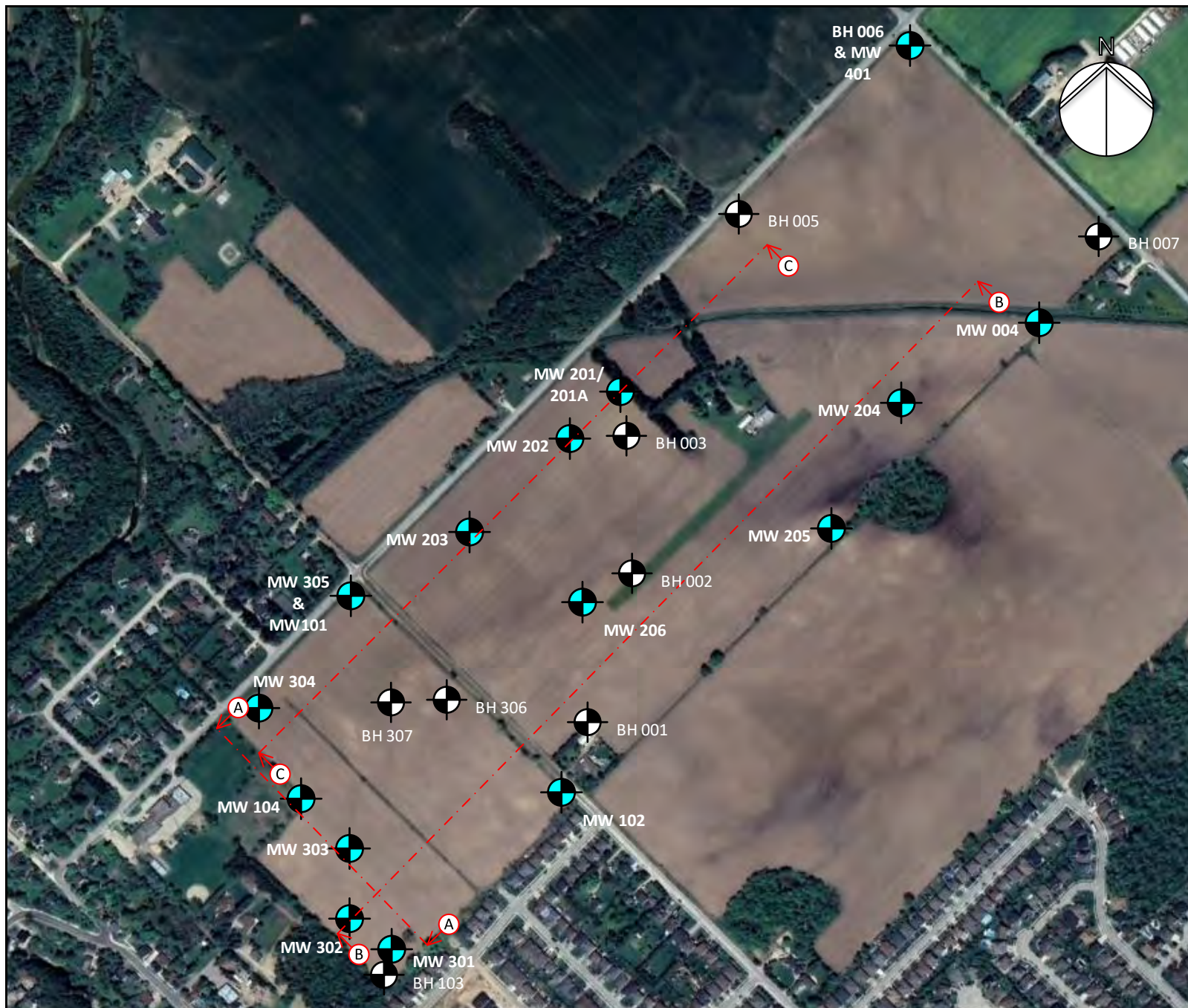
Scott Wylie, B.Eng., EIT.



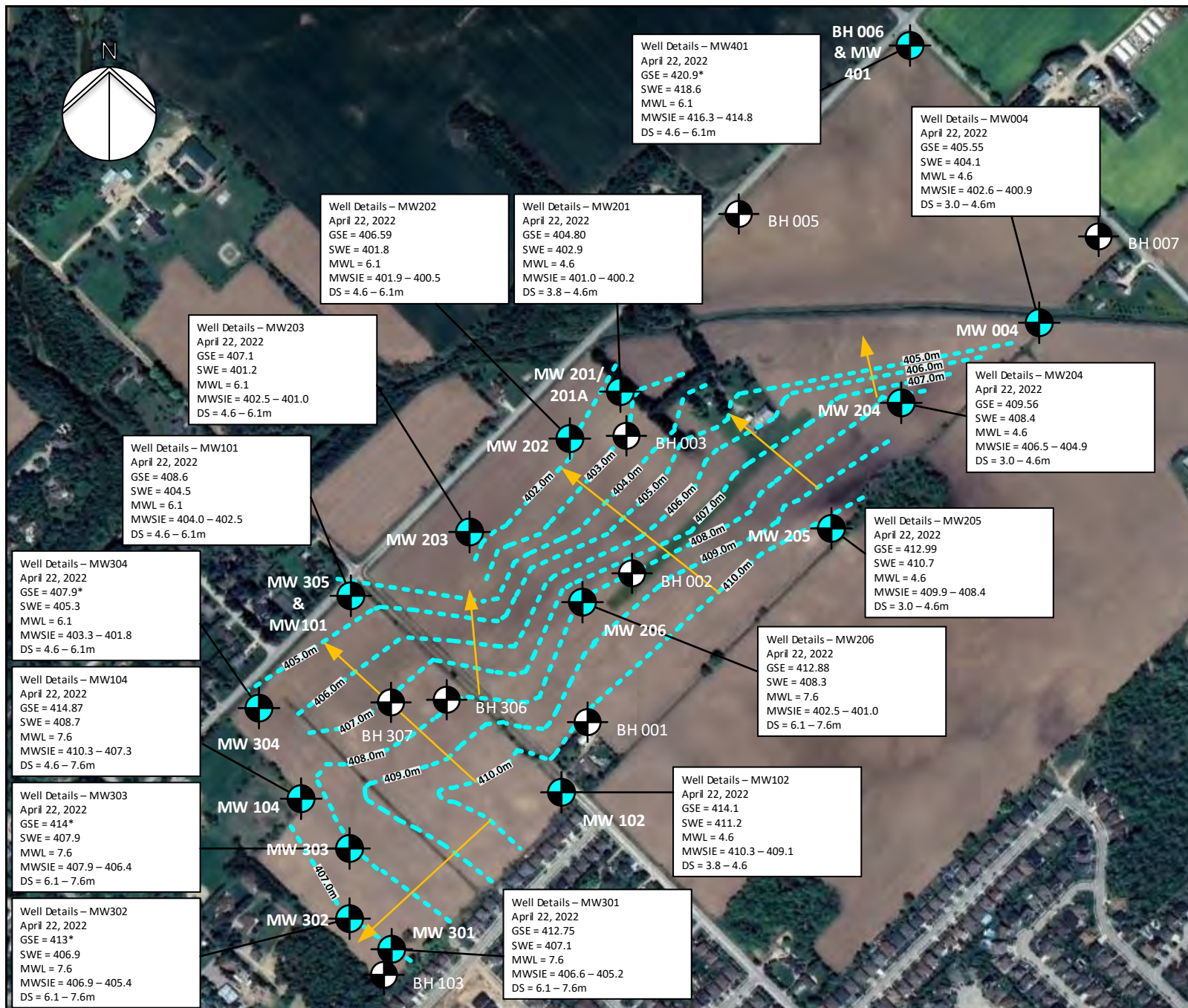
Ian Shaw, P. Eng., QP_{ESA}
Senior Engineer

Enclosures: Drawing No. 1, Borehole Location Plan
 Drawing No. 2, Groundwater Contour Map
 Drawing No. 3, Water Well Records
 Drawing Nos. 4, 5 and 6, Geologic Cross Sections
 Log of Borehole Nos. 001 to 007, 101 to 104, 201 to 206, 301 to 307
 and 401, inclusive
 Grain Size Analyses

Distribution: Cachet Developments [pdf]



LEGEND  Borehole Location BH#  Monitoring Well Location MW#  Geological Cross Section Location	
NOTES 1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301591-G. 2. Borehole and monitoring well locations are approximate.	
SOIL-MAT ENGINEERS & CONSULTANTS LTD.	
Geotechnical Investigation Proposed Residential Development 7581 Nichol Road 15 Elora, Ontario	
Borehole Location Plan	
Project No. SM 301591-G	
Date: June 2022	
Drawn: SW	Checked: IS
SM 301591-G Borehole Location Plan	
Drawing No. 1	



LEGEND

Monitoring Well Location
 MW#

GSE = Monitoring Well Ground Surface Elevation
 SWE = Static Water Elevation [taken on April 22, 2022]
 MWL = Monitoring Well Length
 MWSIE = Monitoring Well Screen Interval Elevation
 DS = Depth of Screen

NOTES

1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301591-G.

2. Borehole and monitoring well locations are approximate.

*GSE interpolated between contour lines from topographic survey

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ENGINEERS & CONSULTANTS LTD.

Geotechnical Investigation
 Proposed Residential Development
 7581 Nichol Road 15
 Elora, Ontario

Groundwater Contour Map

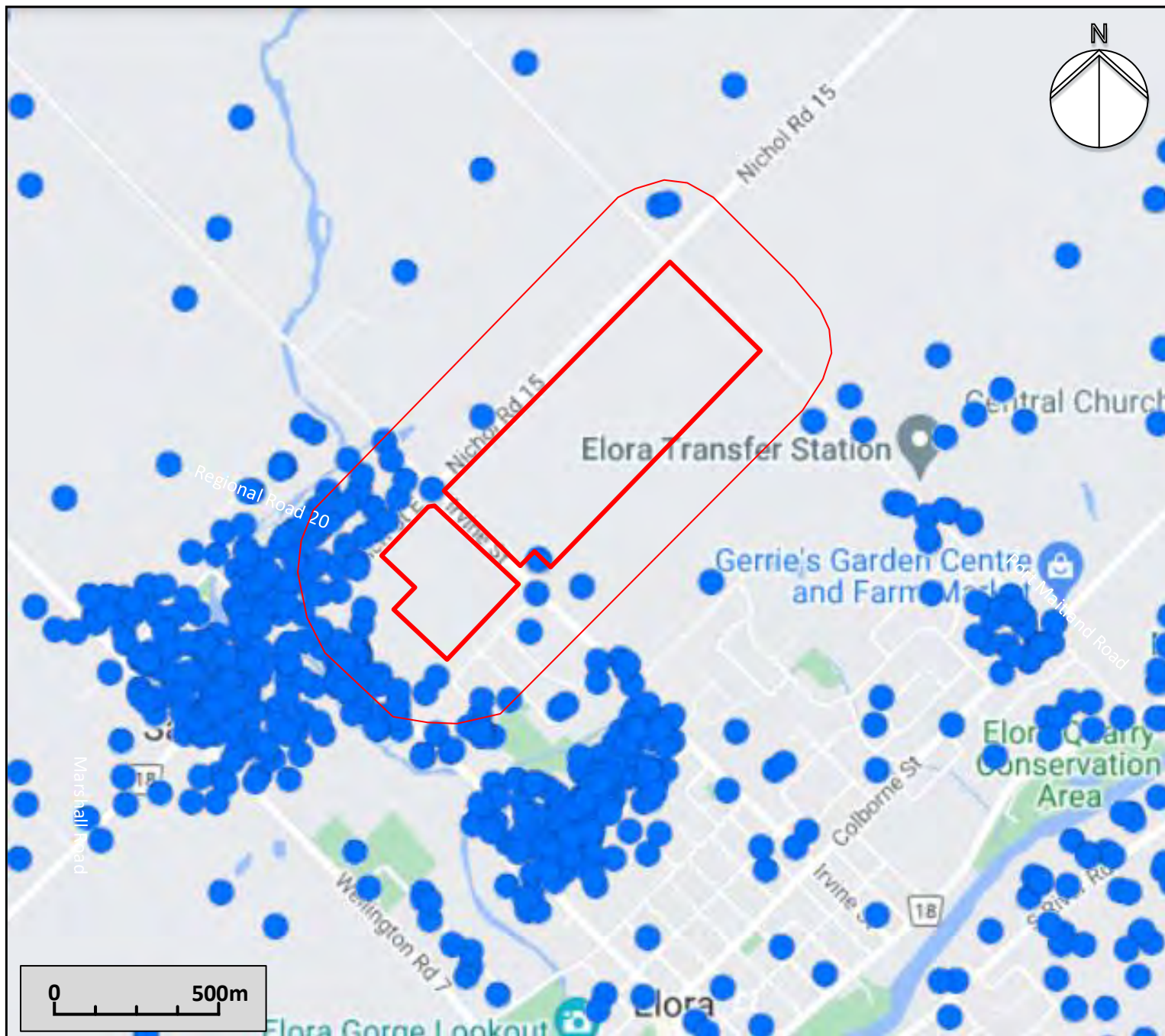
Project No. SM 301591-G

Date: June 2022

Drawn: SW Checked: IS

SM 301591-G Groundwater Contour Map

Drawing No. 2



LEGEND

= Site

● = Well Record

= Study Area

SOIL-MAT

ENGINEERS & CONSULTANTS LTD.

Groundwater Well Survey
Proposed Residential
Development
Nichol & Clayton Lands
Elora, Ontario

Ministry of the Environment
Water Well Records Plots

Project No. SM 302951-E

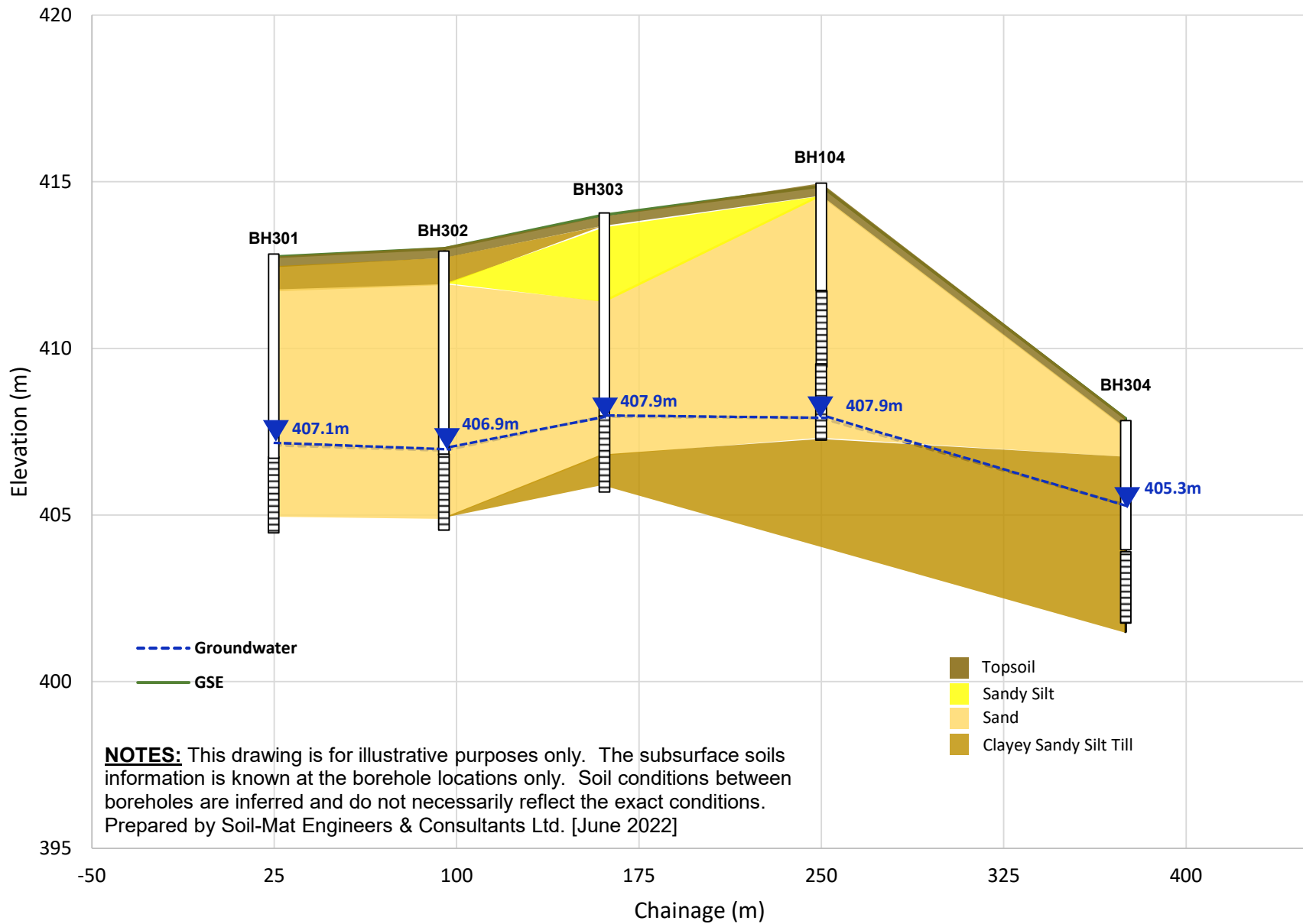
Date: July 2022

Drawn: PM | Checked: IS

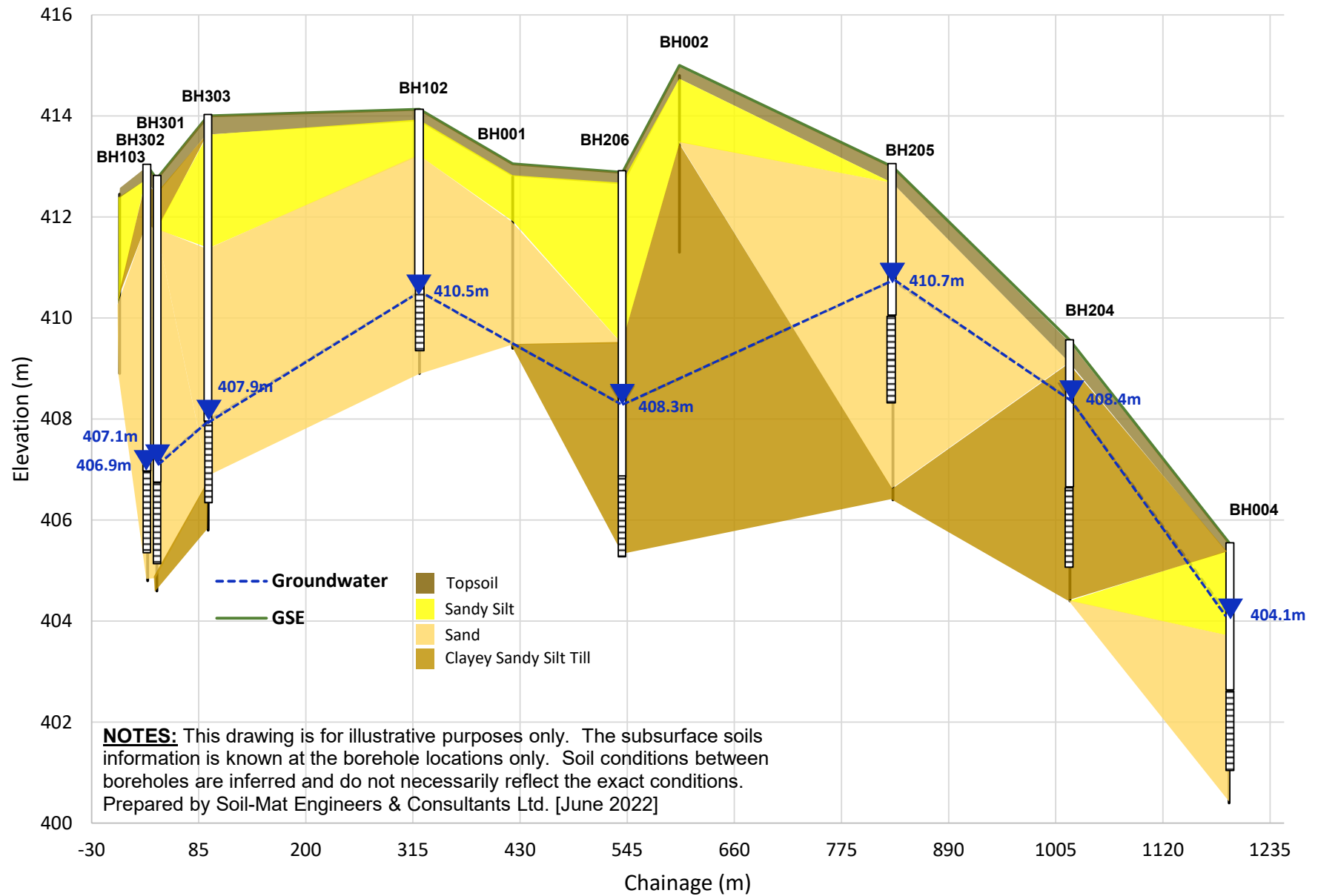
SM 302951-E Water Well Records

Drawing No. 3

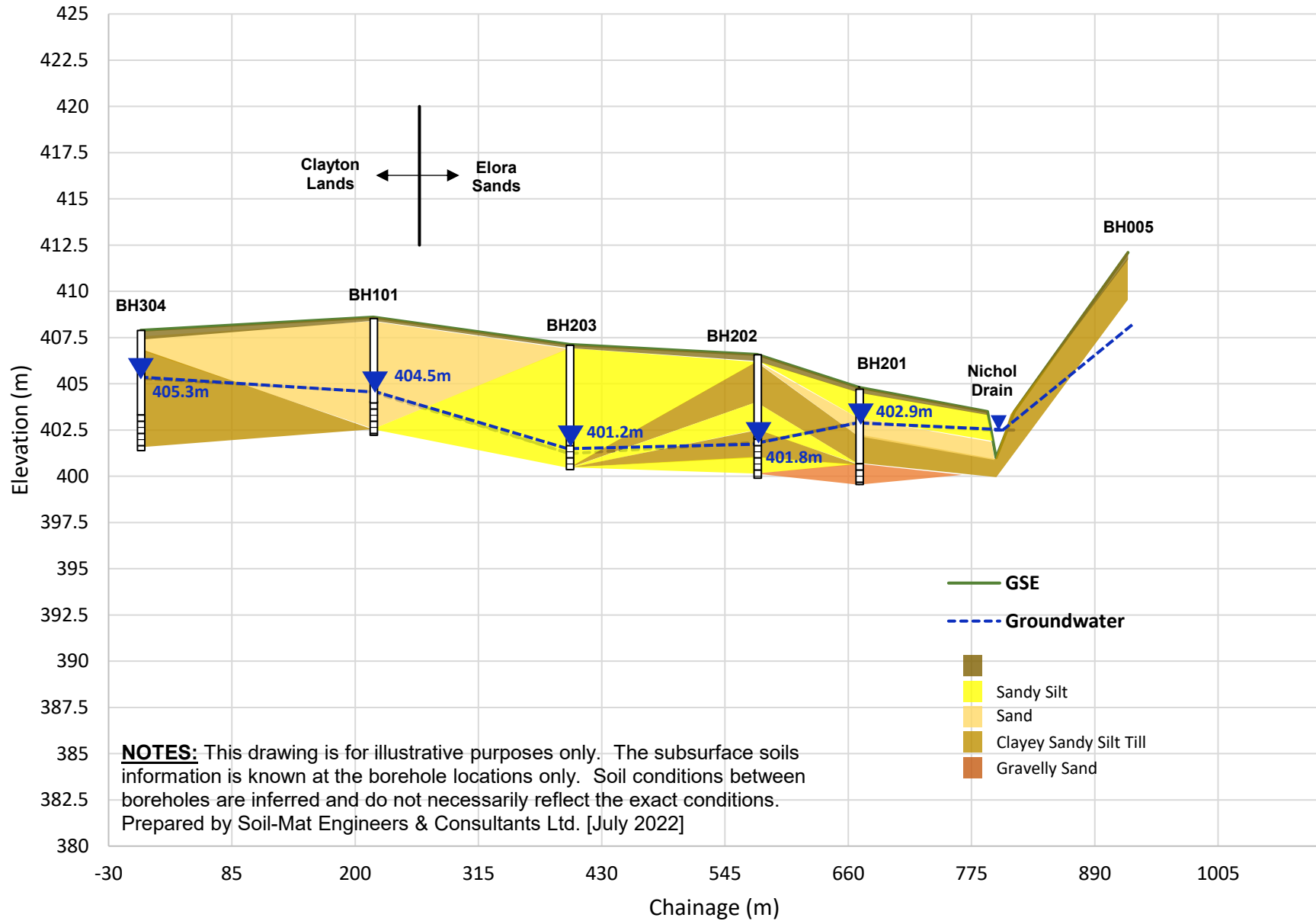
Geological Cross Section A-A



Geological Cross Section B-B



Geological Cross Section C-C



Log of Borehole No. 001

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838268

E: 545454



Depth ftm	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w% ▲10203040▲				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test ●blows/300mm● 20406080			
0	413.05		Ground Surface												
1	412.80		Topsoil Approximately 250 millimetres of topsoil.	SS	1	4 5 7 6	12								
2															
3	411.90		Sandy Silt Brown, trace clay, trace gravel, reworked in upper levels, compact.	SS	2	6 7 6 6	13								
4															
5			Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, compact.	SS	3	5 8 12 14	20								
6															
7															
8															
9															
10															
11															
12	409.40			SS	5	6 11 13 15	24								
13			End of Borehole												
14															
15															
16															
17															
18															
19															
20															
21			NOTES:												
22			1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.												
23			2. Borehole was recorded as dry and caved to a depth of 1.5 metres upon completion and backfilled as per Ontario Regulation 903.												
24			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
25															
26															
27															
28															
29															

NOTES:

- Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.
- Borehole was recorded as dry and caved to a depth of 1.5 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 6, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 002

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838469

E: 545516



Depth ftm	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲10203040▲			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm ●20406080●			
0	415.00		Ground Surface												
1	414.80		Topsoil Approximately 250 millimetres of topsoil.		SS	1	2 4 4 5	8							
2															
3			Sandy Silt Brown, reworked in upper levels, trace clay, silt, and gravel, loose.		SS	2	4 3 6 8	9							
4															
5	413.50		Clayey Sandy Silt Till Brown, trace to some gravel, stiff to very stiff.		SS	3	6 6 6 7	12		3.5					
6															
7															
8	412.50		Transition to grey.		SS	4	3 7 6 7	13		4.0					
9															
10															
11					SS	5	9 7 15 18	22		>4.5					
12	411.30		End of Borehole												
13															
14															
15															
16															
17															
18															
19															
20															
21															
22			NOTES:												
23			1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.7 metres.												
24			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.												
25			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
26															
27															
28															
29															

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

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E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 003

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838652

E: 545505



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
												Standard Penetration Test blows/300mm			
				20	40	60	80								
0	409.93		Ground Surface												
1			Topsoil Approximately 150 millimetres of topsoil.	SS	1	4 6 10 8	16								
2															
3			Sand Brown, reworked in upper levels, trace clay, silt, and gravel, compact.	SS	2	6 10 10 7	20								
4															
5															
6	408.10														
7	407.80		Clayey Sandy Silt Till Brown, trace to some gravel, compact.	SS	3	6 8 10 11	18								
8			End of Borehole												
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22			NOTES:												
23			1. Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 2.1 metres.												
24			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.												
25															
26															
27			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
28															
29															

NOTES:

- Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 2.1 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 6, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

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Datum: Geodetic

Field Logged by: EC

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Sheet: 1 of 1

Log of Borehole No. 004

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838792

E: 546044



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
Standard Penetration Test															
blows/300mm															
20 40 60 80															

0	ft	m	405.55	Ground Surface															
1			405.35	Topsoil Approximately 200 millimetres of topsoil.				SS	1	2 3 5 6	8								
2				Sandy Silt Brown, trace to some clay, trace gravel, reworked in upper levels, loose.				SS	2	4 3 3 5	6								
3		1																	
4																			
5			403.70	Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, wet, compact to dense.				SS	3	8 10 12 15	22								
6		2																	
7																			
8								SS	4	8 10 11 10	21								
9																			
10		3																	
11								SS	5	8 10 23 30	33								
12																			
13		4																	
14																			
15																			
16		5	400.70					Transition to grey.				SS	6	3 11 18 23	29				
17			400.40	End of Borehole															
18								NOTES: 1. Borehole was advanced using hollow stem auger equipment on August 5, 2021 to termination at a depth of 5.2 metres. 2. Borehole was recorded as open and 'wet' at a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client. 4. A monitoring well was installed. The following free groundwater level readings have been measured: August 6, 2021 - 2.74 metres below ground surface. August 27, 2021 - 1.75 metres below ground surface. February 23, 2021 - 1.33 metres below ground surface. April 22, 2022 - 1.47 metres below ground surface. June 1, 2022 - 1.78 metres below ground surface.											
19		6																	
20																			
21																			
22																			
23		7																	
24																			
25																			
26		8																	
27																			
28																			
29		9																	

Drill Method: Hollow Stem Augers

Drill Date: August 5, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

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Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 005

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838939

E: 545636



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
												Standard Penetration Test blows/300mm			
20	40	60	80												
ft m	412.10		Ground Surface												
0	411.90		Topsoil Approximately 200 millimetres of topsoil.		SS	1	2 4 5 7	9							
1			Clayey Sandy Silt Till Brown, reworked in upper levels, trace to some gravel, increasing clay content with depth, loose to compact.												
2															
3	1			SS	2	1 3 3 5	6								
4															
5															
6	2	410.00			SS	3	3 5 7 9	12							
7			End of Borehole												
8															
9															
10	3														
11															
12															
13	4														
14															
15															
16	5														
17															
18															
19															
20	6														
21															
22			NOTES:												
23	7		1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 2.1 metres.												
24			2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.												
25			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
26	8														
27															
28															
29	9														

NOTES:

- Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 2.1 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 006

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4839162

E: 545871



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%				
												10	20	30	40	
												Standard Penetration Test blows/300mm				
				20	40	60	80									
ft	m															
0	420.91		Ground Surface													
0	420.70		Topsoil Approximately 200 millimetres of topsoil.		SS	1	4 4 4 4	8								
1			Sand Brown, reworked in upper levels, trace rootlets, loose to compact.													
2																
3					SS	2	3 5 6 6	11								
4	419.40		Clayey Sandy Silt Till Brown, trace gravel, increasing clay content with depth, loose to compact.													
5																
6					SS	3	5 6 6 7	12								
7																
8																
9					SS	4	3 4 4 4	8								
10			End of Borehole													
11	417.30				SS	5	5 11 10 15	21								
12																
13																
14																
15			NOTES: 1. Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.6 metres. 2. Borehole was recorded as wet at depth of 2.0 metres, and caved to a depth of 2.4 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.													
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																

NOTES:

- Borehole was advanced using solid stem auger equipment on August 5, 2021 to termination at a depth of 3.6 metres.
- Borehole was recorded as wet at depth of 2.0 metres, and caved to a depth of 2.4 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 007

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838910

E: 546126



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w% ▲ 10 20 30 40 ▲					
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test ● blows/300mm ● 20 40 60 80				
0	408.39		Ground Surface													
1	408.10		Topsoil Approximately 250 millimetres of topsoil.	SS	1	3 5 6 7	11									
2			Sandy Silt Brown, trace rootlets, trace clay, reworked in upper levels, increasing clay content with depth, compact.	SS	2	10 8 10 10	18									
3																
4	406.90			SS	3	3 5 6 6	11		2.0							
5																
6																
7			Clayey Sandy Silt Till Brown, trace to some gravel, stiff to hard.	SS	4	5 7 10 18	17		2.5							
8																
9																
10																
11				SS	5	24 36 50/5"	100		>4.5							
12	404.70		End of Borehole													
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																

Drill Method: Solid Stem Augers

Drill Date: August 5, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 101

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838437

E: 545149



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
												Standard Penetration Test			
blows/300mm															
20 40 60 80															

ft	m	408.60	Ground Surface																								
0	0	408.30		Approximately 250 millimetres of topsoil.																							
1		Topsoil																									
2					Sand																						
3	1					Brown, trace gravel.																					
4																											
5																											
6	2																										
7																											
8																											
9																											
10	3																										
11																											
12																											
13	4																										
14																											
15																											
16	5																										
17																											
18	403.10																										
19																											
20	6																										
21	402.50																										
22																											
23	7																										
24																											
25																											
26	8																										
27																											
28																											
29	9																										
30																											
31																											
32																											
33																											

NOTES:

1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 6.10 metres.

2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. No soil samples were retrieved. The following free groundwater level readings have been measured:

August 6, 2021 - 4.78 metres below ground surface.

August 27, 2021 - 4.71 metres below ground surface.

October 14, 2021 - 4.33 metres below ground surface.

February 23, 2022 - 4.31 metres below ground surface.

April 22, 2022 - 4.07 metres below ground surface.

June 1, 2022 - 4.15 metres below ground surface.

NOTES:

- Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 6.10 metres.
- Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.
- A monitoring well was installed. No soil samples were retrieved. The following free groundwater level readings have been measured:
 August 6, 2021 - 4.78 metres below ground surface.
 August 27, 2021 - 4.71 metres below ground surface.
 October 14, 2021 - 4.33 metres below ground surface.
 February 23, 2022 - 4.31 metres below ground surface.
 April 22, 2022 - 4.07 metres below ground surface.
 June 1, 2022 - 4.15 metres below ground surface.

Drill Method: Hollow Stem Augers

Drill Date: August 6, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 102

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838180

E: 545422



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w%				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm			
												10	20	30	40
0	414.13		Ground Surface												
1	413.90		Topsoil 250 millimetres of topsoil.	SS	1	4 5 7 8	12								
2			Sandy Silt Brown, trace clay, trace gravel, reworked in upper levels, loose to compact.	SS	2	2 3 6 5	9								
3	413.20		Sand Brown, trace clay, silt, and gravel, medium to coarse gradation, loose to compact.	SS	3	3 9 12 14	21								
4				SS	4	7 8 11 10	19								
5				SS	5	6 9 11 17	20								
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17	408.90			SS	6	7 5 4 9	9								
18			End of Borehole												
19			NOTES:												
20			1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 5.2 metres.												
21			2. Borehole was recorded as caved to a depth of 3.8 metres and 'wet' at a depth of 3.6 metres upon completion and backfilled as per Ontario Regulation 903.												
22			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
23			4. A monitoring well was installed. The following free groundwater level readings have been measured:												
24			August 6, 2021 - 3.58 metres below ground surface.												
25			August 27, 2021 - 3.61 metres below ground surface.												
26			October 14, 2021 - 3.62 metres below ground surface.												
27			February 23, 2021 - 3.5 metres below ground surface.												
28			April 22, 2022 - 2.89 metres below ground surface.												
29			June 1, 2022 - 3.05 metres below ground surface.												

Drill Method: Hollow Stem Augers

Drill Date: August 6, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 103

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4837942

E: 545194



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲ 10 20 30 40 ▲																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm ● 20 40 60 80 ●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 0 1 2 3 4 5 6 7 8 9	412.55		Ground Surface																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			</

NOTES:

- Borehole was advanced using solid stem auger equipment on August 6, 2021 to termination at a depth of 3.6 metres.
- Borehole was recorded dry and caved to a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.

Drill Method: Solid Stem Augers

Drill Date: August 6, 2021

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 104

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838174

E: 545084



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲ 10 20 30 40 ▲					
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm ● 20 40 60 80 ●					
0	414.87		Ground Surface														
1	414.60		Topsoil Approximately 250 millimetres of topsoil.	SS	1	5 5 6 7	11										
2			Sand Brown, reworked in upper levels, trace clay, silt, and gravel, fine to medium gradation, compact.	SS	2	8 9 9 7	18										
3				SS	3	2 5 8 7	13										
4				SS	4	6 11 16 13	27										
5				SS	5	10 12 11 13	23										
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20	408.80		Wet spoon														
21				SS	7	9 9 8 6	17										
22																	
23																	
24	407.30																
25			End of Borehole														
26			NOTES: 1. Borehole was advanced using hollow stem auger equipment on August 6, 2021 to termination at a depth of 7.6 metres. 2. Borehole was recorded as open and 'wet' at depth of 7.0 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.	4. A monitoring well was installed. The following free groundwater level readings have been measured:													
27				August 6, 2021 - 6.78 metres below ground surface.													
28				August 27, 2021 - 6.96 metres below ground surface.													
29				October 14, 2021 - 7.09 metres below ground surface.													
30				February 23, 2022 - 6.83 metres below ground surface.													
31				April 22, 2022 - 6.13 metres below ground surface.													

Drill Method: Hollow Stem Augers

Drill Date: August 6, 2021

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: EC

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 201

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838708

E: 545501



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
Standard Penetration Test															
blows/300mm															
20 40 60 80															

0	ft	m	404.80	Ground Surface											
1			404.35	Topsoil	Approximately 450 millimetres of topsoil.	SS	1	5,3,3,3	6						
2				Sandy Silt/Silty Sand	Brown, trace to some clay and gravel, loose.										
3		1													
4															
5			403.10												
6				Sand	Brown, loose.	SS	2	2,4,5,6	9						
7		2													
8			402.20												
9				Clayey Sandy Silt Till	Brown, some gravel, ocasional cobbles, compact to dense										
10		3													
11						SS	3	6,12,18,20	30						
12															
13		4	400.70												
14				Gravelly Sand	Brown, trace silt, compact.										
15															
16		5	399.60			SS	4	10,9,9,13	18						
17				End of Borehole											
18				NOTES:											
19				1. Borehole was advanced using hollow stem auger equipment on February 16, 2022 to termination at a depth of 5.2 metres.											
20		6		2. Borehole was recorded as caved to a depth of 3.0 metres and 'wet' at a depth of 2.7 metres upon completion and backfilled as per Ontario Regulation 903.											
21				3. Soil samples will be discarded after 3 months unless otherwise directed by our client.											
22				4. A monitoring well was installed. The following free groundwater level readings have been measured:											
23		7		February 17, 2022 - 2.69 metres below ground surface.											
24				April 22, 2022 - 1.88 metres below ground surface.											
25				June 1, 2022 - 2.44 metres below ground surface.											
26		8													
27															
28															
29		9													

Drill Method: Hollow Stem Augers

Drill Date: February 16, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

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E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 201A

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838708

E: 545501



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w%			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm ²)	U.Wt.(kN/m ³)	Standard Penetration Test blows/300mm			
												10	20	30	40
0	404.75		Ground Surface												
1															
2															
3															
4															
5															
6															
7															
8															
9															
10	401.70		End of Borehole												
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															

NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 16, 2026 to termination at a depth of 3.1 metres.

2. Soil samples will be discarded after 3 months unless otherwise directed by our client.

3. A monitoring well was installed. The following free groundwater level readings have been measured:

February 17, 2022 - dry

April 22, 2022 - 2.05 metres below ground surface.

June 1, 2022 - 2.43 metres below ground surface.

Drill Method: Hollow Stem Augers

Drill Date: February 16, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

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Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 202

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838647

E: 545436



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w%	
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm ²)	U.Wt. (kN/m ³)	10 20 30 40
					Standard Penetration Test blows/300mm							20 40 60 80
0	406.59		Ground Surface									
1	406.14		Topsoil Approximately 450 millimetres of topsoil.		SS	1	2,2,3,2	5				
2			Clayey Sandy Silt Till Brown, some gravel, compact.									
3												
4												
5												
6					SS	2	4,7,9,12	16				
7												
8	404.00		Sandy Silt Brown, dense.									
9												
10												
11					SS	3	21,19,18,24	37				
12												
13	402.50		Clayey Sandy Silt Till Brown, some gravel and sand, very dense dense									
14												
15												
16					SS	4	10,24,50/4	100				
17												
18	401.00		Sandy Silt Brown, very dense.									
19												
20	400.20				SS	5	34,50/4	100				
21			End of Borehole									
22			NOTES:									
23			1. Borehole was advanced using hollow stem auger equipment on February 17, 2022 to termination at a depth of 6.4 metres.									
24			2. Borehole was recorded as open and 'wet' at a depth of 0 metres upon completion and backfilled as per Ontario Regulation 903.									
25			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.									
26			4. A monitoring well was installed. The following free groundwater level readings have been measured:									
27			February 17, 2022 - 5.5 metres below ground surface.									
28			April 22, 2022 - 4.76 metres below ground surface.									
29			June 1, 2022 - 5.43 metres below ground surface.									
30												
31												
32												
33												
34												
35												
36												

Drill Method: Hollow Stem Augers

Drill Date: February 17, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

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E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 203

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838523

E: 545307



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
Standard Penetration Test															
blows/300mm															
20 40 60 80															

ft	m	407.13	Ground Surface												
0	0	406.88	Topsoil Approximately 250 millimetres of topsoil. Sandy Silt Brown, trace to some gravel, frequent cobbles, loose to very dense.	SS	1	9,3,2,1	5								
1															
2															
3	1														
4															
5															
6	2				SS	2	8,16,17,27	33							
7															
8															
9															
10	3														
11				SS	3	50/6	100								
12															
13	4														
14															
15															
16	5			SS	4	36,15,15,8	30								
17															
18															
19	6														
20															
21		400.40		SS	5	7,9,12,14	21								
22															
23	7		End of Borehole												
24			NOTES:												
25			1. Borehole was advanced using hollow stem auger equipment on February 17, 2022 to termination at a depth of 6.7 metres.												
26	8		2. Borehole was recorded as open and 'wet' at a depth of 0 metres upon completion and backfilled as per Ontario Regulation 903.												
27			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.												
28			4. A monitoring well was installed. The following free groundwater level readings have been measured:												
29	9		February 17, 2022 - dry												
30			April 22, 2022 - 5.9 metres below ground surface.												
31			June 1, 2022 - 5.91 metres below ground surface.												
32	10														
33															
34															
35															
36	11														

Drill Method: Hollow Stem Augers

Drill Date: February 16, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 204

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838693

E: 545861



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w%					
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	▲	10 20 30 40		▲	
												Standard Penetration Test blows/300mm				
												●	20 40 60 80		●	
0	409.56		Ground Surface													
1	409.16		Topsoil Approximately 400 millimetres of topsoil.	SS	1	9,4,4,4	8									
2			Clayey Sandy Silt Till Brown, trace to some gravel, compact to dense.													
3				SS	2	4,5,7,17	12									
4																
5	404.40			SS	3	5,7,20,29	27									
6			End of Borehole													
7			NOTES: 1. Borehole was advanced using hollow stem auger equipment on February 18, 2022 to termination at a depth of 5.2 metres. 2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client. 4. A monitoring well was installed. The following free groundwater level readings have been measured: February 17, 2022 - 2.81 metres below ground surface. April 22, 2022 - 1.16 metres below ground surface. June 1, 2022 - 1.53 metres below ground surface.													
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
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23																
24																
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26																
27																
28																
29																
30																
31																
32																
33																
34																
35																
36																

Drill Method: Hollow Stem Augers

Drill Date: February 18, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 205

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838523

E: 545777



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content w% ▲ 10 20 30 40 ▲			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test ● blows/300mm ● 20 40 60 80			
0	412.99		Ground Surface												
1	412.74		Topsoil Approximately 250 millimetres of topsoil.		SS	1	6,5,3,2	8							
2			Sand Brown, loose.												
3					SS	2	4,4,4,4	8							
4															
5					SS	3	4,4,5,6	9							
6															
7					SS	4	3,3,4,6	7							
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21	406.60														
22	406.40		Clayey Sandy Silt Till Brown, trace to some gravel, very dense.		SS	5	5,4,50/5	100							
23															
24			End of Borehole												
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															
36															

NOTES:

- Borehole was advanced using hollow stem auger equipment on February 18, 2022 to termination at a depth of 6.6 metres.
- Borehole was recorded as 'dry' and caved to a depth of 4.8 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.
- A monitoring well was installed. The following free groundwater level readings have been measured:
February 17, 2022 - 2.56 metres below ground surface.
April 22, 2022 - 2.25 metres below ground surface.
June 1, 2022 - 2.39 metres below ground surface.

Drill Method: Hollow Stem Augers

Drill Date: February 18, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 206

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Road, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838460

E: 545394



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
Standard Penetration Test															
blows/300mm															
20 40 60 80															

0	ft	m	412.88	Ground Surface											
1			412.58	Topsoil Approximately 300 millimetres of topsoil.				SS	1	11,11,5,2	16				
2				Sandy Silt Brown, trace to some clay and gravel, compact.											
3		1													
4								SS	2	7,7,8,9	15				
5		2													
6															
7															
8															
9															
10		3	409.50	Clayey Sandy Silt Till Brown, trace to some gravel, compact to dense.				SS	3	3,4,10,12	14				
11															
12															
13		4													
14															
15															
16		5						SS	4	10,15,24,30	39				
17															
18															
19		6													
20															
21															
22															
23		7													
24			405.30												
25															
26		8		End of Borehole											
27															
28				NOTES:											
29															
30		9		1. Borehole was advanced using hollow stem auger equipment on February 18, 2022 to termination at a depth of 7.6 metres.											
31															
32				2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903.											
33															
34				3. Soil samples will be discarded after 3 months unless otherwise directed by our client.											
35															
36		10		4. A monitoring well was installed. The following free groundwater level readings have been measured:											
37															
38				February 17, 2022 - 6.83 metres below ground surface.											
39		1													
				April 22, 2022 - 4.6 metres below ground surface.											
				June 1, 2022 - 4.66 metres below ground surface.											

Drill Method: Hollow Stem Augers

Drill Date: February 18, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 301

Project No: SM 301951B-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4837975

E: 545199



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content			
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
Standard Penetration Test															
blows/300mm															
20 40 60 80															

ft	m	412.75	Ground Surface												
0	0	412.50	Topsoil Approximately 250 millimetres of topsoil.		SS	1	2,1,3,4	4							
1															
2			Clayey Sandy Silt Till Brown, trace gravel, loose .												
3	1	411.70													
4			Sand Brown, loose to compact.		SS	2	1,3,6,9	9							
5	2														
6															
7															
8															
9															
10	3				SS	3	7,7,6,9	13							
11															
12															
13	4														
14															
15															
16	5				SS	4	8,9,13,15	22							
17															
18															
19															
20	6														
21															
22					SS	5	6,7,10,13	17							
23	7														
24															
25															
26	8	404.90	Clayey Sandy Silt Till Brown, trace gravel, dense to very dense.		SS	6	3,13,32,42	45							
27		404.60													
28															
29															
30	9														
31															
32															
33	10														
34															
35															
36	1														
37															
38															
39															

NOTES:

1. Borehole was advanced using hollow stem auger equipment on February 22, 2022 to termination at a depth of 8.2 metres.

2. Borehole was recorded as open and 'wet' at a depth of 6.3 metres upon completion and backfilled as per Ontario Regulation 903.

3. Soil samples will be discarded after 3 months unless otherwise directed by our client.

4. A monitoring well was installed. The following free groundwater level readings have been measured:

February 23, 2022 - 6.29 metres below ground surface.

April 22, 2022 - 5.65 metres below ground surface.

June 1, 2022 - 5.71 metres below ground surface.

NOTES:

- Borehole was advanced using hollow stem auger equipment on February 22, 2022 to termination at a depth of 8.2 metres.
- Borehole was recorded as open and 'wet' at a depth of 6.3 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.
- A monitoring well was installed. The following free groundwater level readings have been measured:
February 23, 2022 - 6.29 metres below ground surface.
April 22, 2022 - 5.65 metres below ground surface.
June 1, 2022 - 5.71 metres below ground surface.

Drill Method: Hollow Stem Augers

Drill Date: February 22, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 302

Project No: SM 301951B-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838015

E: 545142



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%			
												10	20	30	40
Standard Penetration Test															
blows/300mm															
20 40 60 80															

0	ft	m	413.00	Ground Surface																			
1			412.75	Topsoil Approximately 250 millimetres of topsoil.										SS	1	2,2,4,9	6						
2																							
3			411.90	Clayey Sandy Silt Till Brown, trace gravel, loose .																			
4																							
5				Sand Brown, loose to compact.										SS	2	2,4,6,8	10						
6																							
7																							
8																							
9																							
10																							
11														SS	3	5,7,8,15	15						
12																							
13																							
14																							
15																							
16														SS	4	5,8,9,11	17						
17																							
18																							
19																							
20																							
21														SS	5	10,10,11,15	21						
22																							
23																							
24																							
25																							
26																							
27			404.80											SS	6	5,8,10,8	18						
28				End of Borehole																			
29				NOTES:																			
30				1. Borehole was advanced using hollow stem auger equipment on February 22, 2022 to termination at a depth of 8.2 metres.																			
31				2. Borehole was recorded as open and 'wet' at a depth of 6.6 metres upon completion and backfilled as per Ontario Regulation 903.																			
32				3. Soil samples will be discarded after 3 months unless otherwise directed by our client.																			
33				4. A monitoring well was installed. The following free groundwater level readings have been measured:																			
34				February 23, 2022 - 6.62 metres below ground surface.																			
35				April 22, 2022 - 6.06 metres below ground surface.																			
36				June 1, 2022 - 6.12 metres below ground surface.																			
37																							
38																							
39																							

Drill Method: Hollow Stem Augers

Drill Date: February 22, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 303

Project No: SM 301951B-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838108

E: 545144



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w% ▲ 10 20 30 40 ▲					
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test blows/300mm ● 20 40 60 80 ●				
0	414.00		Ground Surface													
1	413.65		Topsoil Approximately 350 millimetres of topsoil.	SS	1	3,2,2,3	4									
2			Sandy Silt Brown, trace gravel and clay, loose .													
3				SS	2	2,3,4,6	7									
4																
5																
6	411.40		Sand Brown, loose.													
7				SS	3	2,2,3,4	5									
8																
9																
10																
11																
12																
13																
14																
15																
16				SS	4	3,2,4,6	6									
17																
18																
19																
20																
21				SS	5	2,2,3,4	5									
22																
23	406.80		Clayey Sandy Silt Till Brown, trace gravel, dense.													
24																
25																
26	405.80			SS	6	13,19,23,31	42									
27																
28			End of Borehole													
29			NOTES:													
30			1. Borehole was advanced using hollow stem auger equipment on February 22, 2022 to termination at a depth of 8.2 metres.													
31			2. Borehole was recorded as open and 'wet' at a depth of 5.4 metres upon completion and backfilled as per Ontario Regulation 903.													
32			3. Soil samples will be discarded after 3 months unless otherwise directed by our client.													
33			4. A monitoring well was installed. The following free groundwater level readings have been measured:													
34			February 23, 2022 - 5.4 metres below ground surface.													
35			April 22, 2022 - 6.04 metres below ground surface.													
36			June 1, 2022 - 6.11 metres below ground surface.													
37																
38																
39																

Drill Method: Hollow Stem Augers

Drill Date: February 22, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 304

Project No: SM 301951B-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4538292

E: 545023



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w% ▲ 10 20 30 40 ▲					
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test ● blows/300mm ●				
												20	40	60	80	
0	407.90		Ground Surface													
1	407.65		Topsoil Approximately 250 millimetres of topsoil.	SS	1	3,2,3,7	5									
2			Sand Brown, trace gravel, loose .													
3	406.80		Clayey Sandy Silt Till Brown, trace gravel, loose to very dense.	SS	2	1,2,6,6	8									
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21	401.50															
22			End of Borehole													
23			NOTES: 1. Borehole was advanced using hollow stem auger equipment on February 23, 2022 to termination at a depth of 6.4 metres. 2. Borehole was recorded as open and 'wet' at a depth of 2.8 metres upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client. 4. A monitoring well was installed. The following free groundwater level readings have been measured: February 23, 2022 - 2.87 metres below ground surface. April 22, 2022 - 2.6 metres below ground surface. June 1, 2022 - 2.96 metres below ground surface.													
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NOTES:

- Borehole was advanced using hollow stem auger equipment on February 23, 2022 to termination at a depth of 6.4 metres.
- Borehole was recorded as open and 'wet' at a depth of 2.8 metres upon completion and backfilled as per Ontario Regulation 903.
- Soil samples will be discarded after 3 months unless otherwise directed by our client.
- A monitoring well was installed. The following free groundwater level readings have been measured:

February 23, 2022 - 2.87 metres below ground surface.
April 22, 2022 - 2.6 metres below ground surface.
June 1, 2022 - 2.96 metres below ground surface.

Drill Method: Hollow Stem Augers

Drill Date: February 23, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

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E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 305

Project No: SM 301951B-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838438

E: 545144



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w% ▲ 10 20 30 40 ▲				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test ● blows/300mm ●			
												20	40	60	80
0	408.60		Ground Surface												
1	408.35		Topsoil Approximately 250 millimetres of topsoil.	AS	1										
2			Sand Brown, trace gravel, loose to very loose.												
3				SS	2	2,3,4,4	7								
4															
5				SS	3	2,1,1,5	2								
6	404.90		End of Borehole												
7			NOTES: 1. Borehole was advanced using hollow stem auger equipment on February 23, 2022 to termination at a depth of 3.6 metres. 2. Borehole was recorded as open and 'dry' upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client. 4. A monitoring well was installed. The following free groundwater level readings have been measured: February 23, 2022 - dry April 22, 2022 - dry June 1, 2022 - dry												
8															
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12															
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35															
36															
37															
38															
39															

Drill Method: Hollow Stem Augers

Drill Date: February 23, 2022

Hole Size: 200 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 306

Project No: SM 301951B-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4838305

E: 545271



Depth ft m	Elevation (m)	Symbol	Description	Well Data	SAMPLE						Moisture Content w% ▲ 10 20 30 40 ▲					
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	Standard Penetration Test ● blows/300mm ● 20 40 60 80				
0	412.85		Ground Surface													
1	412.60	~	Topsoil Approximately 250 millimetres of topsoil.	SS	1	2,2,4,5	6									
2			Sand Brown, trace gravel, loose.			3,2,5,6	7									
3				SS	2											
4																
5			Clayey Sandy Silt Till Brown, some gravel, very dense			3,3,7,15	10									
6				SS	3											
7																
8			End of Borehole	SS	4	20,34,38,50/4	72									
9																
10																
11			NOTES: 1. Borehole was advanced using solid stem auger equipment on February 23, 2022 to termination at a depth of 5.2 metres. 2. Borehole was recorded as caved to a depth of 2.4 metres and dry upon completion and backfilled as per Ontario Regulation 903 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.													
12																
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39																

Drill Method: Solid Stem Augers

Drill Date: February 23, 2022

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 307

Project No: SM 301951B-G

Project: Proposed Residential Development

Location: 75 Woolwich Street East, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 3838296

E: 545199



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content				
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%				
												10	20	30	40	
											Standard Penetration Test					
											blows/300mm					
											20	40	60	80		
ft	m		Ground Surface													
0	411.12		Topsoil Approximately 250 millimetres of topsoil.		SS	1	1,2,2,3	4								
1	410.87															
2																
3	1															
4																
5																
6	2		Clayey Sandy Silt Till Brown, some gravel, compact.		SS	2	5,7,10,12	17								
7																
8																
9																
10	3															
11																
12					SS	3	9,10,15,19	25								
13	4															
14																
15																
16	5															
17																
18			End of Borehole NOTES: 1. Borehole was advanced using solid stem auger equipment on February 23, 2022 to termination at a depth of 5.2 metres. 2. Borehole was recorded as open and 'wet' at a depth of 4.3 metres below the existing grade upon completion and backfilled as per Ontario Regulation 903. 3. Soil samples will be discarded after 3 months unless otherwise directed by our client.													
19																
20	6															
21																
22																
23	7															
24																
25																
26	8															
27																
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29	9															
30																
31																
32	10															
33																
34																
35																
36	11															
37																
38																
39																

Drill Method: Solid Stem Augers

Drill Date: February 23, 2022

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

T: 905.318.7440 F: 905.318.7455

E: info@soil-mat.ca

Datum: Geodetic

Field Logged by: KJR

Checked by: SW

Sheet: 1 of 1

Log of Borehole No. 401

Project No: SM 301951-G

Project: Proposed Residential Development

Location: 7581 Nichol Rd, Elora

Client: Cachet Development

Project Manager: Ian Shaw, P. Eng

Borehole Location: See Drawing No. 1

UTM Coordinates - N: 4839146

E: 545881



Depth	Elevation (m)	Symbol	Description	Well Data	SAMPLE							Moisture Content						
					Type	Number	Blow Counts	Blows/300mm	Recovery	PP (kgf/cm2)	U.Wt. (kN/m3)	w%						
												10	20	30	40			
					Standard Penetration Test							blows/300mm						
					20							40 60 80						
ft	m		Ground Surface															
0	420.91		Topsoil Approximately 250 millimetres of topsoil.		SS	1	2,2,4,4	6										
1	420.66																	
2			Silty Sand Brown, trace to some gravel and clay, loose to compact.		SS	2	1,2,3,5	5										
3																		
4			Clayey Sandy Silt Till Brown, trace to some sand and gravel, compact to very dense		SS	3	1,4,9,7	13										
5	419.10																	
6																		
7																		
8																		
9					SS	4	6,15,50/4	100										
10																		
11																		
12																		
13																		
14					SS	5	6,17,16,24	33										
15																		
16																		
17																		
18																		
19					SS	6	10,35,50/5	100										
20																		
21																		
22																		
23																		
24					SS	7	27,46,43, 50/3	89										
25																		
26																		
27																		
28																		
29			End of Borehole															
30																		
31																		
32																		
33																		
34																		
35																		
36																		
37																		
38																		
39																		
NOTES:																		
1. Borehole was advanced using solid stem auger equipment on April 18, 2022 to termination at a depth of 6.7 metres.																		
2. Borehole was recorded as open and 'wet' at a depth of 4.7 metres below the existing grade upon completion and backfilled as per Ontario Regulation 903.																		
3. Soil samples will be discarded after 3 months unless otherwise directed by our client.																		
4. A monitoring well was installed. The following free groundwater level readings have been measured:																		
April 22, 2022 - 2.29 metres below ground surface.																		
June 1, 2022 - 2.39 metres below ground surface.																		

Drill Method: Solid Stem Augers

Drill Date: April 18, 2022

Hole Size: 150 millimetres

Drilling Contractor: Altech

Soil-Mat Engineers & Consultants Ltd.

130 Lancing Drive, Hamilton, ON L8W 3A1

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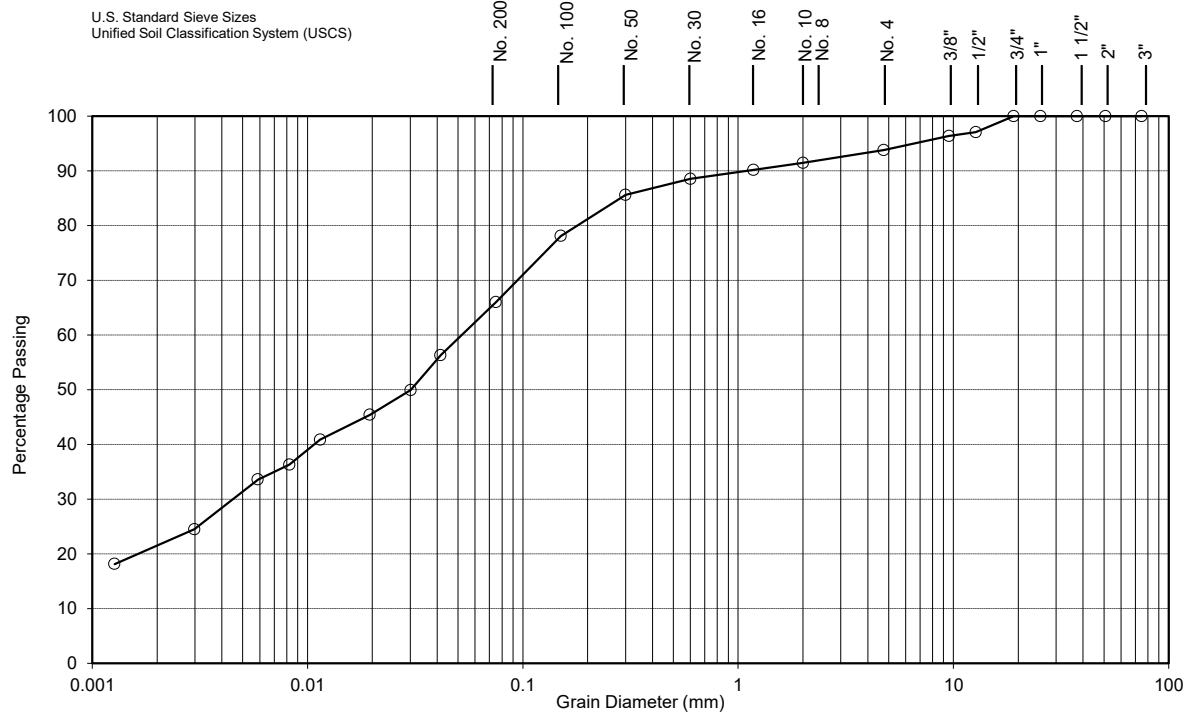
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Field Logged by: KJR

Checked by: SW

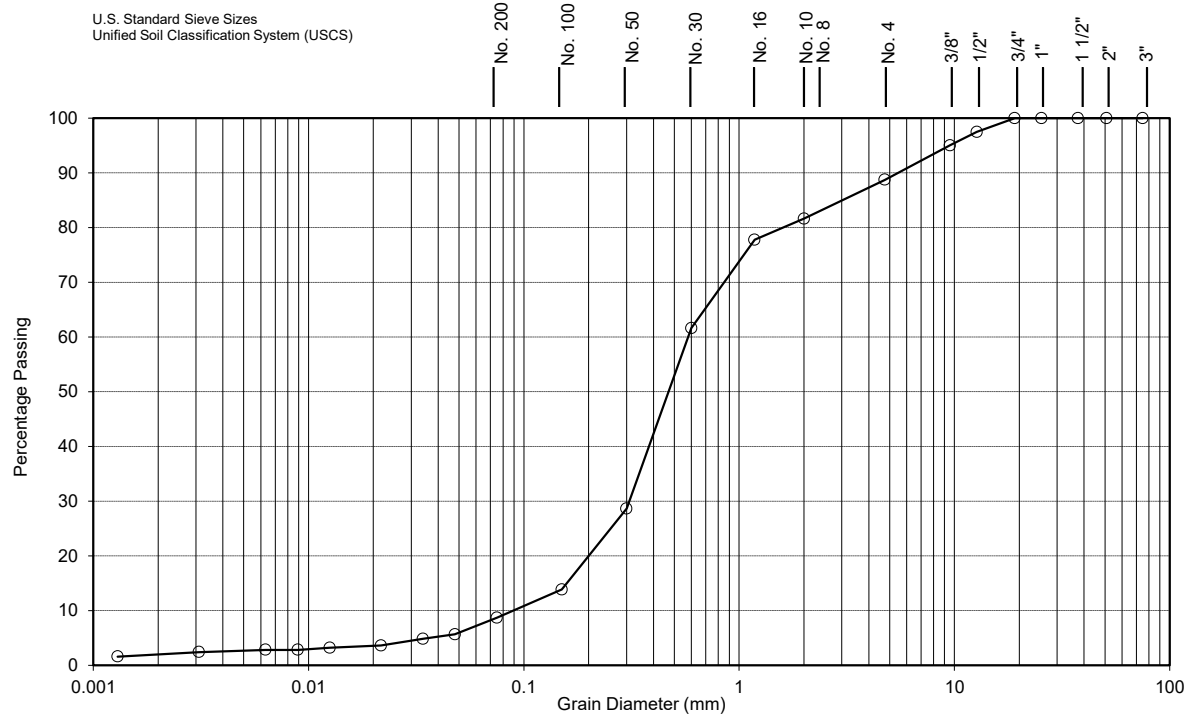
Sheet: 1 of 1

Mechanical & Hydrometer Analyses

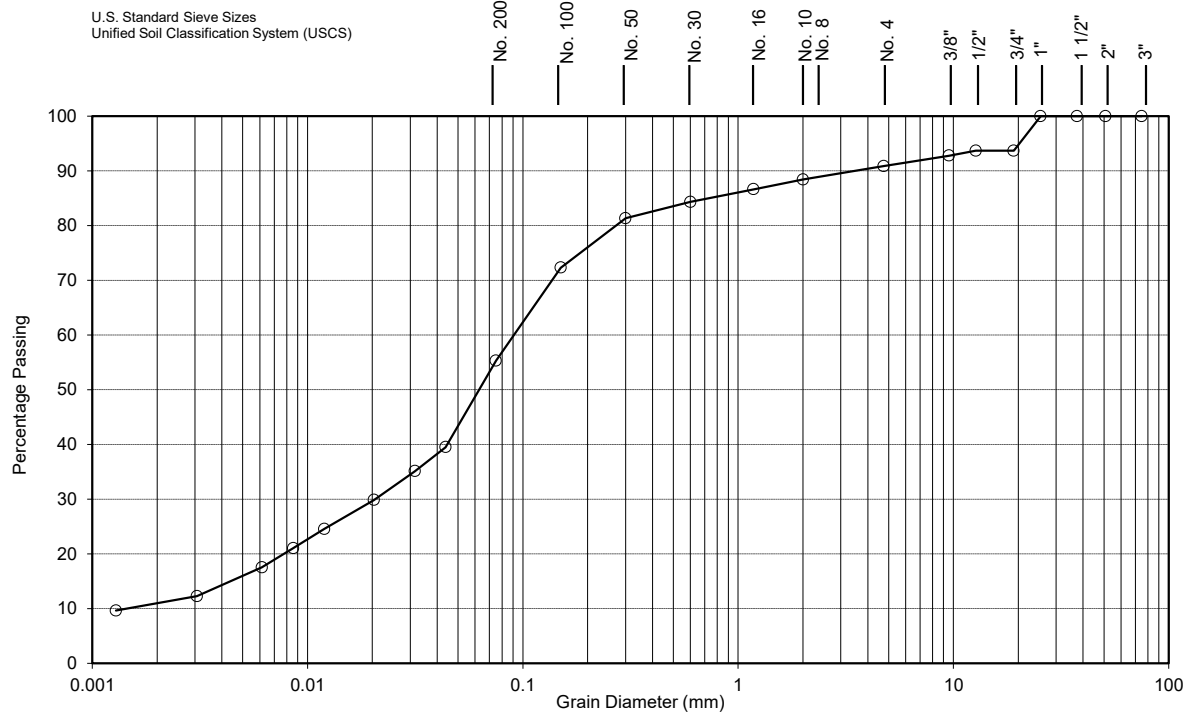


Lab No.:	21-335	Notes: Depth: 5'			
Borehole No.:	003				
Sample No.:	3				
CLAY [%]:	22	Soil Description: Brown Sandy Silt w/ some Clay and trace Gravel M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity			
SILT [%]:	44				
SAND [%]:	28				
GRAVEL [%]:	6				
D ₁₀ (Effective Diam. in mm):	0.0005	Estimated Infiltration Rate [mm/hr] :	< 10	Estimated Permeability, k [cm/s]	10 ⁻⁷
		Coefficient of Uniformity C _u :	102.0	Coefficient of Curvature C _c :	0.8
SOIL-MAT ENGINEERS & CONSULTANTS LTD.					
7581 Sideroad 15, Elora ON					
August 2021		Grain Size Analysis No. 1		Project No.: SM 301951-T	

Mechanical & Hydrometer Analyses



Mechanical & Hydrometer Analyses

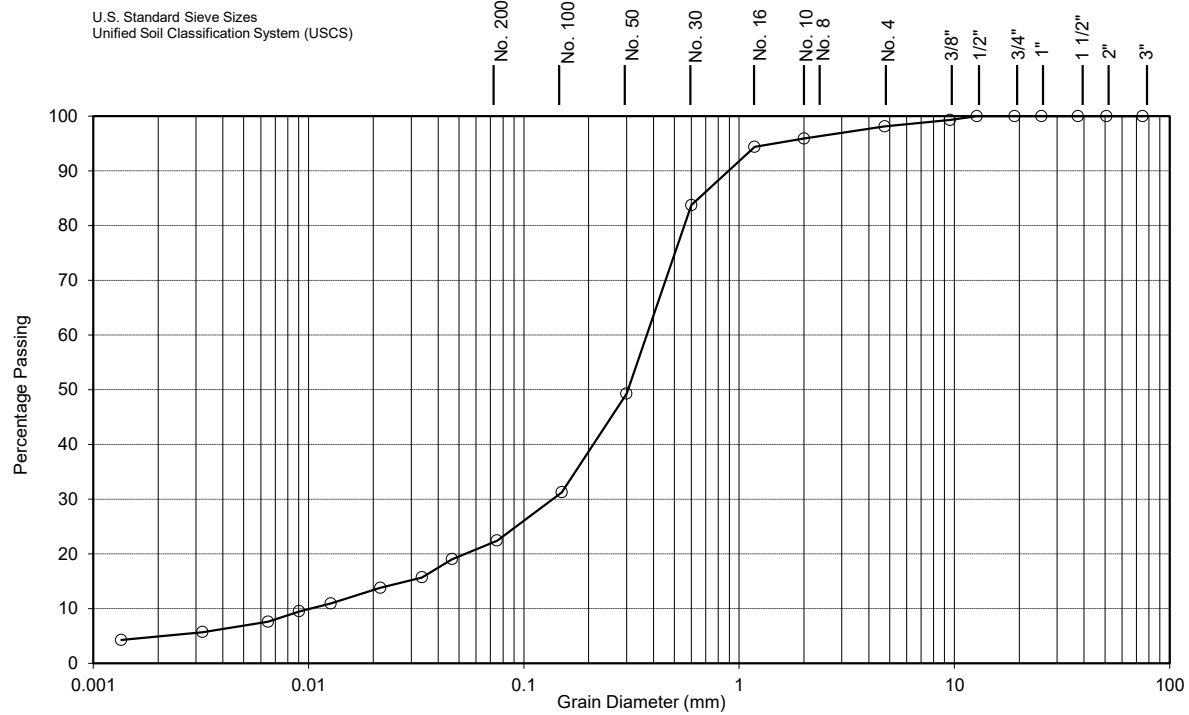


CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.:	21-336	Notes: Depth: 10'	
Borehole No.:	006		
Sample No.:	5		
CLAY [%]:	11	Soil Description: Brown Sandy Silt w/ some Clay and trace Gravel M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity	
SILT [%]:	44		
SAND [%]:	36		
GRAVEL [%]:	9		
D ₁₀ (Effective Diam. in mm):	0.0015	Estimated Infiltration Rate [mm/hr] :	10 to 15
		Estimated Permeability, k [cm/s]	10 ⁻⁶
		Coefficient of Uniformity C _u :	60.0
		Coefficient of Curvature C _c :	3.3
SOIL-MAT ENGINEERS & CONSULTANTS LTD.			
7581 Sideroad 15, Elora ON			
August 2021	Grain Size Analysis No. 3	Project No.: SM 301951-T	



Mechanical & Hydrometer Analyses

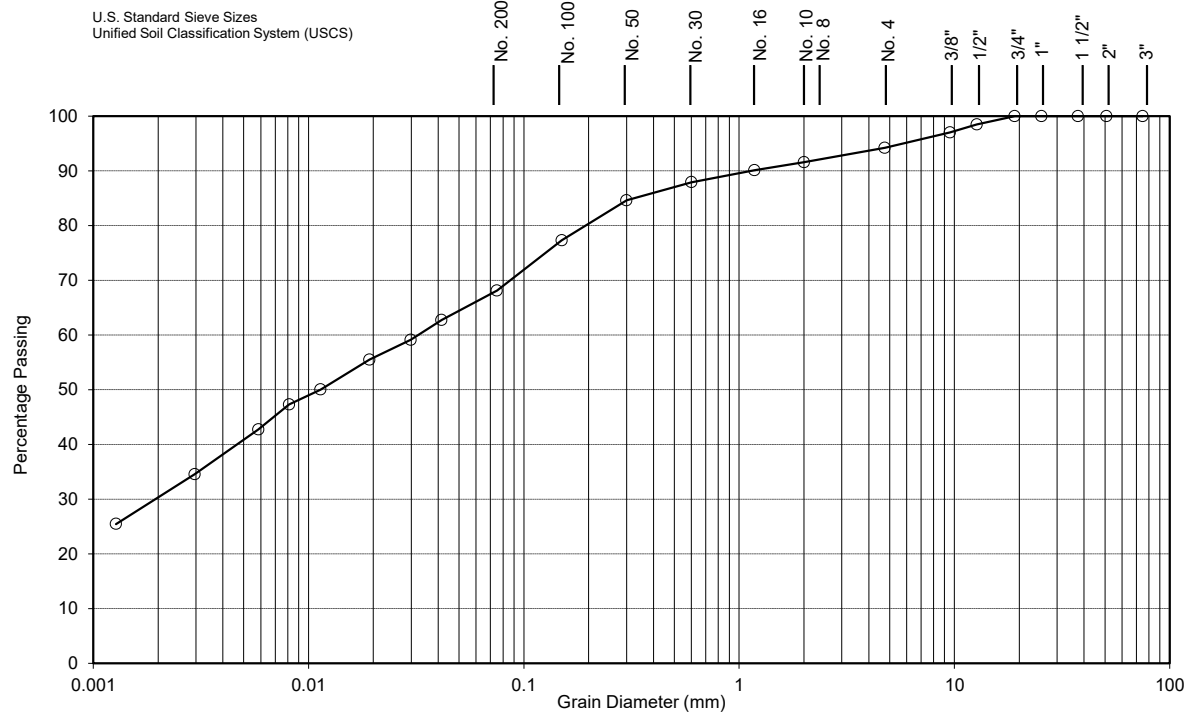


CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.: 22-088	Notes: Depth: 5'	
Borehole No.: 201		
Sample No.: 2		
CLAY [%]: 5	Soil Description: Brown Sand w/ Some Silt and traces of Clay and Gravel S.M. - Silty sands, sand-silt mixtures	
SILT [%]: 17		
SAND [%]: 76		
GRAVEL [%]: 2		
D ₁₀ (Effective Diam. in mm): 0.0001	Estimated Infiltration Rate [mm/hr] : 50	Estimated Permeability, k [cm/s] 10⁻⁴
	Coefficient of Uniformity C _u : 40.0	Coefficient of Curvature C _c : 5.4
SOIL-MAT ENGINEERS & CONSULTANTS LTD.		
7581 Nichol Road 15, Elora ON		
March 2022	Grain Size Analysis No. 4	Project No.: SM 301951-T



Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.: 22-089	Notes: Depth: 5'
Borehole No.: 202	
Sample No.: 2	
CLAY [%]: 30 SILT [%]: 38 SAND [%]: 26 GRAVEL [%]: 6	Soil Description: Brown Clayey Sandy Silt w/ a trace of Gravel M.L - Clayey silts with slight plasticity, silty or clayey fine sands, inorganic silts and very fine sands
D ₁₀ (Effective Diam. in mm): 0.0004	Estimated Infiltration Rate [mm/hr] : < 10 Coefficient of Uniformity C _u : 80.0
	Estimated Permeability, k [cm/s] 10⁻⁸ Coefficient of Curvature C _c : 0.3

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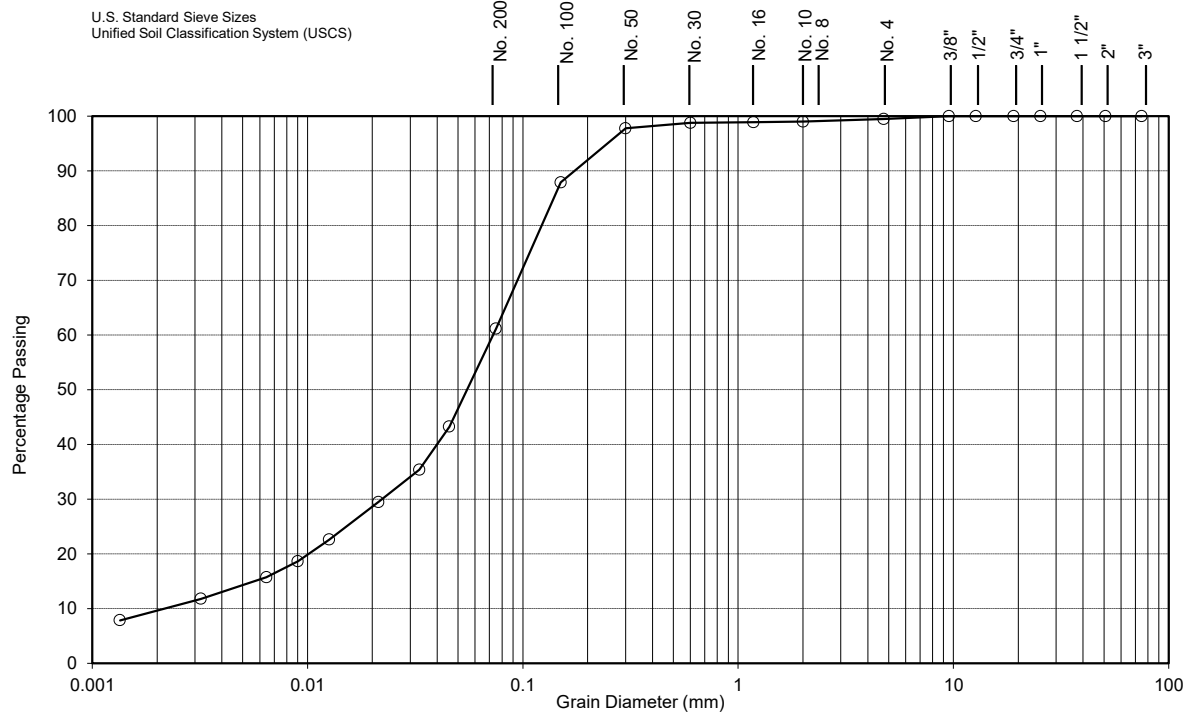


March 2022

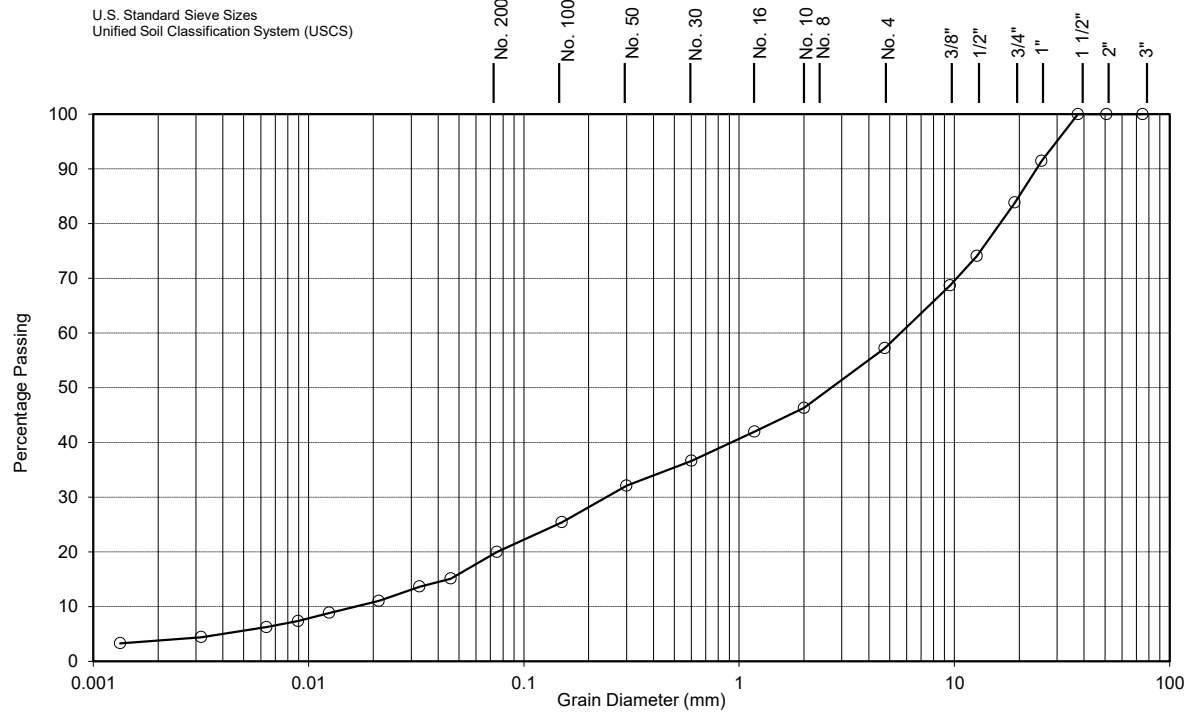
Grain Size Analysis No. 5

Project No.: SM 301951-T

Mechanical & Hydrometer Analyses



Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.:	22-091	Notes: Depth: 5'	
Borehole No.:	203		
Sample No.:	2		
CLAY [%]:	3	Soil Description: Brown Gravel and Sand w/ some Silt and a trace of Clay G.M. - Gravel-sand-silt mixtures, silty gravels	
SILT [%]:	17		
SAND [%]:	37		
GRAVEL [%]:	43		
D ₁₀ (Effective Diam. in mm):	0.017	Estimated Infiltration Rate [mm/hr] :	50 to 60
		Coefficient of Uniformity C _u :	335.3
		Estimated Permeability, k [cm/s]	10 ⁻⁴
		Coefficient of Curvature C _c :	0.6

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7581 Nichol Road 15, Elora ON

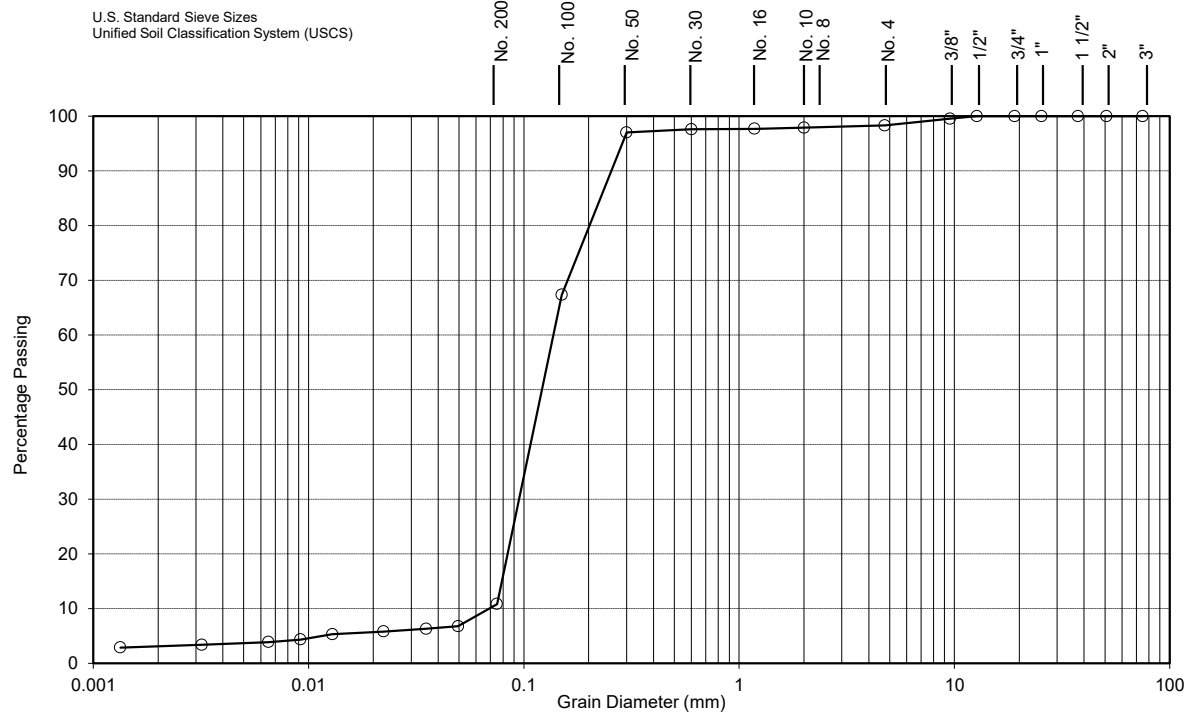


March 2022

Grain Size Analysis No. 7

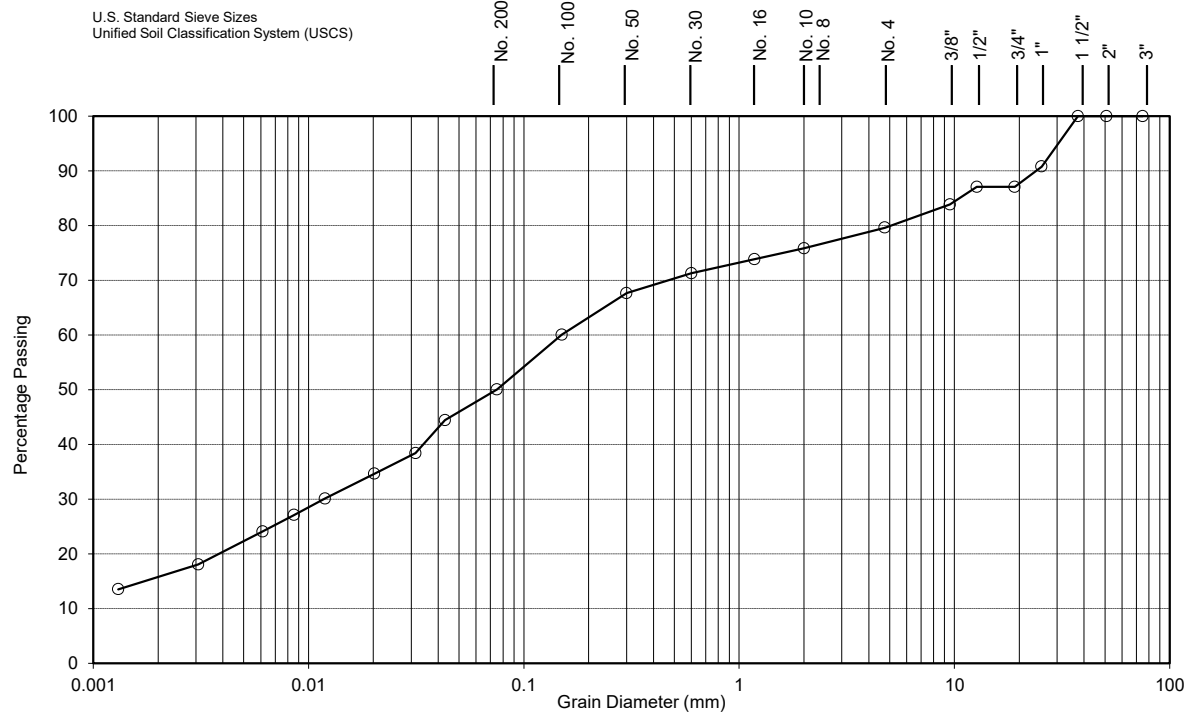
Project No.: SM 301951-T

Mechanical & Hydrometer Analyses



Lab No.:	22-092	Notes: Depth: 20'				
Borehole No.:	203					
Sample No.:	5					
CLAY [%]:	3	Soil Description: Brown Sand w/ traces of Silt, Clay and Gravel S.P. - Poorly graded sands				
SILT [%]:	8					
SAND [%]:	87	Estimated Infiltration Rate [mm/hr] : 125 to 150 Estimated Permeability, k [cm/s] 10⁻³				
GRAVEL [%]:	2					
D ₁₀ (Effective Diam. in mm):	0.07	Coefficient of Uniformity C _U : 2.1		Coefficient of Curvature C _C : 0.9		
SOIL-MAT ENGINEERS & CONSULTANTS LTD.						
7581 Nichol Road 15, Elora ON						
March 2022		Grain Size Analysis No. 8		Project No.: SM 301951-T		

Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.:	22-094	Notes: Depth: 5'			
Borehole No.:	204				
Sample No.:	2				
CLAY [%]:	16	Soil Description: Brown Sandy Gravelly Silt w/ some Clay M.L. - Silty or clayey fine sands			
SILT [%]:	34				
SAND [%]:	30				
GRAVEL [%]:	20				
D ₁₀ (Effective Diam. in mm):	0.00085	Estimated Infiltration Rate [mm/hr] :		10	Estimated Permeability, k [cm/s]
		Coefficient of Uniformity C _u :		188.2	10 ⁻⁷
					Coefficient of Curvature C _c :
					1.2

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

7581 Nichol Road 15, Elora ON

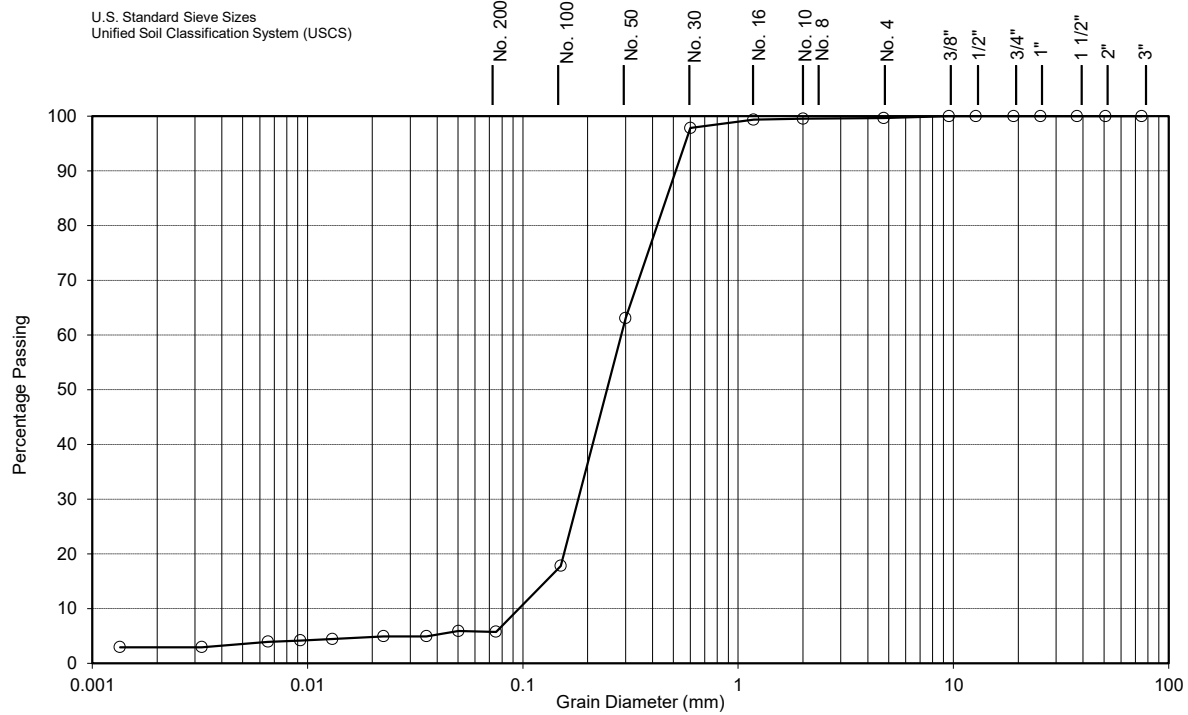


March 2022

Grain Size Analysis No. 9

Project No.: SM 301951-T

Mechanical & Hydrometer Analyses

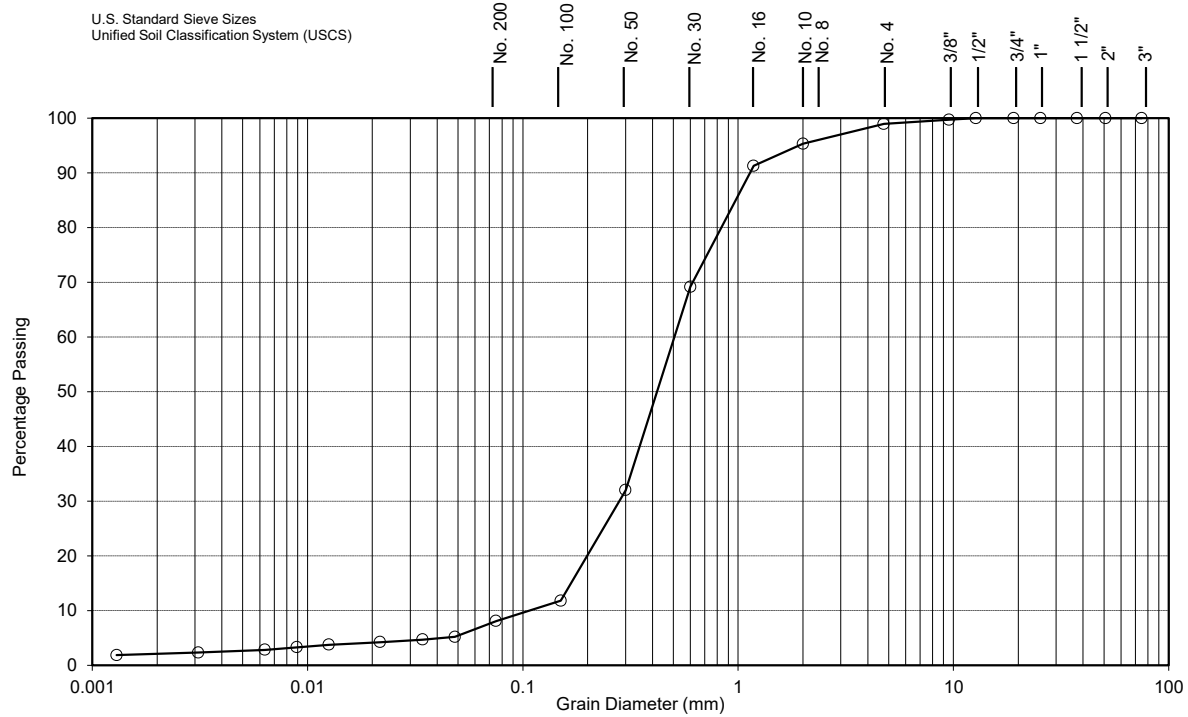


CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.: 22-093	Notes: Depth: 10'	
Borehole No.: 205		
Sample No.: 3		
CLAY [%]: 2	Soil Description: Brown Sand w/ traces of Silt and Clay S.P. - Poorly graded sands	
SILT [%]: 4		
SAND [%]: 94	Estimated Infiltration Rate [mm/hr] : 150 to 300	
GRAVEL [%]: 0		
D ₁₀ (Effective Diam. in mm): 0.095	Coefficient of Uniformity C _u : 3.1	Estimated Permeability, k [cm/s] 10⁻³
		Coefficient of Curvature C _c : 1.2
SOIL-MAT ENGINEERS & CONSULTANTS LTD.		
7581 Nichol Road 15, Elora ON		
March 2022	Grain Size Analysis No. 10	Project No.: SM 301951-T



Mechanical & Hydrometer Analyses

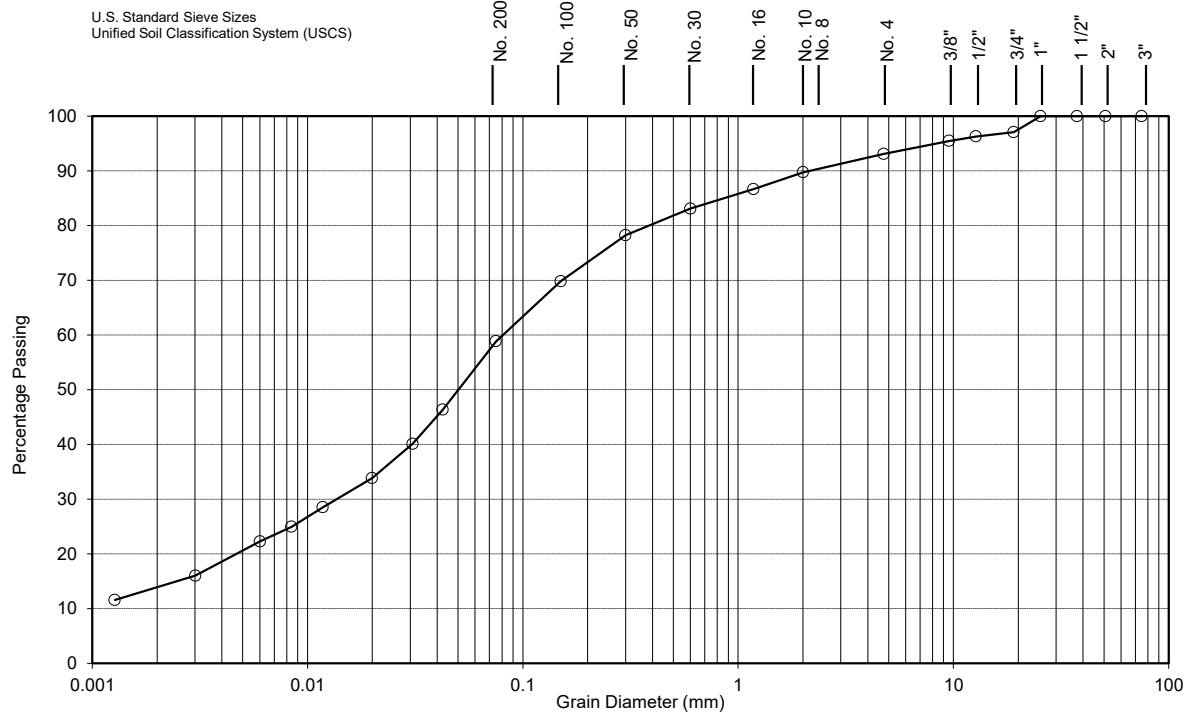


CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.: 21-339	Notes: Depth: 15'	
Borehole No.: 102		
Sample No.: 6		
CLAY [%]: 2	Soil Description: Brown Sand w/ traces of Silt, Clay and Gravel S.P. - Poorly graded sands, little or no fines	
SILT [%]: 6		
SAND [%]: 91		
GRAVEL [%]: 1		
D ₁₀ (Effective Diam. in mm): 0.10	Estimated Infiltration Rate [mm/hr] : 150 to 300	Estimated Permeability, k [cm/s] 10⁻²
	Coefficient of Uniformity C _u : 5.1	Coefficient of Curvature C _c : 1.5
SOIL-MAT ENGINEERS & CONSULTANTS LTD.		
75 Woolwich Street East, Elora ON		
August 2021	Grain Size Analysis No. 11	Project No.: SM 301951-T

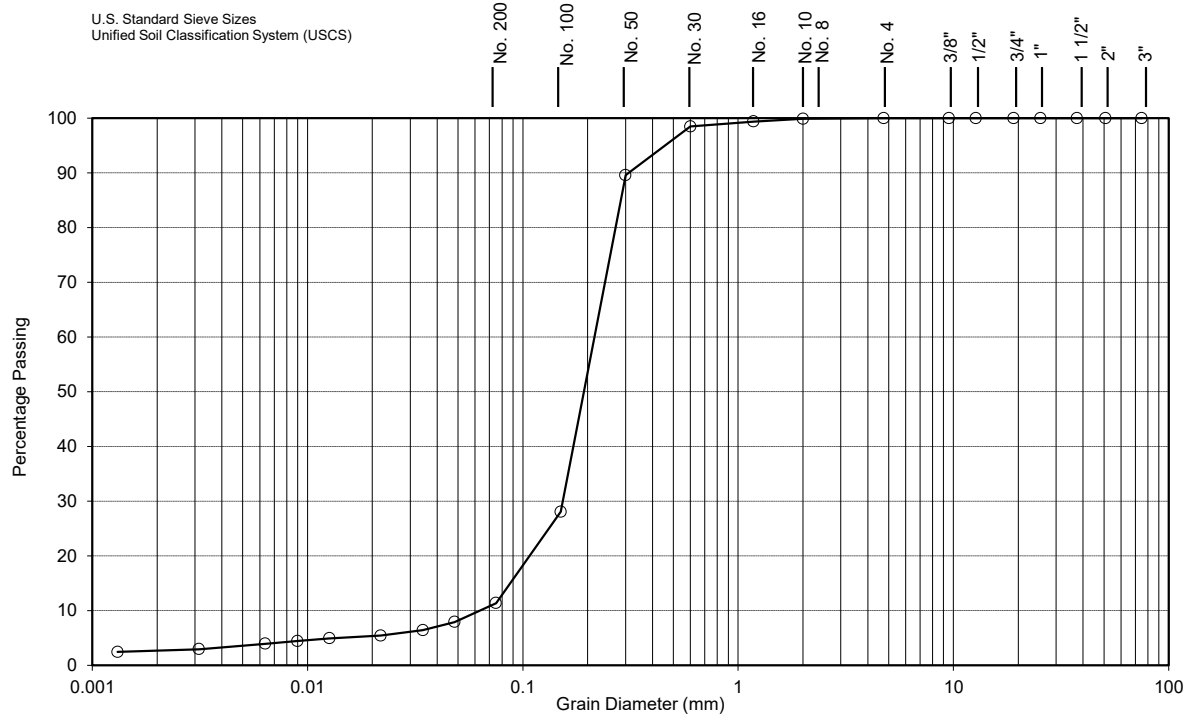


Mechanical & Hydrometer Analyses



Lab No.:	21-338	Notes: Depth: 5'	
Borehole No.:	103		
Sample No.:	3		
CLAY [%]:	14	Soil Description: Brown Sandy Silt w/ some Clay and trace Gravel M.L. - Inorganic silts and very fine sands, clayey silts with slight plasticity	
SILT [%]:	45		
SAND [%]:	34		
GRAVEL [%]:	7		
D ₁₀ (Effective Diam. in mm):	0.00100	Estimated Infiltration Rate [mm/hr] :	10
		Coefficient of Uniformity C _u :	80.0
		Estimated Permeability, k [cm/s]	10 ⁻⁶
		Coefficient of Curvature C _c :	2.1
SOIL-MAT ENGINEERS & CONSULTANTS LTD.			
75 Woolwich Street East, Elora ON			
August 2021	Grain Size Analysis No. 12	Project No.: SM 301951-T	

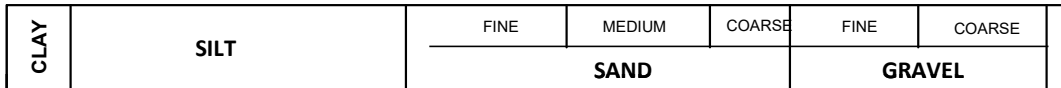
Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

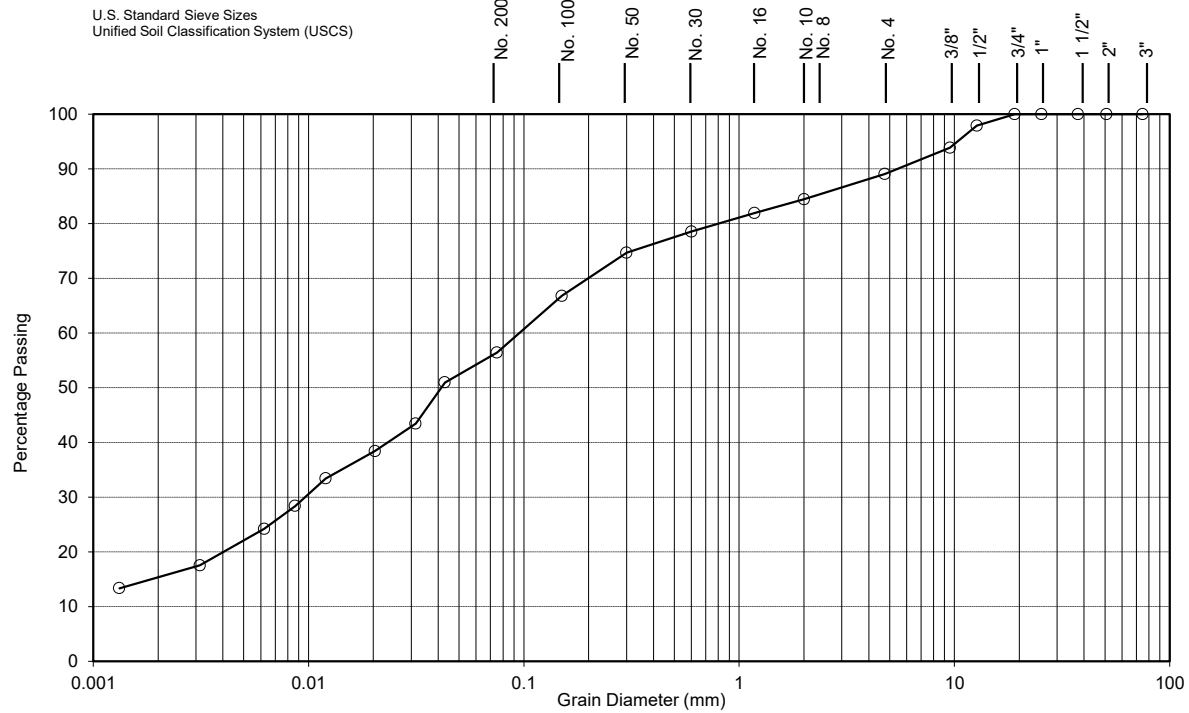
Lab No.:	21-337	Notes: Depth: 7.5'				
Borehole No.:	104					
Sample No.:	4					
CLAY [%]:	2	Soil Description: Brown Sand w/ traces of Silt and Clay S.P. - Poorly graded sands, little or no fines				
SILT [%]:	9					
SAND [%]:	89	Estimated Infiltration Rate [mm/hr] : 100 to 150				
GRAVEL [%]:	0					
D ₁₀ (Effective Diam. in mm):	0.0600	Coefficient of Uniformity C _u :		Estimated Permeability, k [cm/s] 10⁻³ to 10⁻²		
		Coefficient of Curvature C _c :		1.9		
SOIL-MAT ENGINEERS & CONSULTANTS LTD.						
75 Woolwich Street East, Elora ON						
August 2021		Grain Size Analysis No. 13		Project No.: SM 301951-T		

U.S. Standard Sieve Sizes
Unified Soil Classification System (USCS)

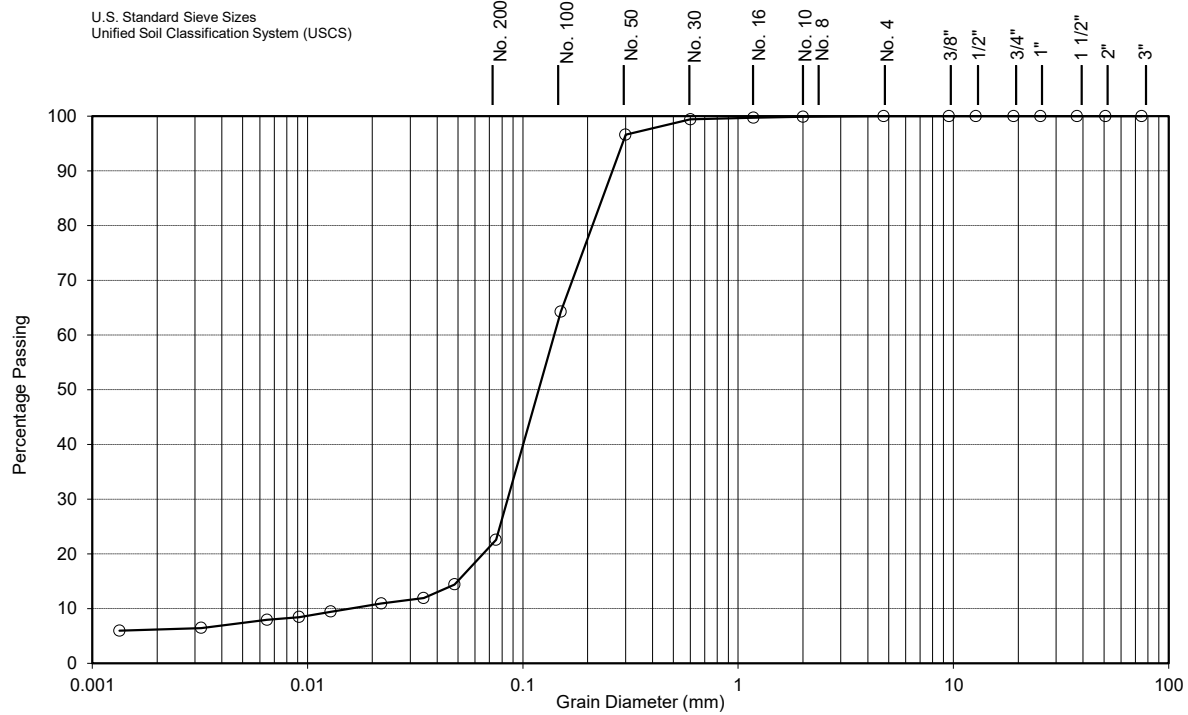


Lab No.:	22-096	Notes: Depth: 5'				
Borehole No.:	302					
Sample No.:	2					
CLAY [%]:	2	Soil Description: Brown Sand w/ traces of Silt and Clay S.P. - Poorly graded sands, little or no fines				
SILT [%]:	3					
SAND [%]:	95					
GRAVEL [%]:	0	Estimated Infiltration Rate [mm/hr] :		150 to 300	Estimated Permeability, k [cm/s]	10 ⁻²
D ₁₀ (Effective Diam. in mm):	0.09	Coefficient of Uniformity C _U :		2.3	Coefficient of Curvature C _C :	1.5
SOIL-MAT ENGINEERS & CONSULTANTS LTD.						
75 Woolwich Street East, Elora ON						
March 2022		Grain Size Analysis No. 14		Project No.: SM 301951-T		

Mechanical & Hydrometer Analyses



Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.:	22-098	Notes: Depth: 5'			
Borehole No.:	305				
Sample No.:	2				
CLAY [%]:	7	Soil Description: Brown Sand w/ some Silt and a trace of Clay S.M. - Sand-silt mixtures, silty sands			
SILT [%]:	16				
SAND [%]:	77				
GRAVEL [%]:	0				
D ₁₀ (Effective Diam. in mm):	0.015	Estimated Infiltration Rate [mm/hr] :	50 to 60	Estimated Permeability, k [cm/s]	10 ⁻⁴
		Coefficient of Uniformity C _U :	10.0	Coefficient of Curvature C _C :	3.3
SOIL-MAT ENGINEERS & CONSULTANTS LTD.					
75 Woolwich Street East, Elora ON					
March 2022		Grain Size Analysis No. 16		Project No.: SM 301951-T	



SOIL-MAT ENGINEERS & CONSULTANTS LTD.

401 Grays Road · Hamilton, ON · L8E 2Z3

🌐 www.soil-mat.ca ✉ info@soil-mat.ca ☎ 905.318.7440 / 800.243.1922 (toll free) 📠 905.318.7455

PROJECT No.: SM 301951-G

August 19, 2024

CACHET DEVELOPMENTS
361 CONNIE CRESCENT, SUITE 200
Concord, Ontario
L4K 5R2

Attention: Hatim Jafferjee
Land Development Coordinator

**SUPPLEMENTAL GROUNDWATER DATA
PROPOSED RESIDENTIAL DEVELOPMENT
CLAYTON AND ELORA SANDS
ELORA, ONTARIO**

Dear Mr. Jafferjee,

Further to the recent request and correspondence with MTE Consultants, SOIL-MAT ENGINEERS & CONSULTANTS LTD. has prepared the following brief updated groundwater level summary based on information collected between July 15, 2022 to May 3, 2023. This information is further to our preliminary hydrogeological assessment reports for the development lands [SM 301951-G, dated June 17 and July 20, 2022], and should be referenced in conjunction with those reports.

Groundwater Observations

Monitoring wells were installed at Borehole Nos. 004, 101, 102, 104, 201, 201A, 202, 203, 204, 205, 206, 301 through 305, and 401, to allow for future measurements of the static groundwater level. Monitoring data up to June 2022 was presented in the prior referenced reports. A data logger was maintained in each of the monitoring wells to allow for further continuous monitoring of the groundwater level between July 2022 to May 2023, the readings of which have been illustrated in graphs which can be found appended to the end of this report.

In addition, manual monitoring well readings were also taken from all of the installed monitoring well locations across the site on various dates, ranging from August 2021 to May 2023. These have been summarized in the following charts. As well, the detailed plots of continuous groundwater levels for each monitoring well are appended.

TABLE A
SUMMARY OF MANUAL GROUNDWATER READINGS (ELORA SANDS)

Borehole No. 004 (Ground Surface Elevation of 405.55 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	2.74	402.8
August 27, 2021	1.75	403.8
February 23, 2022	1.33	404.2
April 22, 2022	1.47	404.1
June 1, 2022	1.78	403.8
May 3, 2023	1.20	404.35

Borehole No. 201 (Ground Surface Elevation of 404.80 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.69	402.1
April 22, 2022	1.88	402.9
June 1, 2022	2.44	402.4
May 3, 2023	1.88	402.9

Borehole No. 201A (Ground Surface Elevation of 404.75 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	Dry	<401.8
April 22, 2022	2.05	402.7
June 1, 2022	2.43	402.3
May 3, 2023	1.71	403.1

Borehole No. 202 (Ground Surface Elevation of 406.59 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	5.5	401.1
April 22, 2022	4.76	401.8
June 1, 2022	5.43	401.2
May 3, 2023	4.51	402.1

Borehole No. 203 (Ground Surface Elevation of 407.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	Dry	<401.0
April 22, 2022	5.90	401.2
June 1, 2022	5.91	401.2
May 3, 2023	Dry	<401.0

Borehole No. 204 (Ground Surface Elevation of 409.56 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.81	406.7
April 22, 2022	1.16	408.4
June 1, 2022	1.53	408.0
May 3, 2023	1.20	408.4

Borehole No. 205 (Ground Surface Elevation of 412.99 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	2.56	410.4
April 22, 2022	2.25	410.7
June 1, 2022	2.39	410.6
May 3, 2023	2.34	410.6

Borehole No. 206 (Ground Surface Elevation of 412.88 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 17, 2022	6.83	406.1
April 22, 2022	4.60	408.3
June 1, 2022	4.66	408.2
May 3, 2023	4.76	408.1

Borehole No. 401 (Ground Surface Elevation of 420.91 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
April 22, 2022	2.29	418.6
June 1, 2022	2.39	418.5
May 3, 2023	2.31	418.6

TABLE B
SUMMARY OF MANUAL GROUNDWATER READINGS (CLAYTON LANDS)

Borehole No. 101 (Ground Surface Elevation of 408.60 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	4.78	403.8
August 27, 2021	4.71	403.9
October 14, 2021	4.33	404.3
February 23, 2022	4.31	404.3
April 22, 2022	4.07	404.5
June 1, 2022	4.15	404.5
May 3, 2023	4.06	404.5

Borehole No. 102 (Ground Surface Elevation of 414.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	3.58	410.6
August 27, 2021	3.61	410.5
October 14, 2021	3.62	410.5
February 23, 2022	3.50	410.6
April 22, 2022	2.89	411.2
June 1, 2022	3.05	411.1
May 3, 2023	3.00	411.0

Borehole No. 103 (Ground Surface Elevation of 414.13 metres)		
	Groundwater Depth (m)	Groundwater Elevation (m)
August 6, 2021	6.78	407.3
August 27, 2021	6.96	407.2
October 14, 2021	7.09	407.0
February 23, 2022	6.83	407.3
April 22, 2022	6.13	408.0
June 1, 2022	6.28	407.8
May 3, 2023	6.56	407.6

Borehole No. 301 (Ground Surface Elevation of 412.75 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	6.29	406.5
April 22, 2022	5.65	407.1
June 1, 2022	5.71	407.0
May 3, 2023	5.85	406.9

Borehole No. 302 (Ground Surface Elevation of 413.00 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	6.62	406.4
April 22, 2022	6.06	406.9
June 1, 2022	6.12	406.9
May 3, 2023	6.35	406.7

Borehole No. 303 (Ground Surface Elevation of 414.00 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	5.40	408.6
April 22, 2022	6.04	407.9
June 1, 2022	6.11	407.9
May 3, 2023	6.41	407.6

Borehole No. 304 (Ground Surface Elevation of 407.90 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	2.87	405.0
April 22, 2022	2.60	405.3
June 1, 2022	2.96	404.9
May 3, 2023	2.42	405.5

Borehole No. 305 (Ground Surface Elevation of 408.60 metres)*		
	Groundwater Depth (m)	Groundwater Elevation (m)
February 23, 2022	Dry	<405.6
April 22, 2022	Dry	<405.6
June 1, 2022	Dry	<405.6
May 3, 2023	Dry	<405.6

*Ground surface elevations have been interpolated based on contours from current topographic survey

We trust that this geotechnical report is sufficient for your present requirements. Should you require any additional information or clarification as to the contents of this document, please do not hesitate to contact the undersigned.

Yours very truly,
SOIL-MAT ENGINEERS & CONSULTANTS LTD.



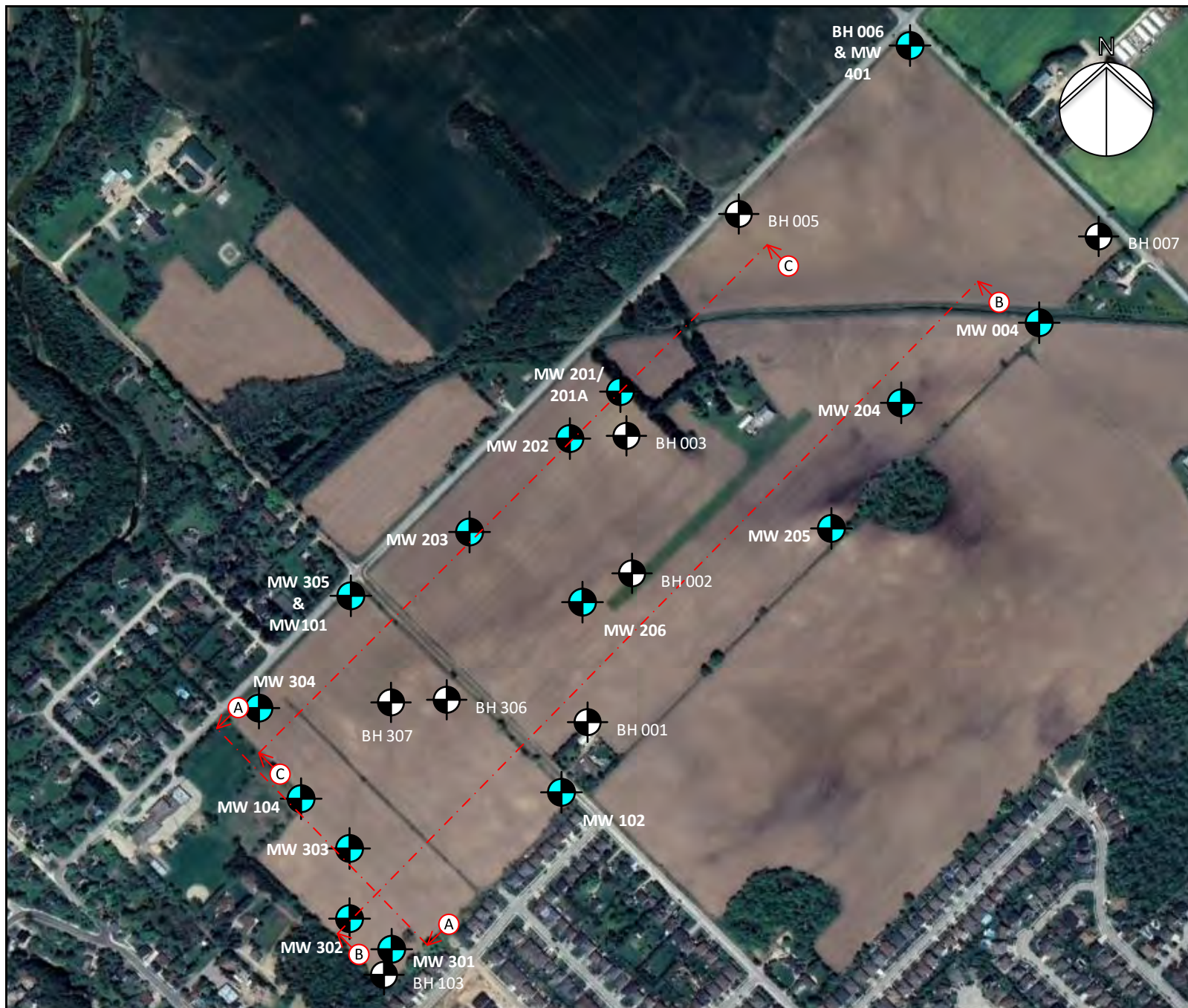
Kevin Reid, B. Eng
Junior Engineer



Ian Shaw, P. Eng., QP_{ESA}
Senior Engineer

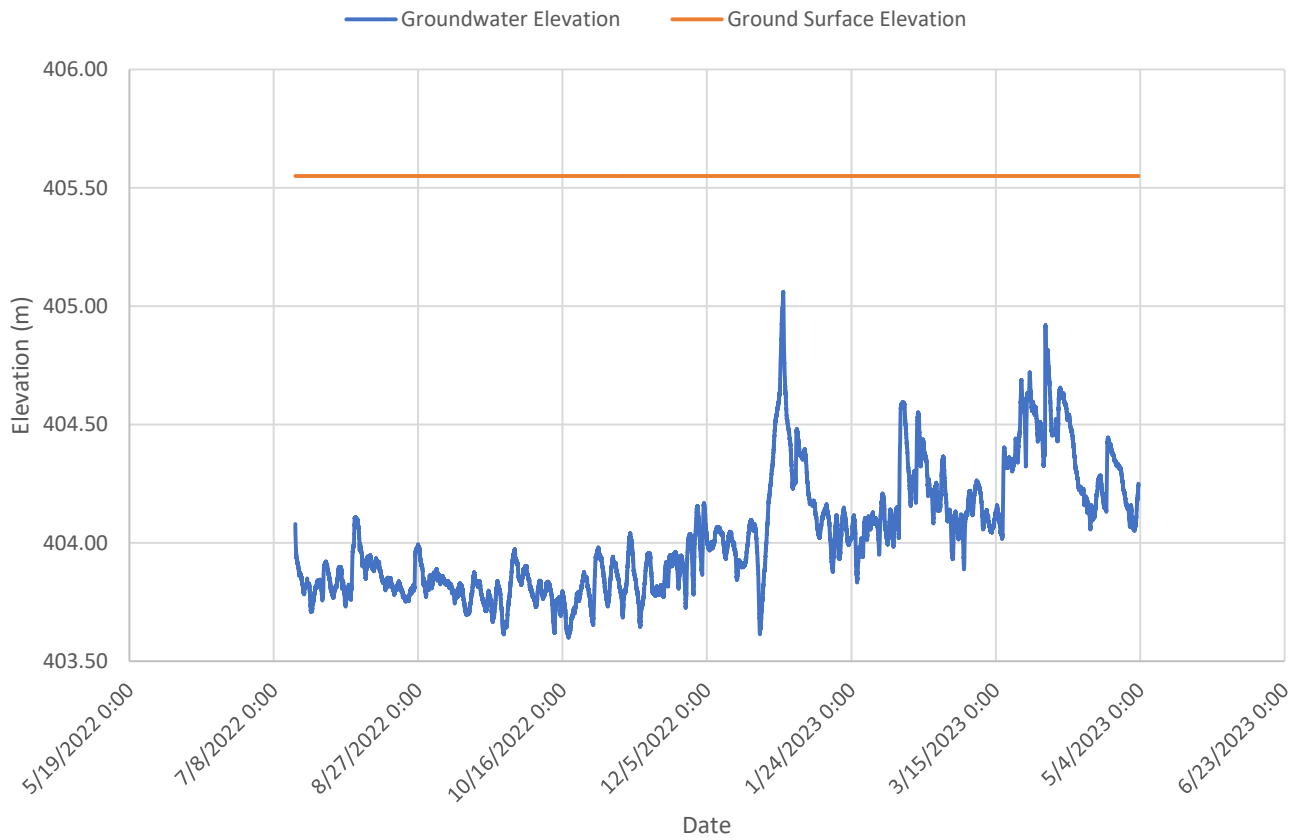
Enclosures: Drawing No. 1, Borehole Location Plan
Groundwater Monitoring Well Plots

Distribution: Cachet Developments [pdf]



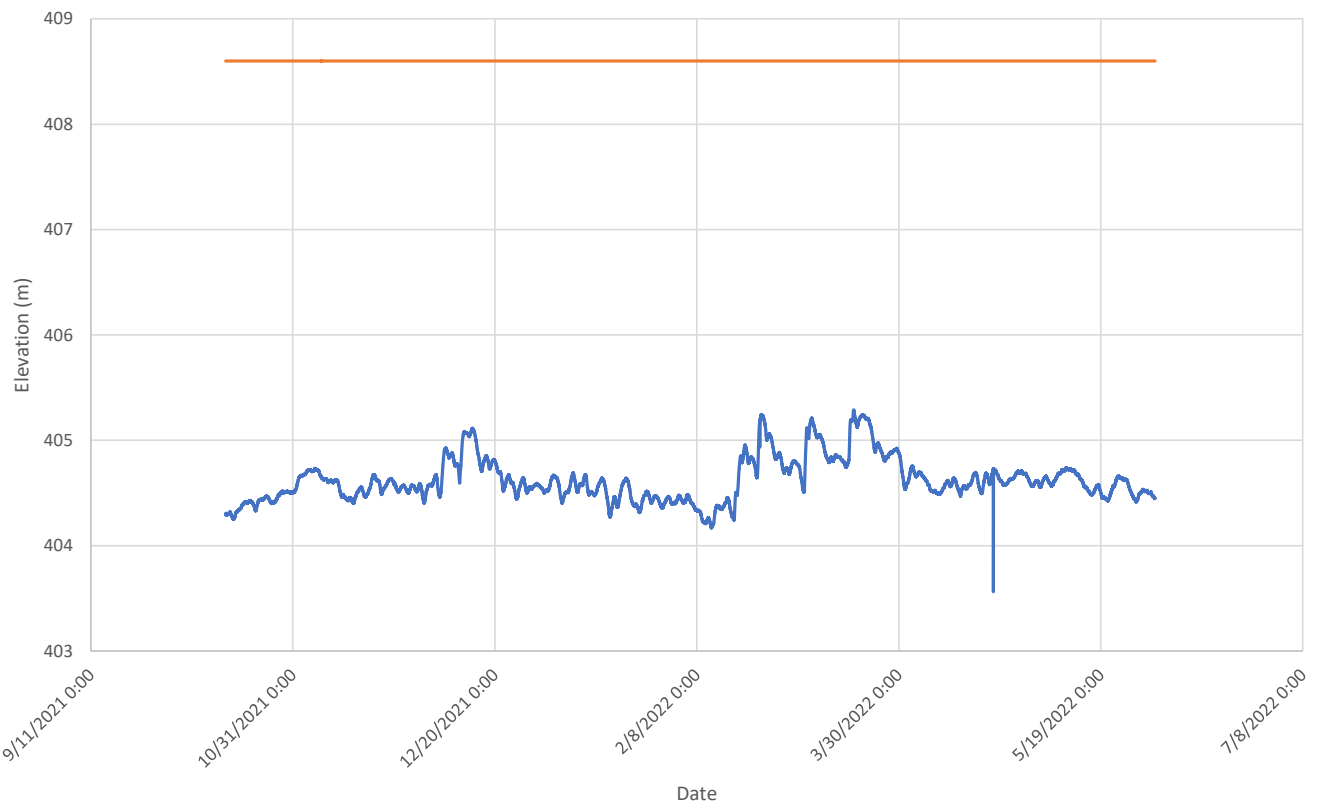
LEGEND  Borehole Location BH#  Monitoring Well Location MW#  Geological Cross Section Location	
NOTES 1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301591-G. 2. Borehole and monitoring well locations are approximate.	
SOIL-MAT ENGINEERS & CONSULTANTS LTD.	
Geotechnical Investigation Proposed Residential Development 7581 Nichol Road 15 Elora, Ontario	
Borehole Location Plan	
Project No. SM 301591-G	
Date: June 2022	
Drawn: SW	Checked: IS
SM 301591-G Borehole Location Plan	
Drawing No. 1	

MW 004 Groundwater Elevation July 2022 to May 2023

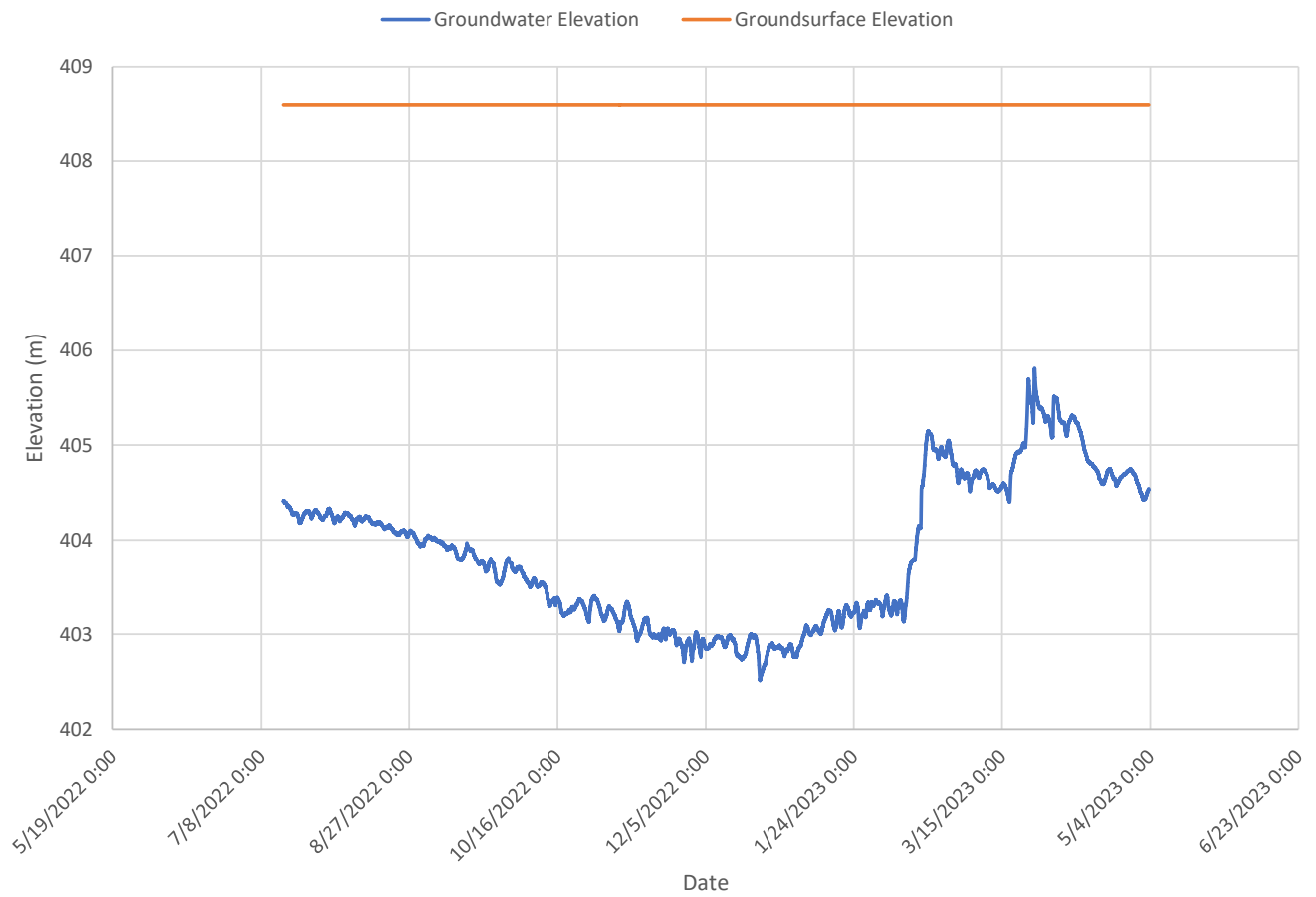


MW 101 (Elevation of 408.60 metres)
October 2021 to June 2022

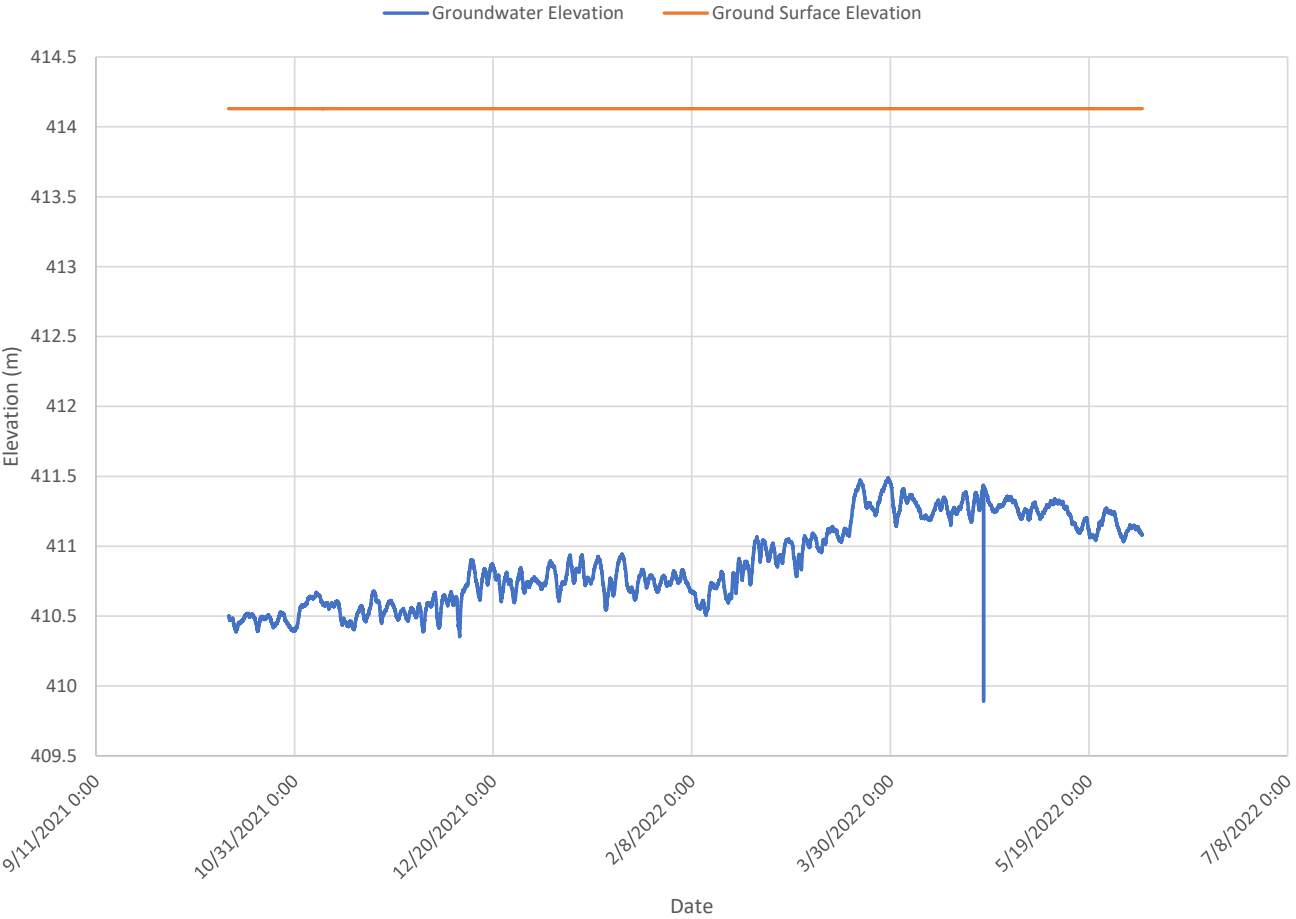
Groundwater Elevation Ground Surface Elevation



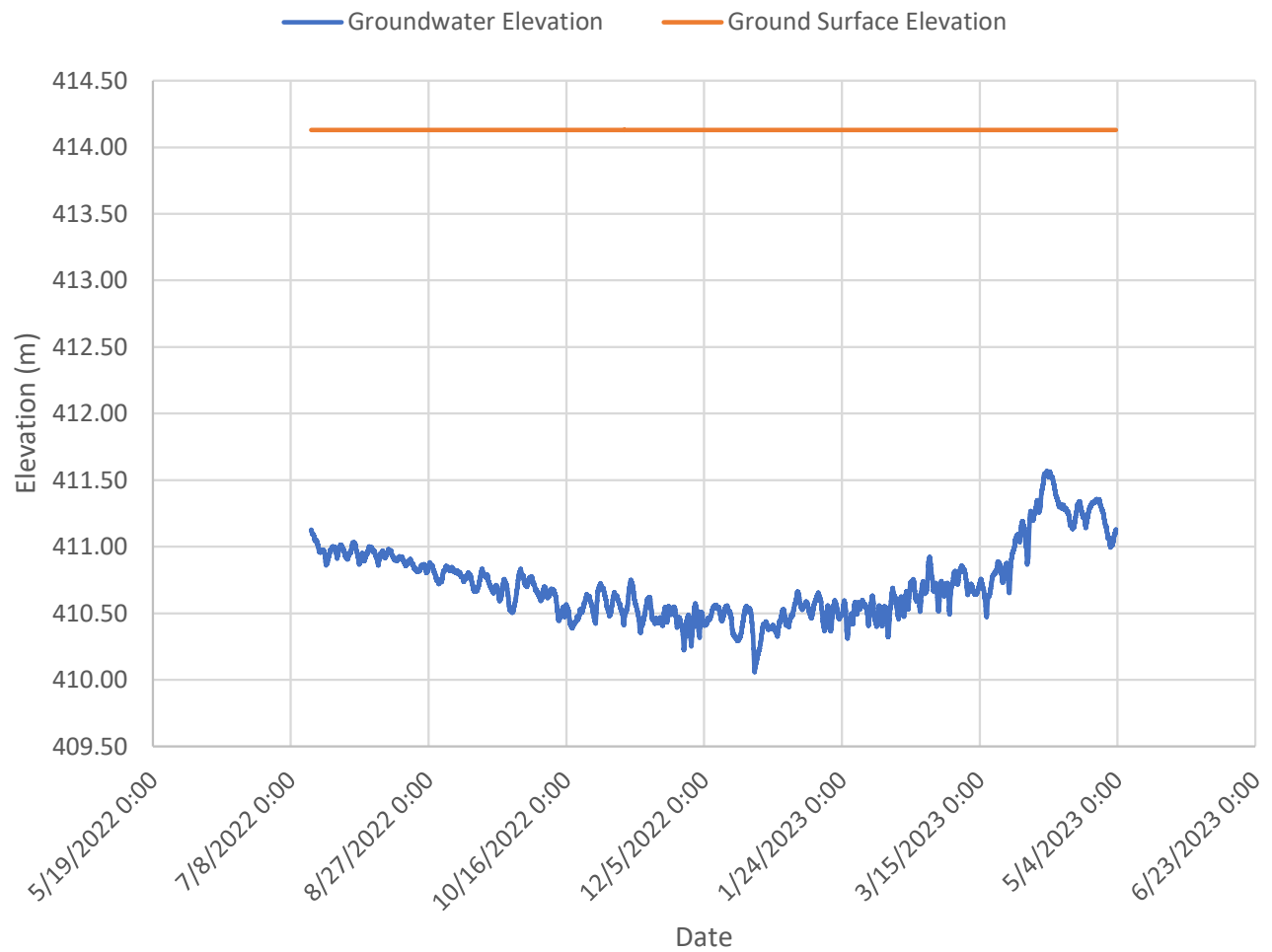
MW 101 Groundwater Elevation July 2022 to May 2023



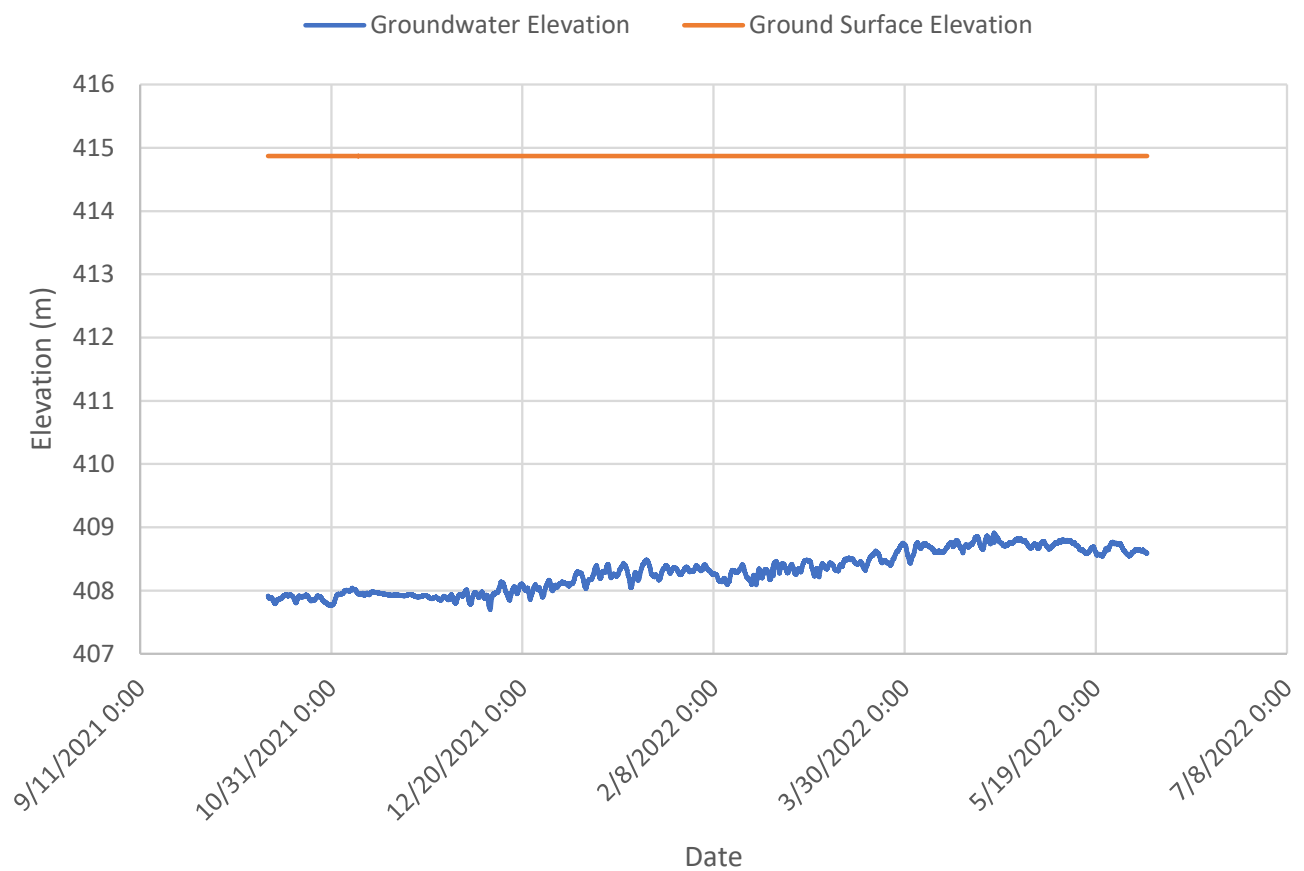
MW 102 (Elevation of 414.13 metres)
October 2021 to June 2022



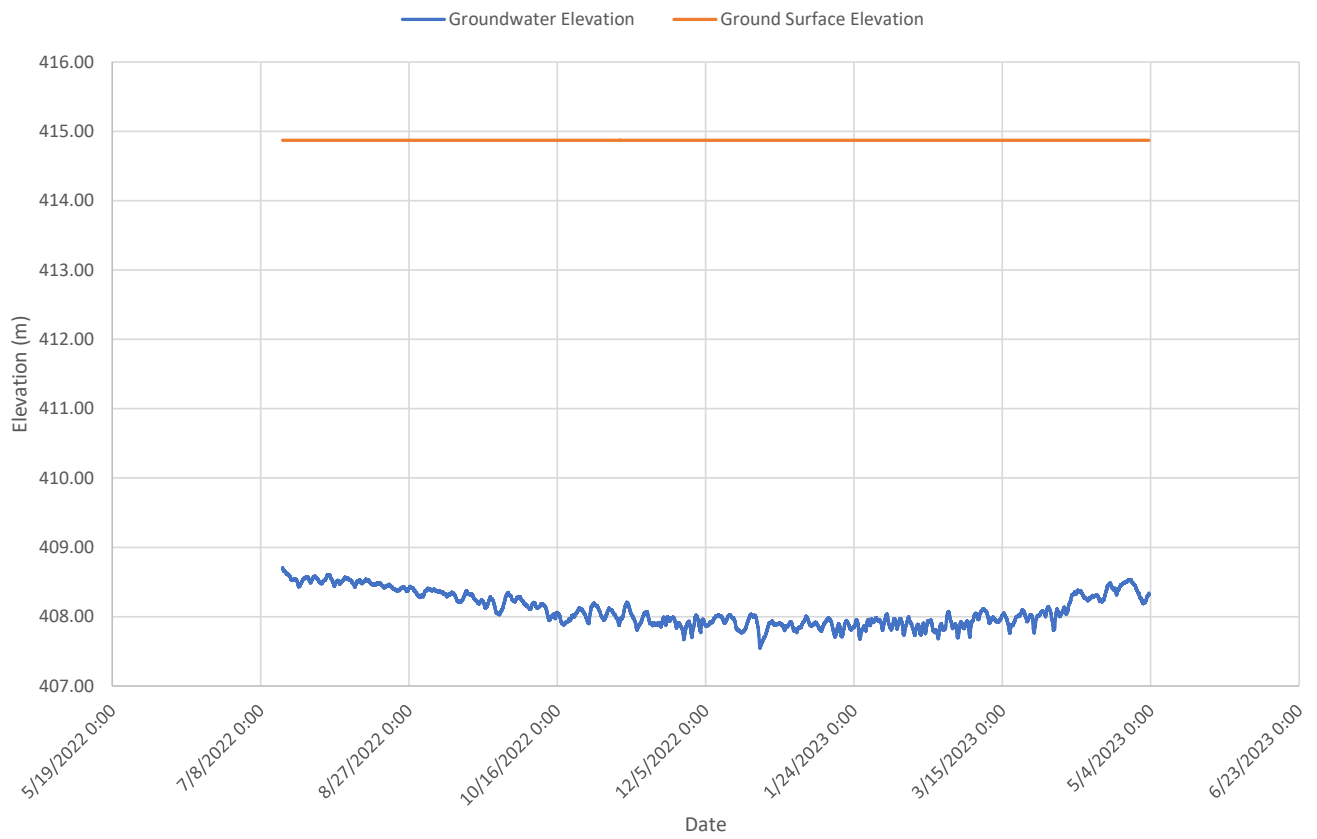
MW 102 Groundwater Elevation July 2022 to May 2023



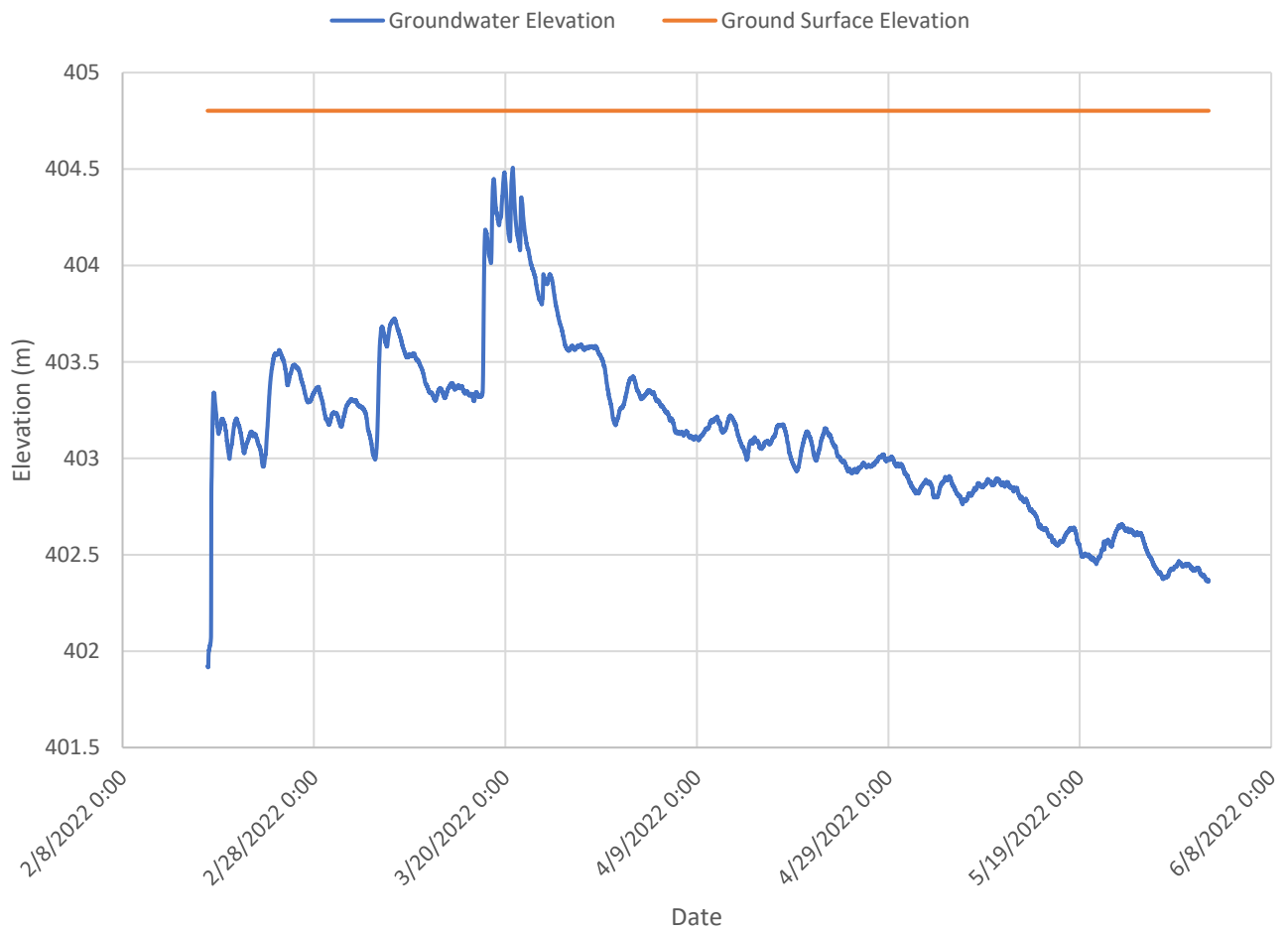
MW104 (Elevation of 414.87 metres) October 2021 to June 2022



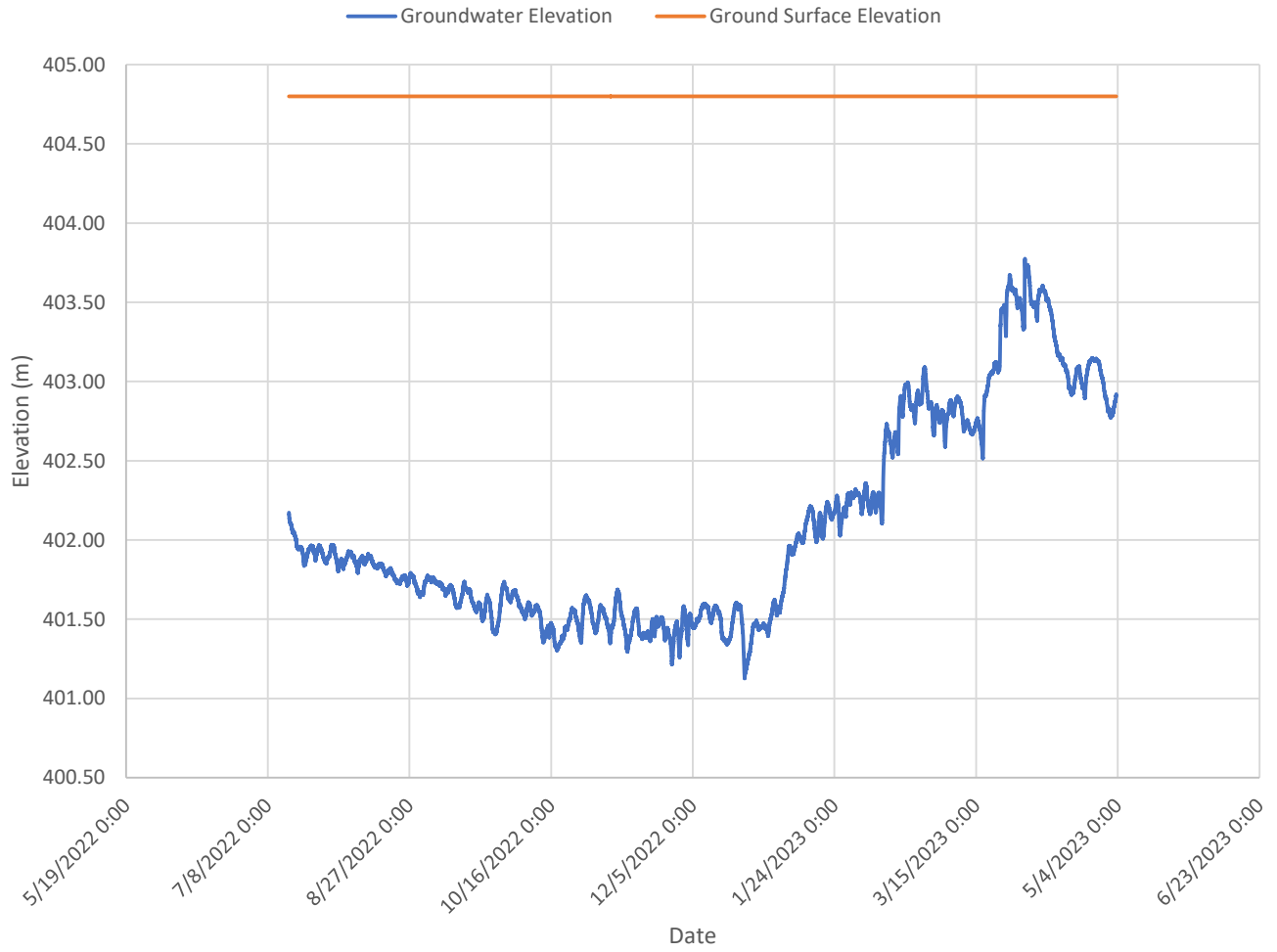
MW 104 Groundwater Elevation July 2022 to May 2023



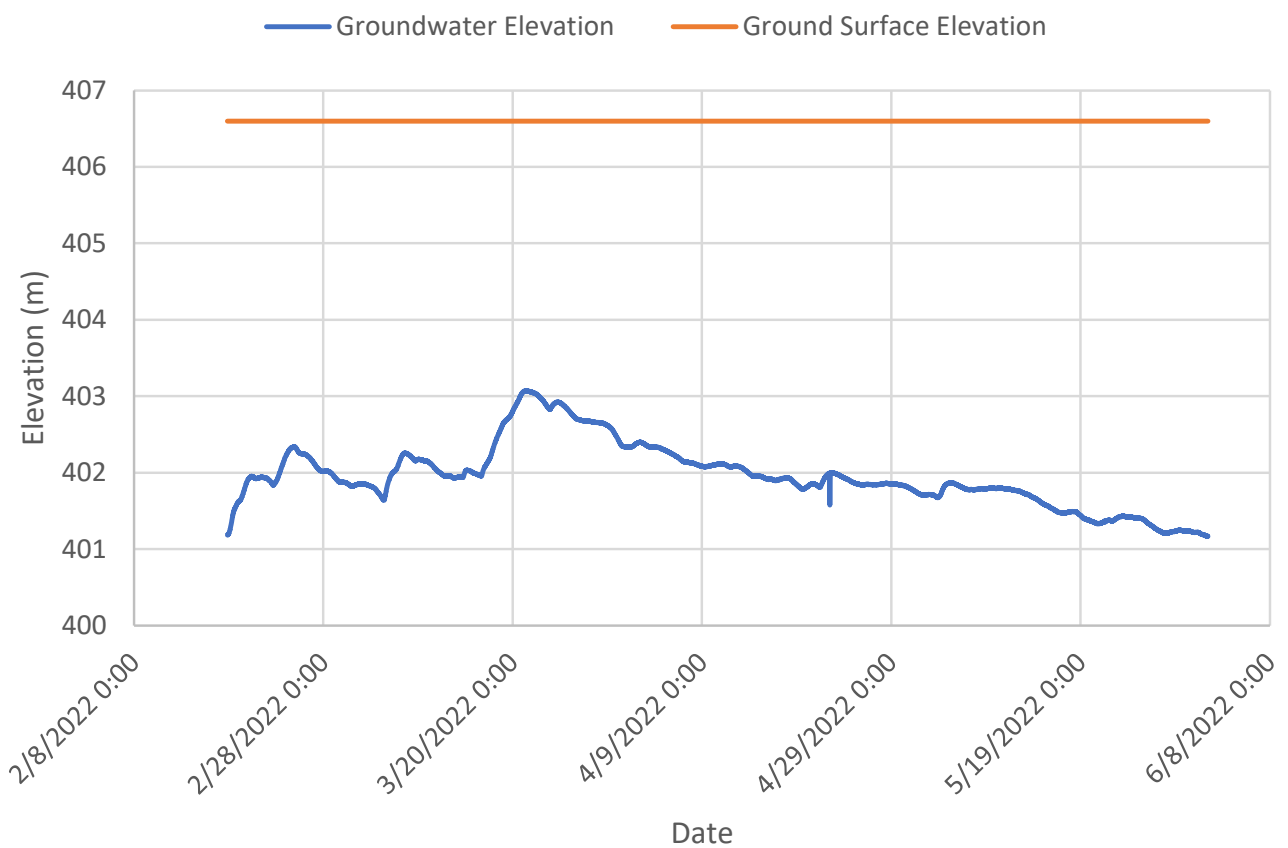
MW 201 (Elevation of 404.80 metres)
February 2022 to June 2022



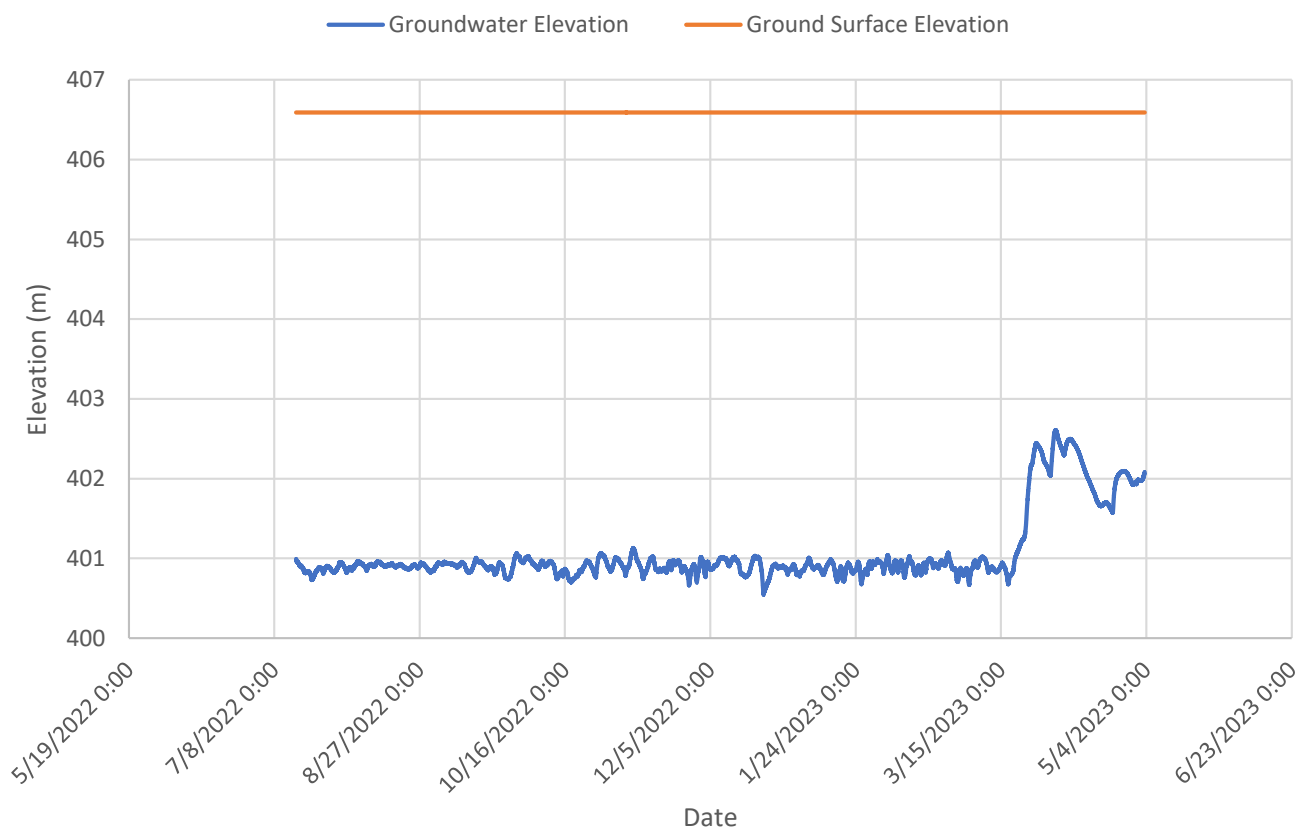
MW 201 Groundwater Elevation
July 2022 to May 2023



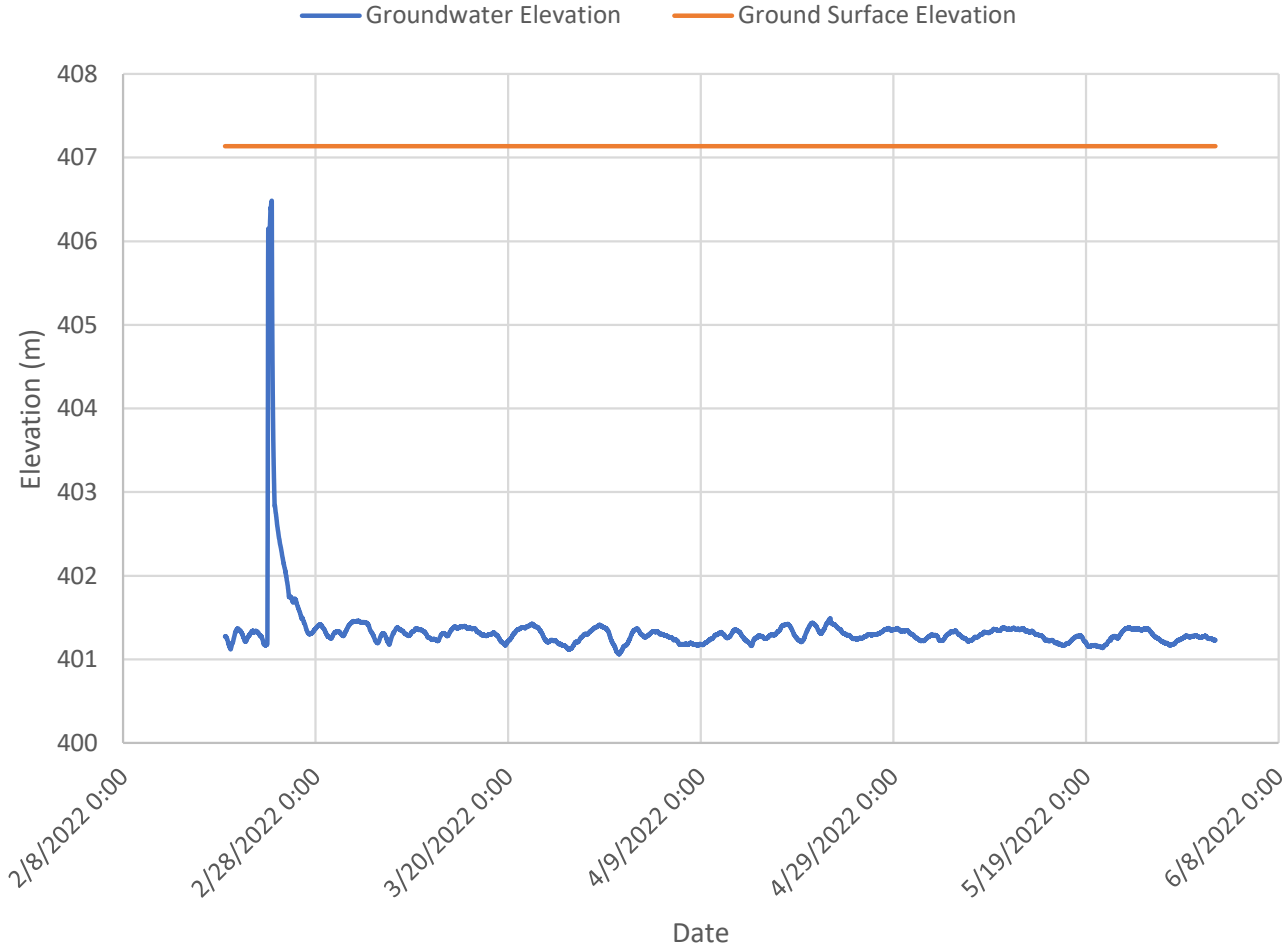
MW 202 (Elevation of 406.59 metres) February 2022 to June 2022



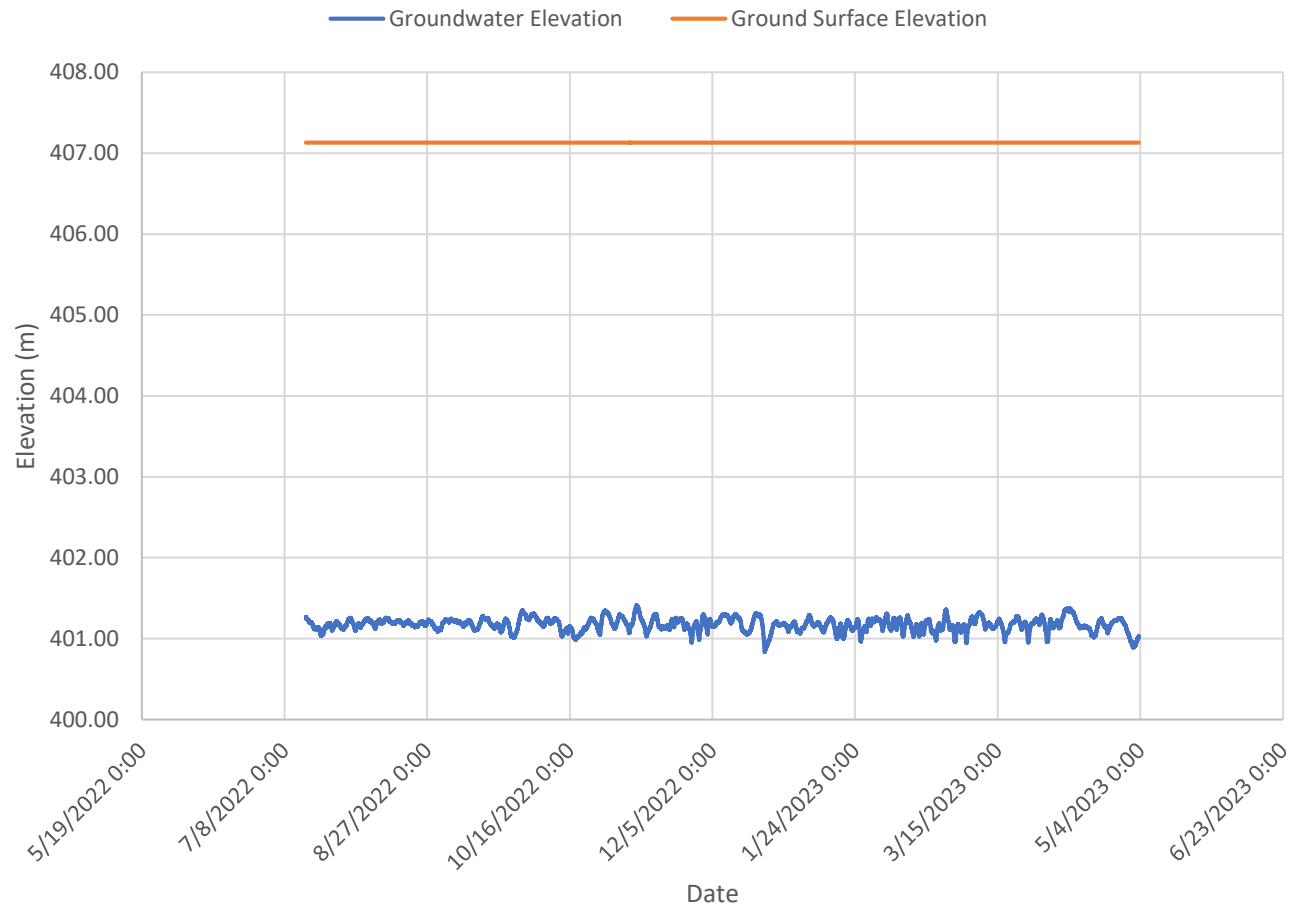
MW 202 Groundwater Elevation July 2022 to May 2023



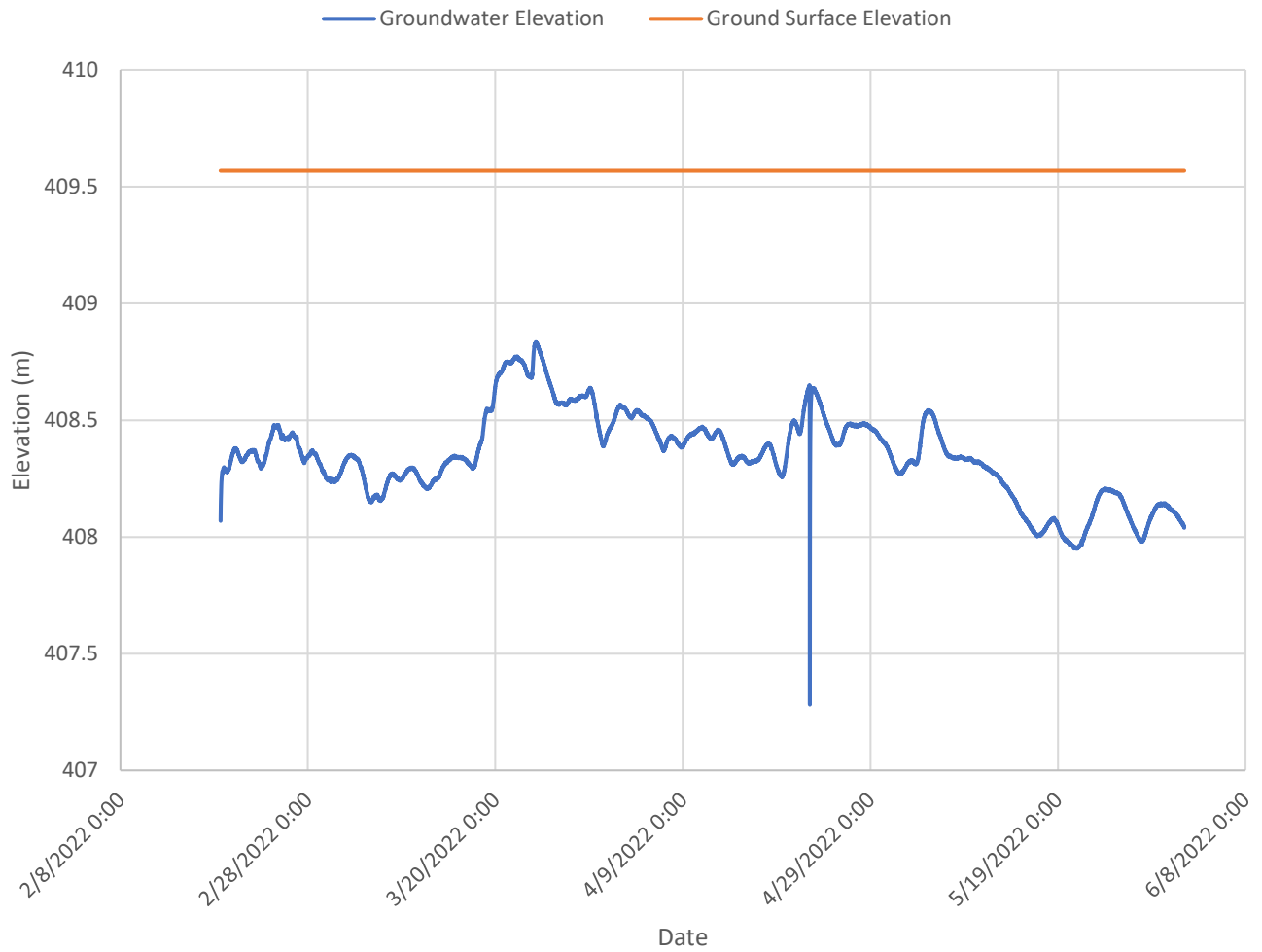
MW 203 (Elevation of 407.13 metres)
February 2022 to June 2022



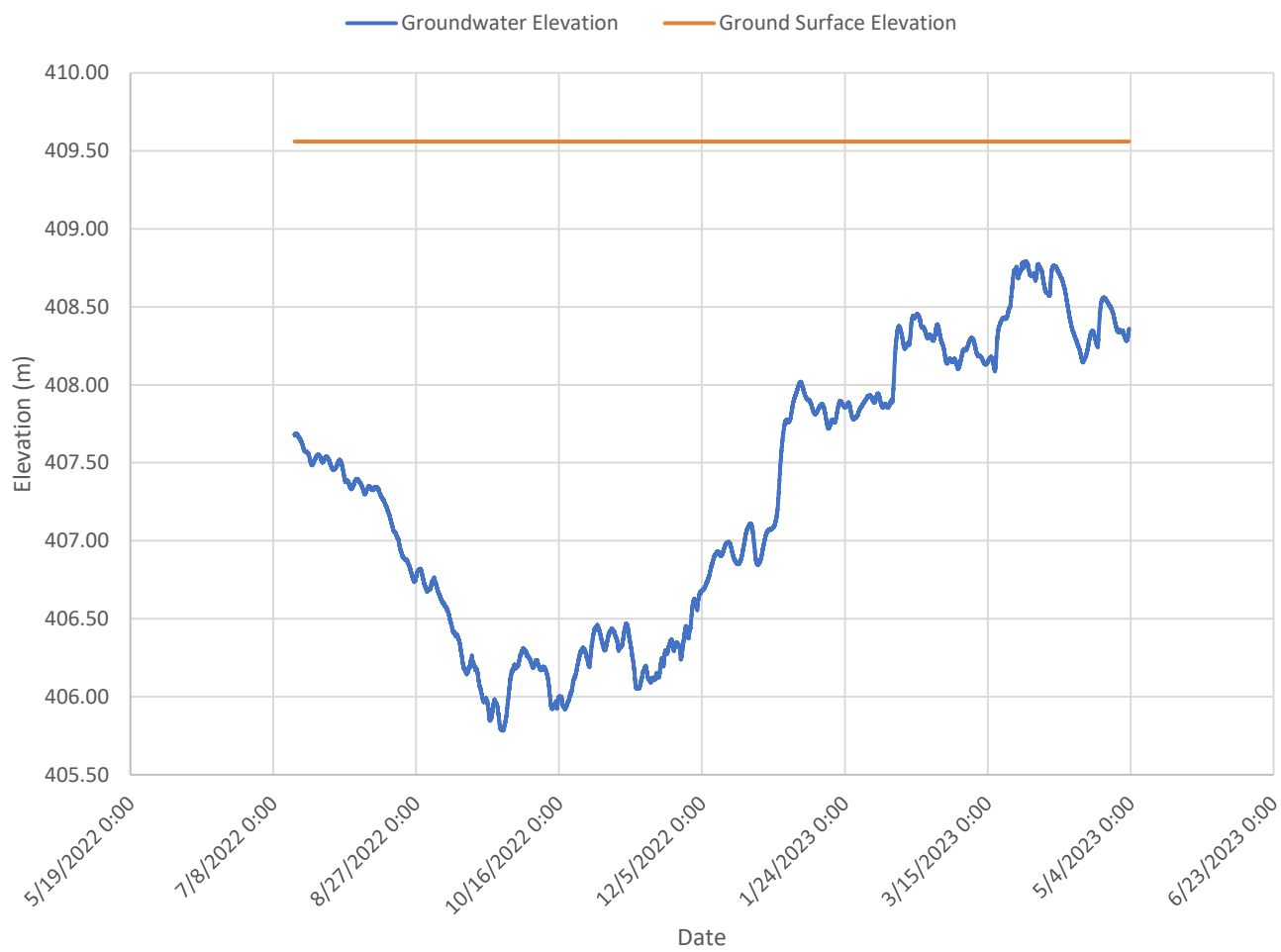
MW 203 Groundwater Elevation July 2022 to May 2023



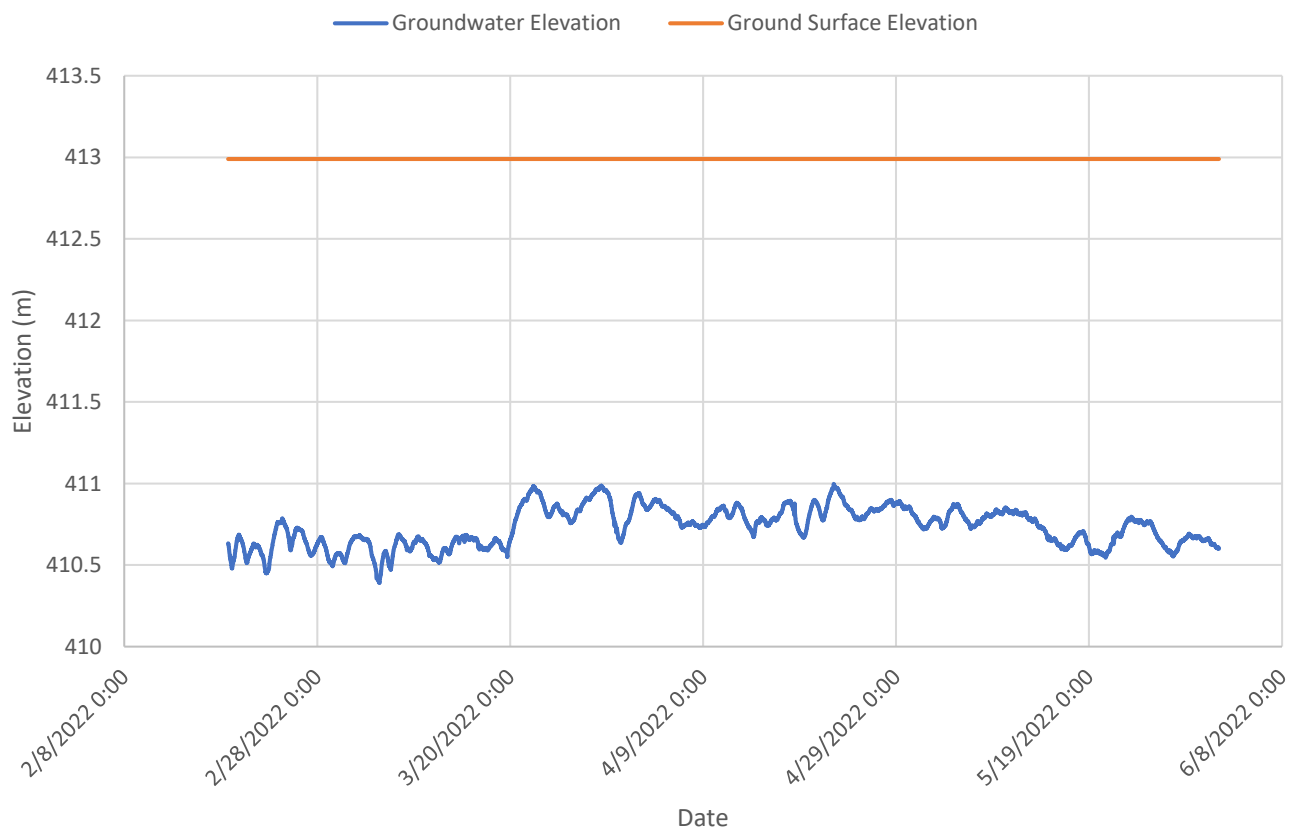
MW 204 (Elevation of 409.57 metres)
February 2022 to June 2022



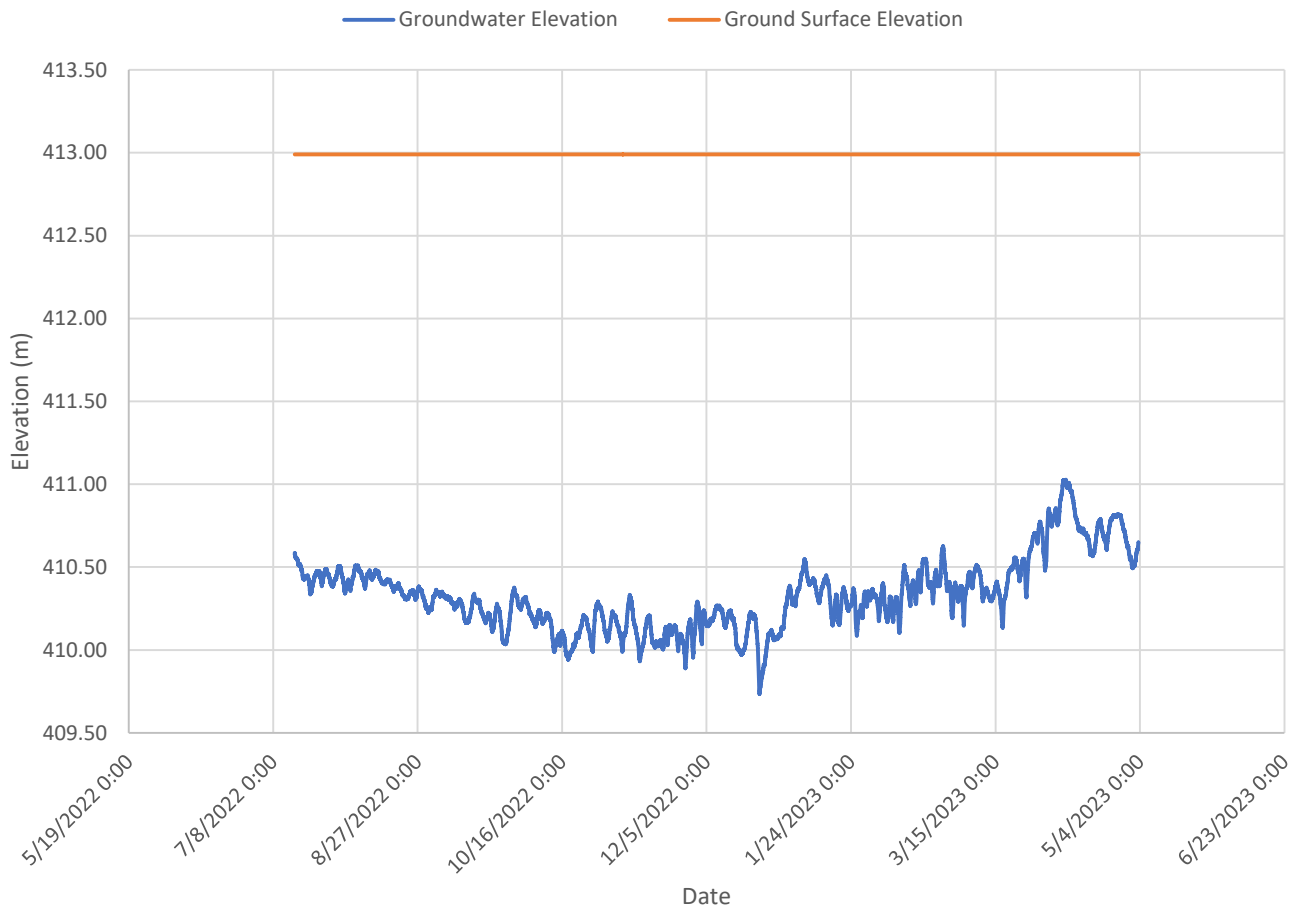
MW 204 Groundwater Elevation July 2022 to May 2023



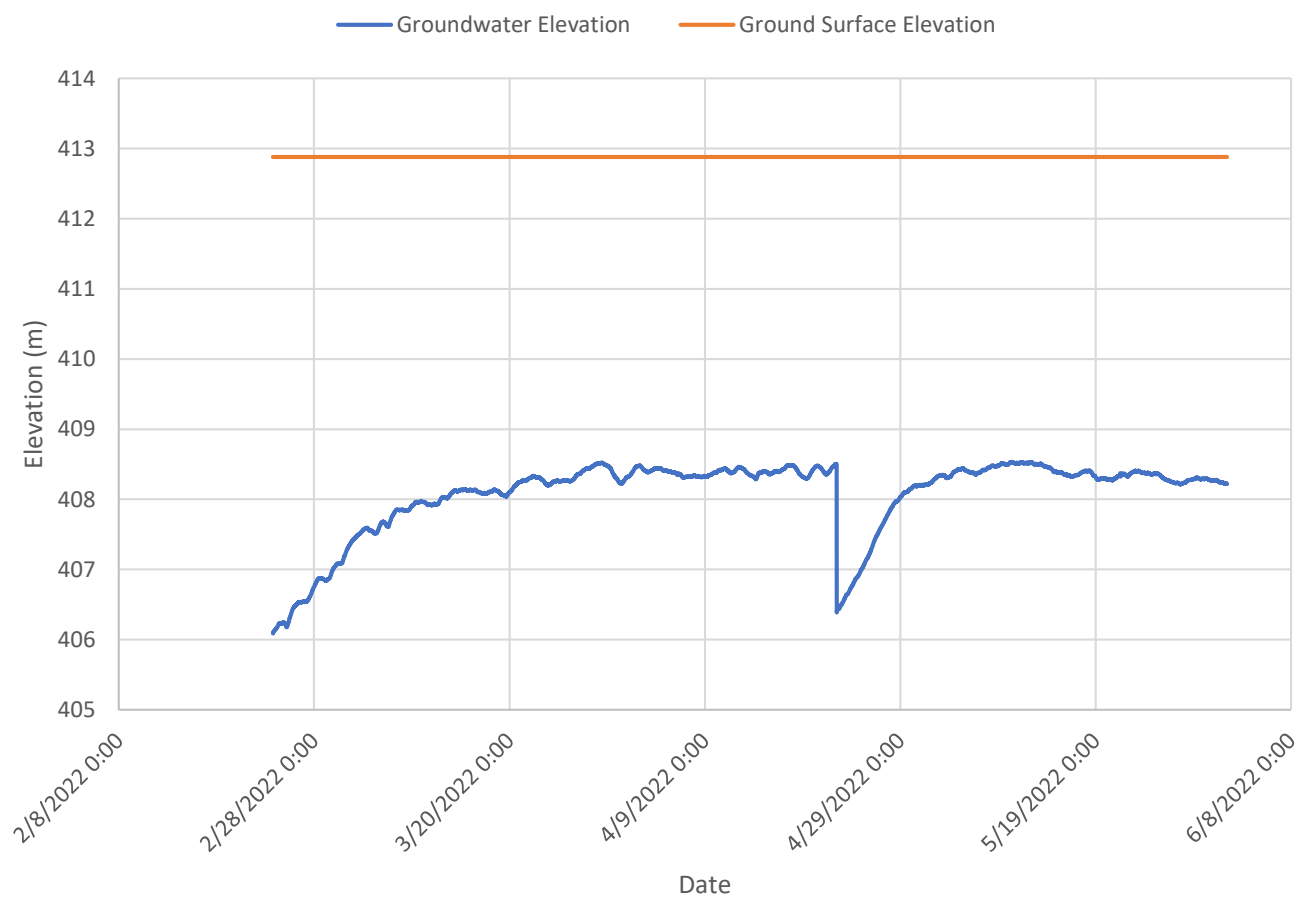
MW 205 (Elevation of 412.99 metres)
February 2022 to June 2022



MW 205 Groundwater Elevation July 2022 to May 2023

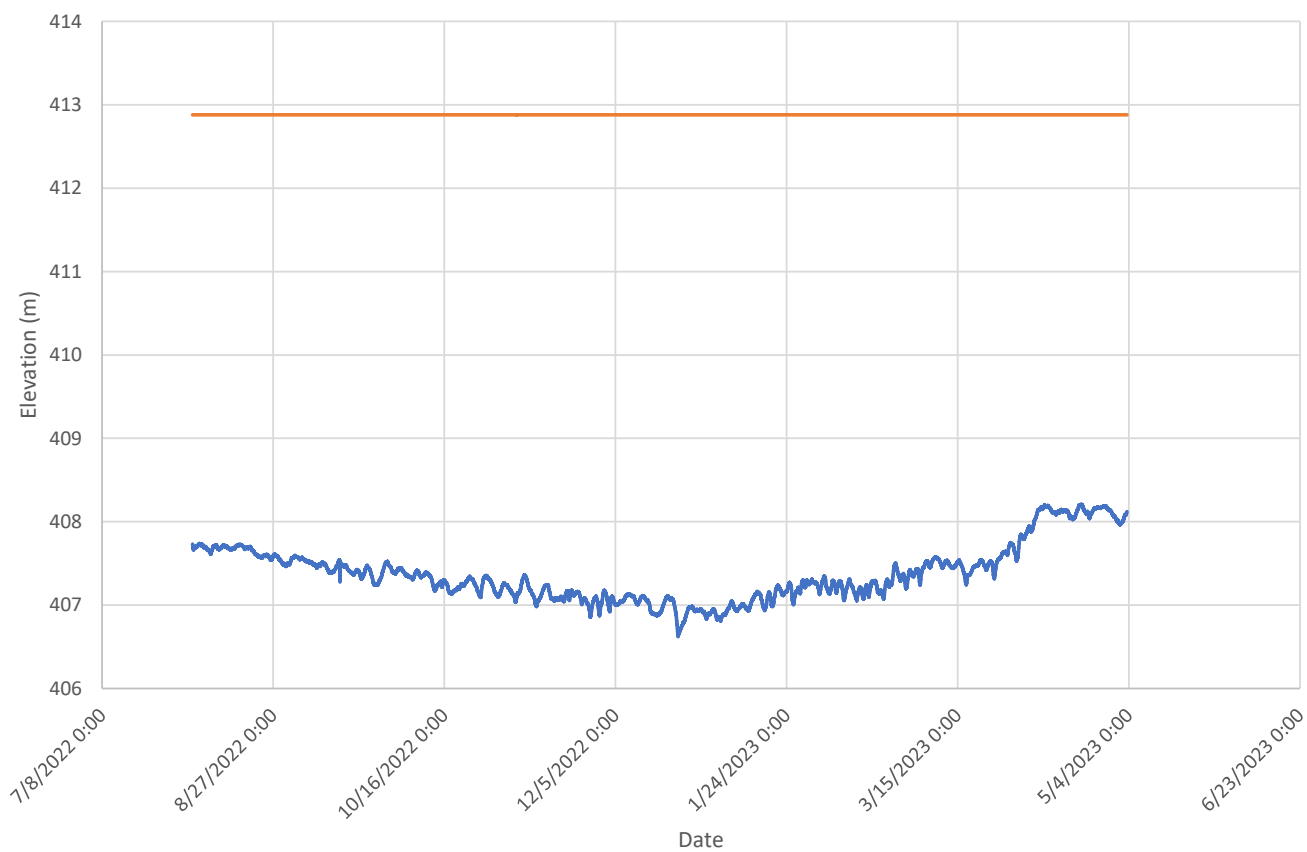


MW 206 (Elevation of 412.88 metres)
February 2022 to June 2022

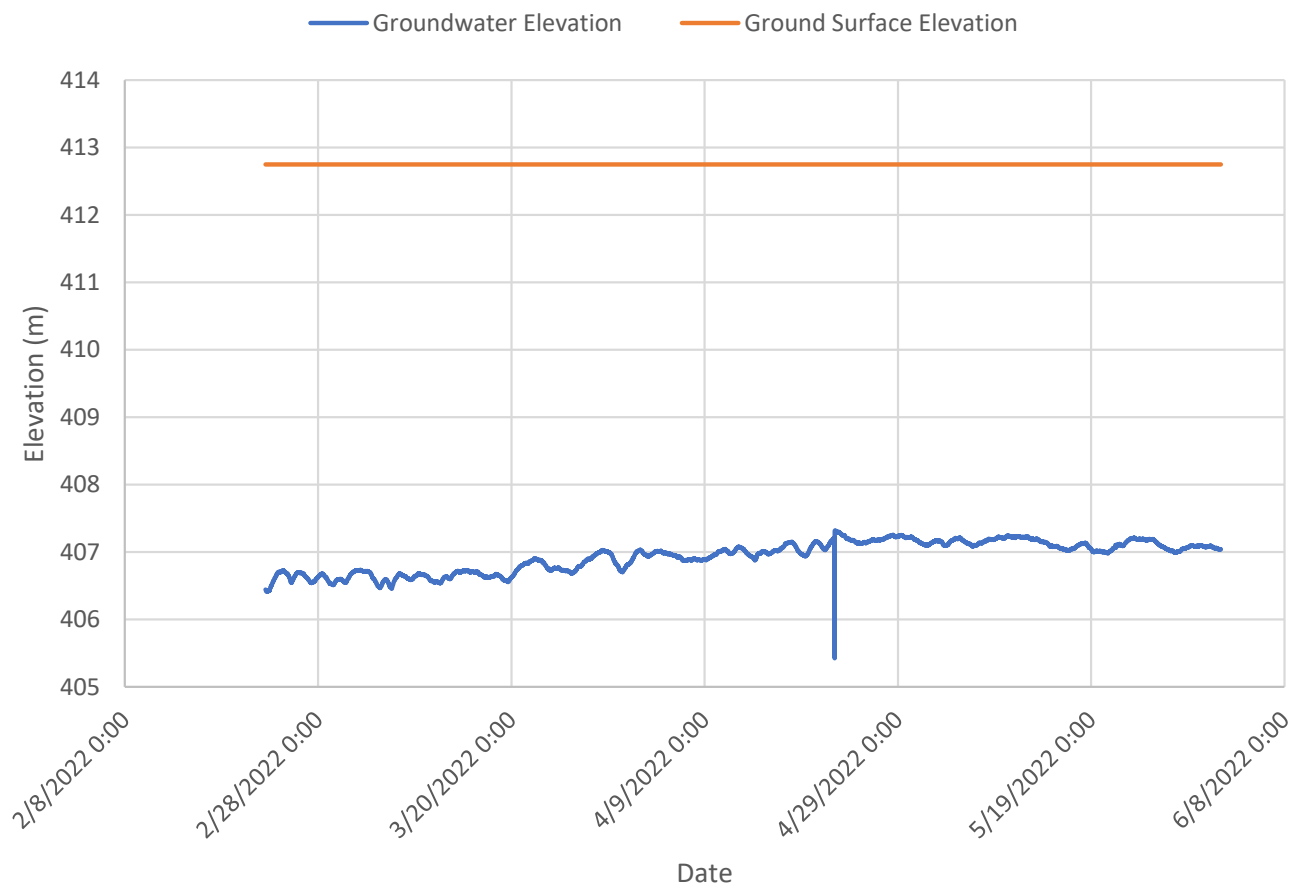


MW 206 Groundwater Elevation July 2022 to May 2023

Groundwater Elevation Ground Surface Elevation

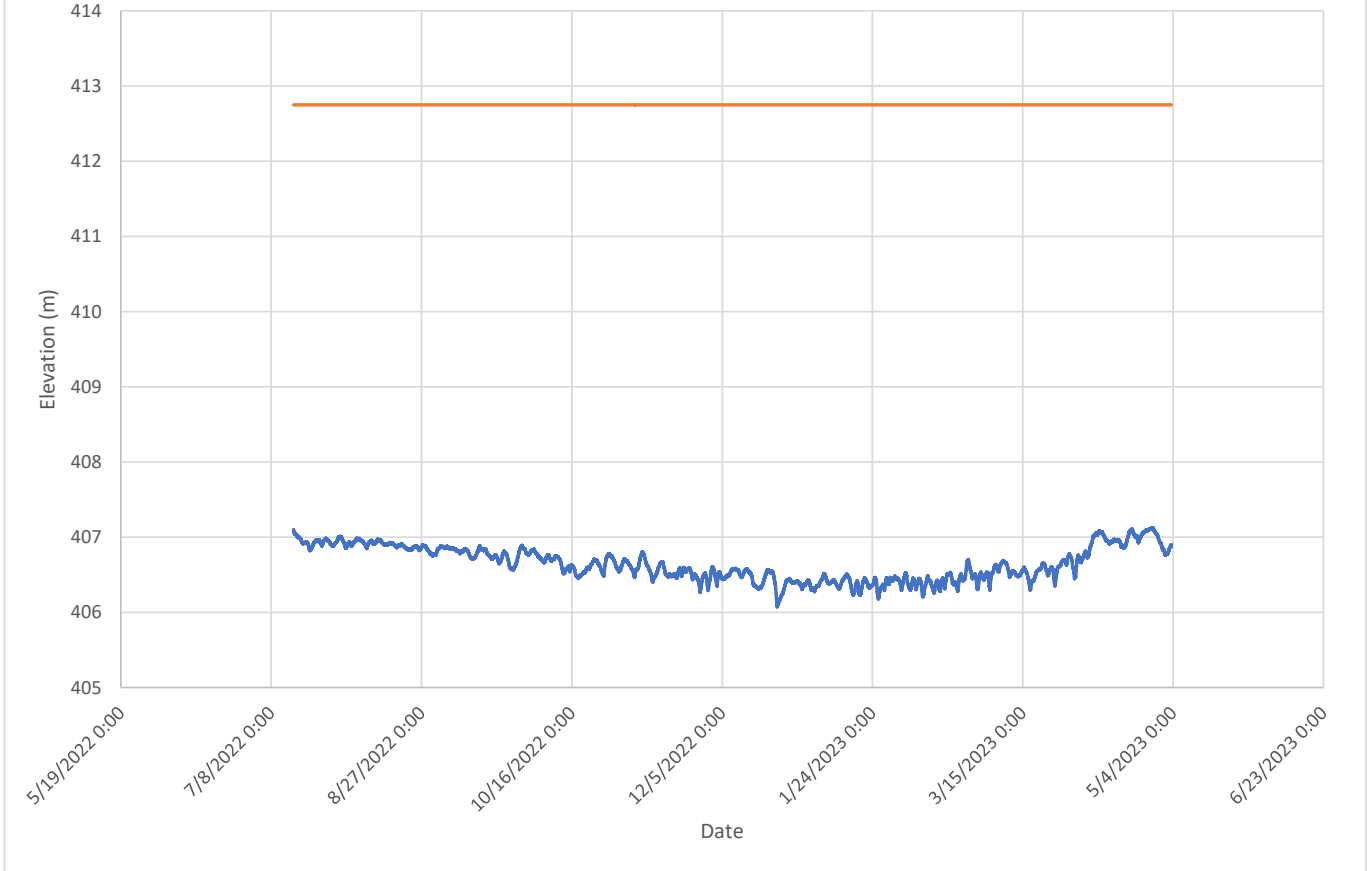


MW 301 (Elevation of 412.75 metres)
February 2022 to June 2022

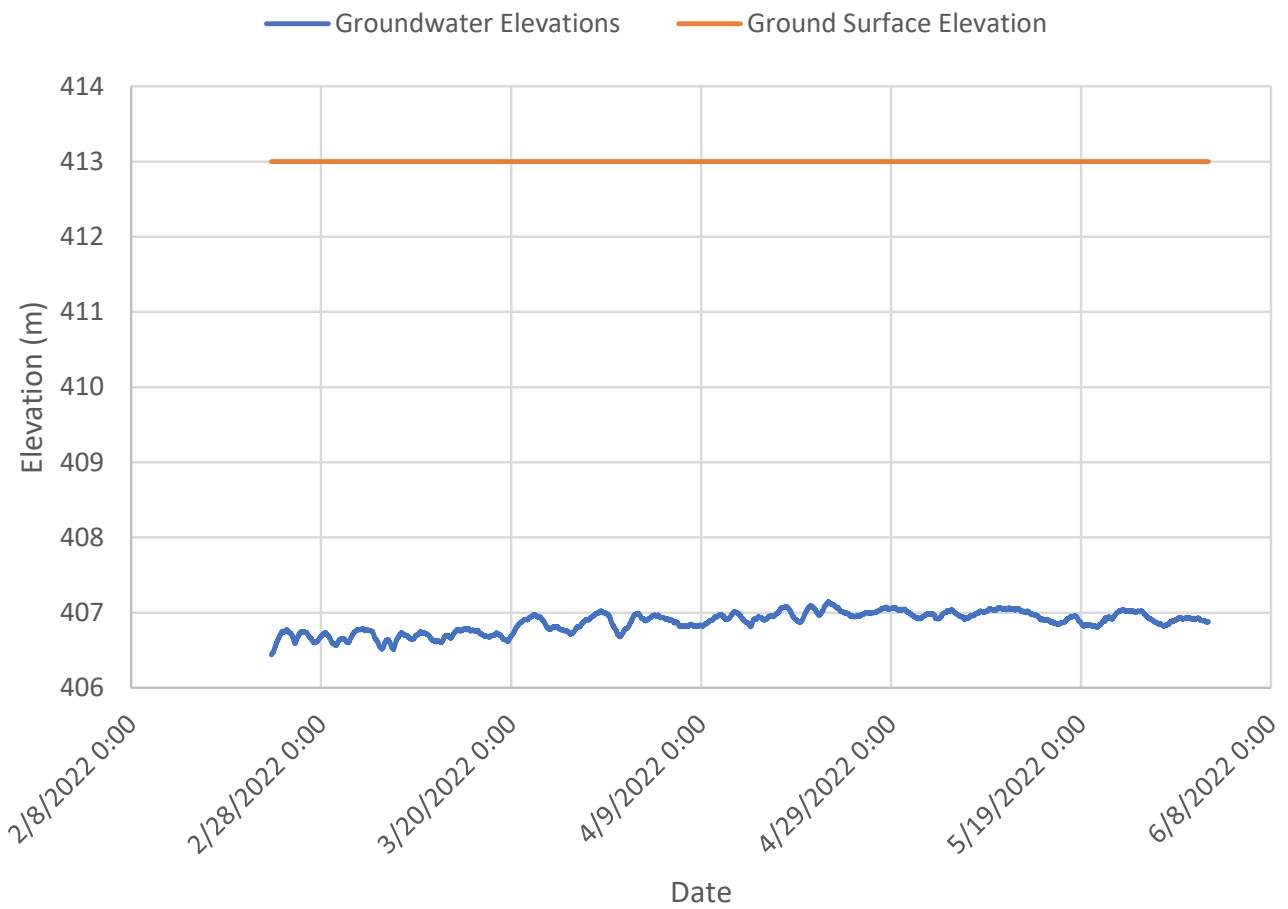


MW 301 Groundwater Elevation
July 2022 to May 2023

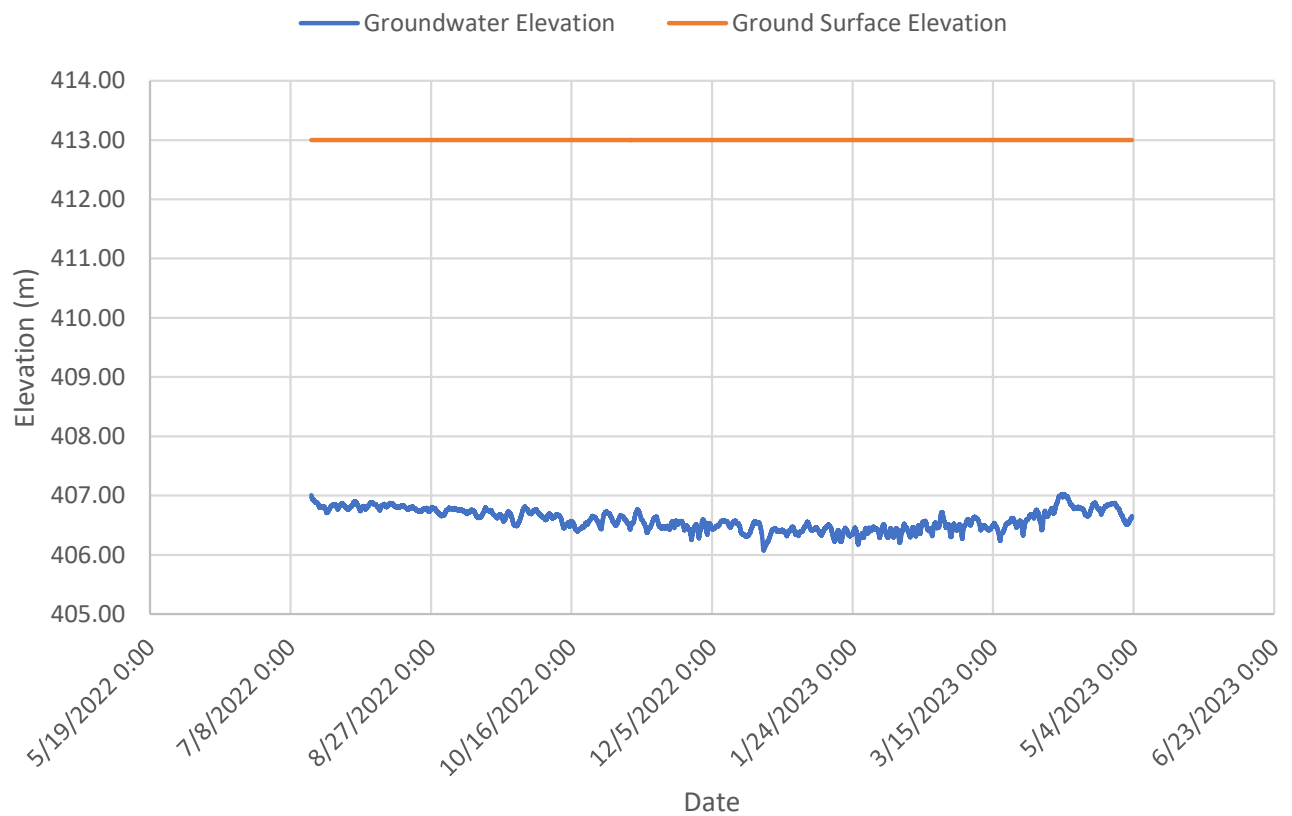
Groundwater Elevation Ground Surface Elevation



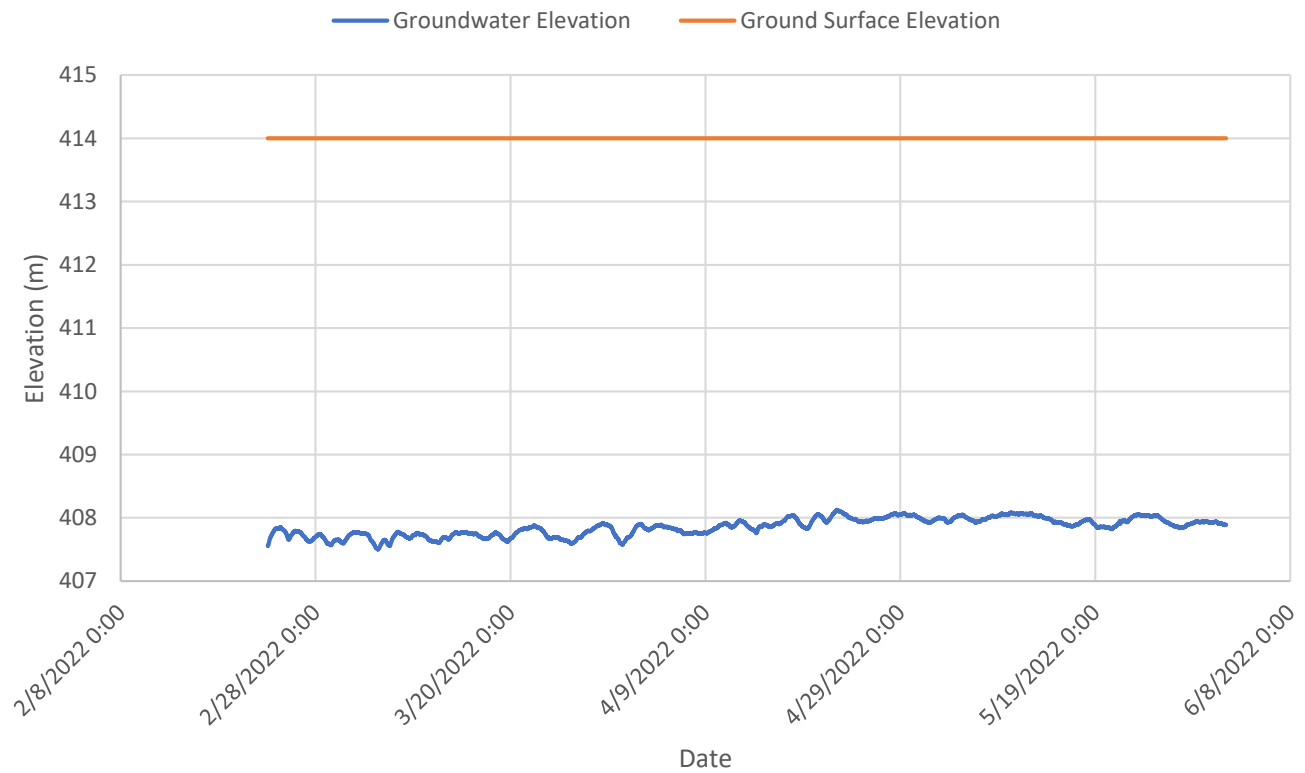
MW 302 (Elevation of 413.0 metres) February 2022 to June 2022



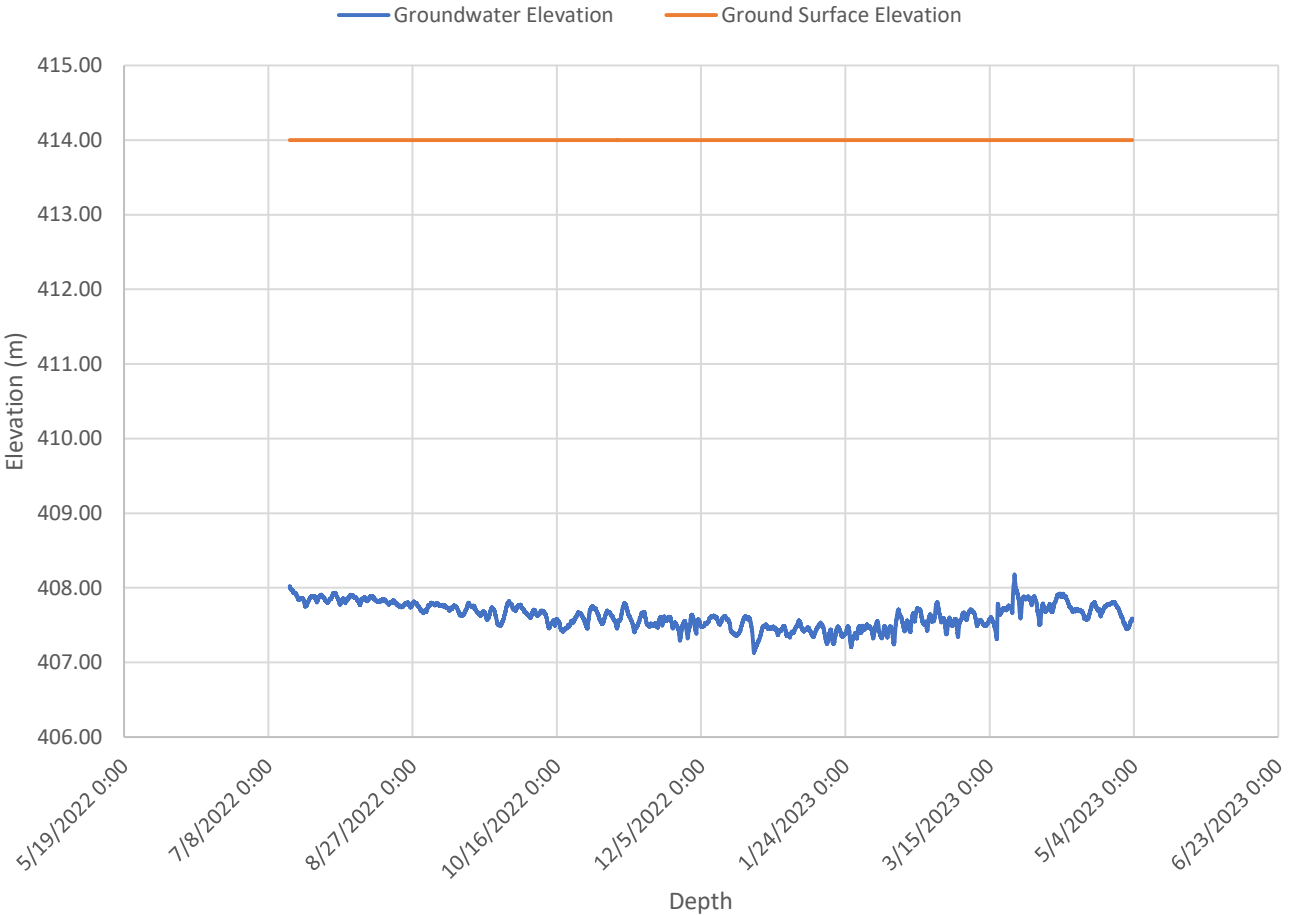
MW 302 Groundwater Elevation July 2022 to May 2023



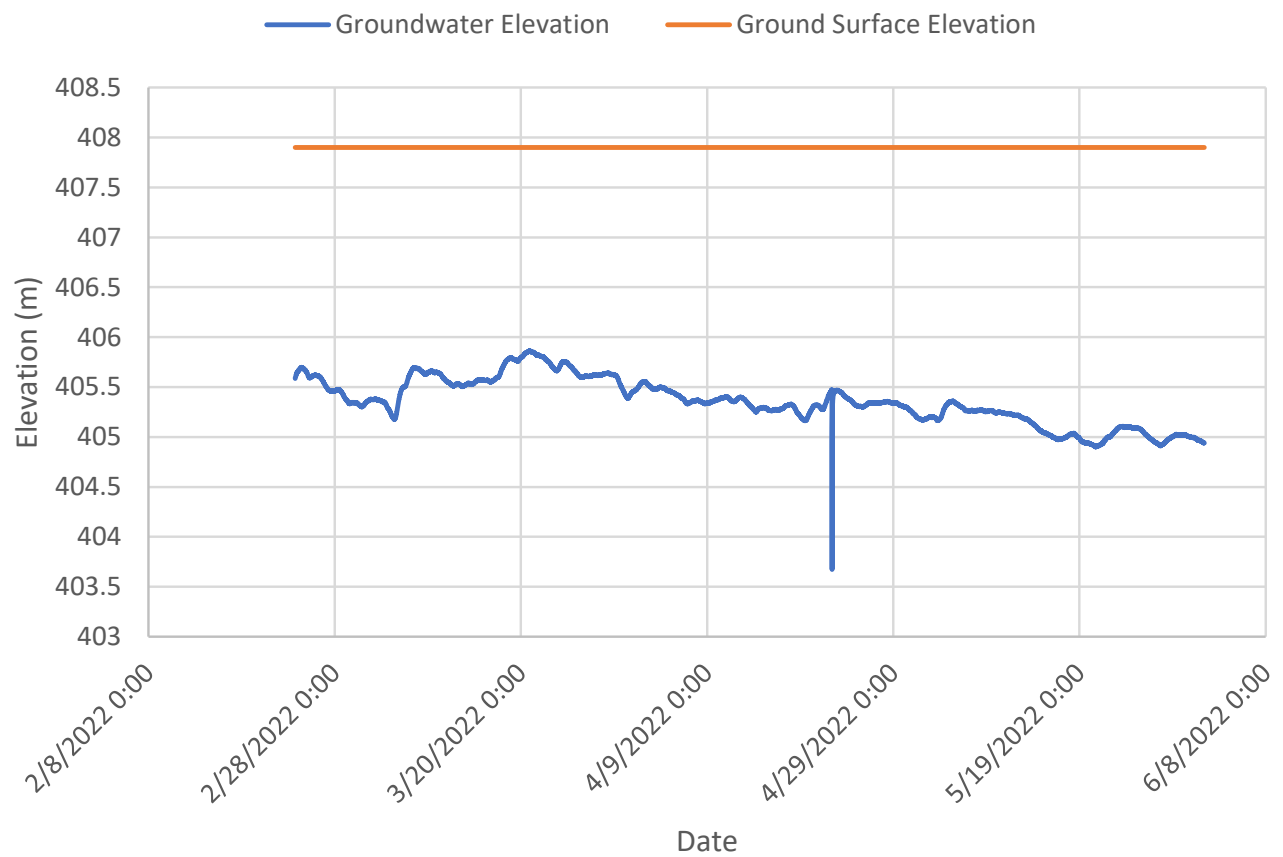
MW 303 (Elevation of 414.0 metres)
February 2022 to June 2022



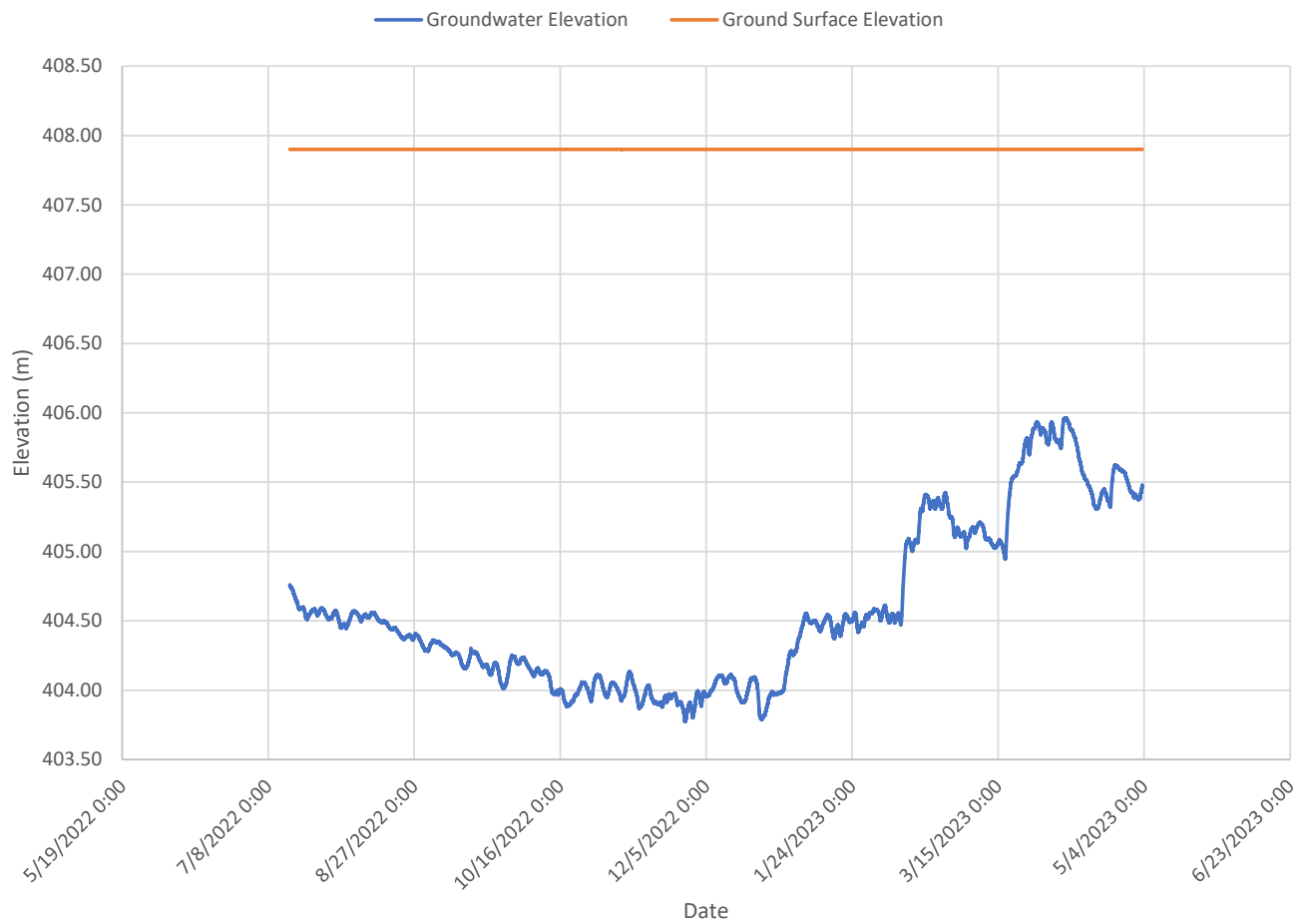
MW 303 Groundwater Elevation
July 2022 to May 2023



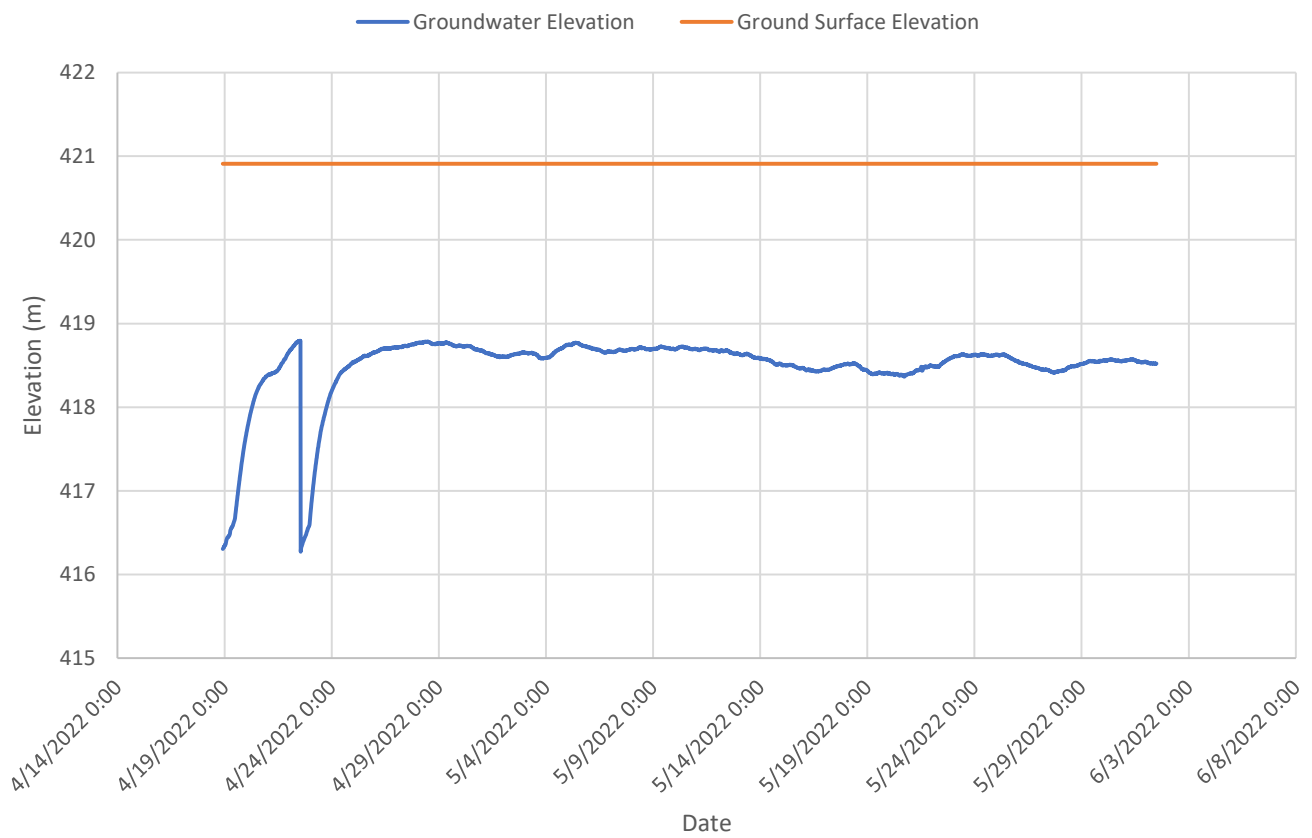
MW 304 (Elevation of 407.9 metres) February 2022 to June 2022



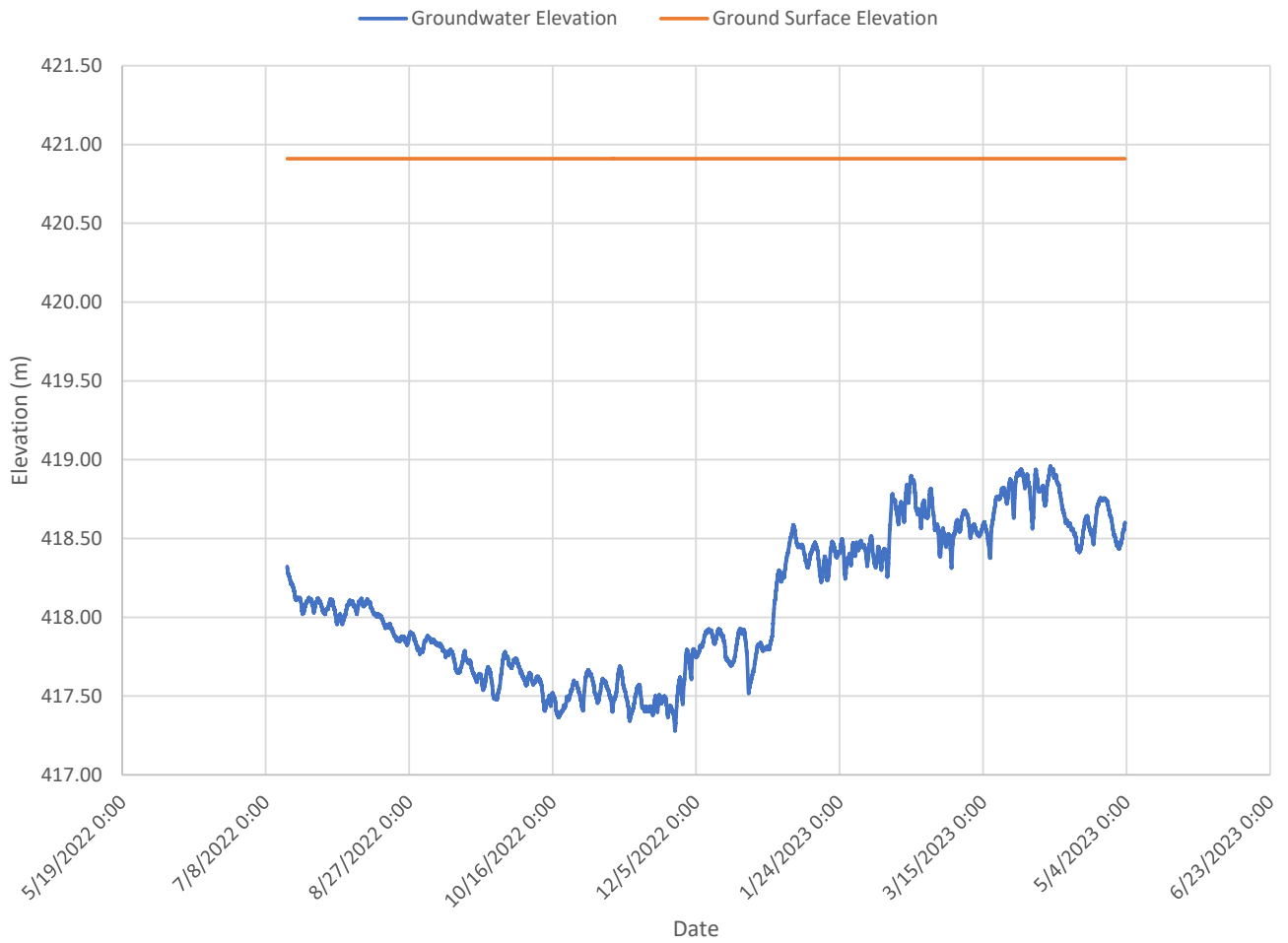
MW 304 Groundwater Elevation July 2022 to May 2023



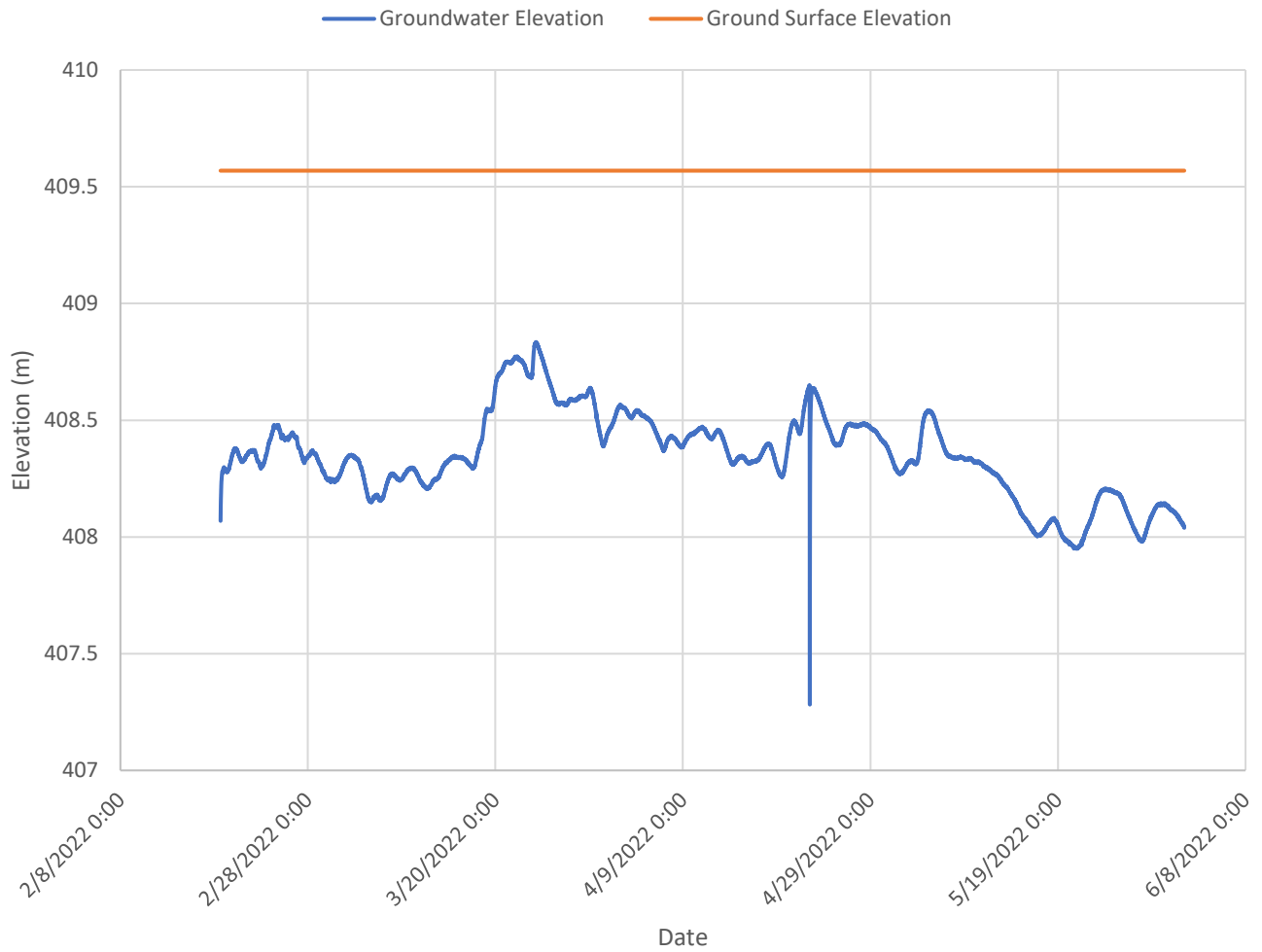
MW 401 (Elevation of 420.91 metres)
April 2022 to June 2022



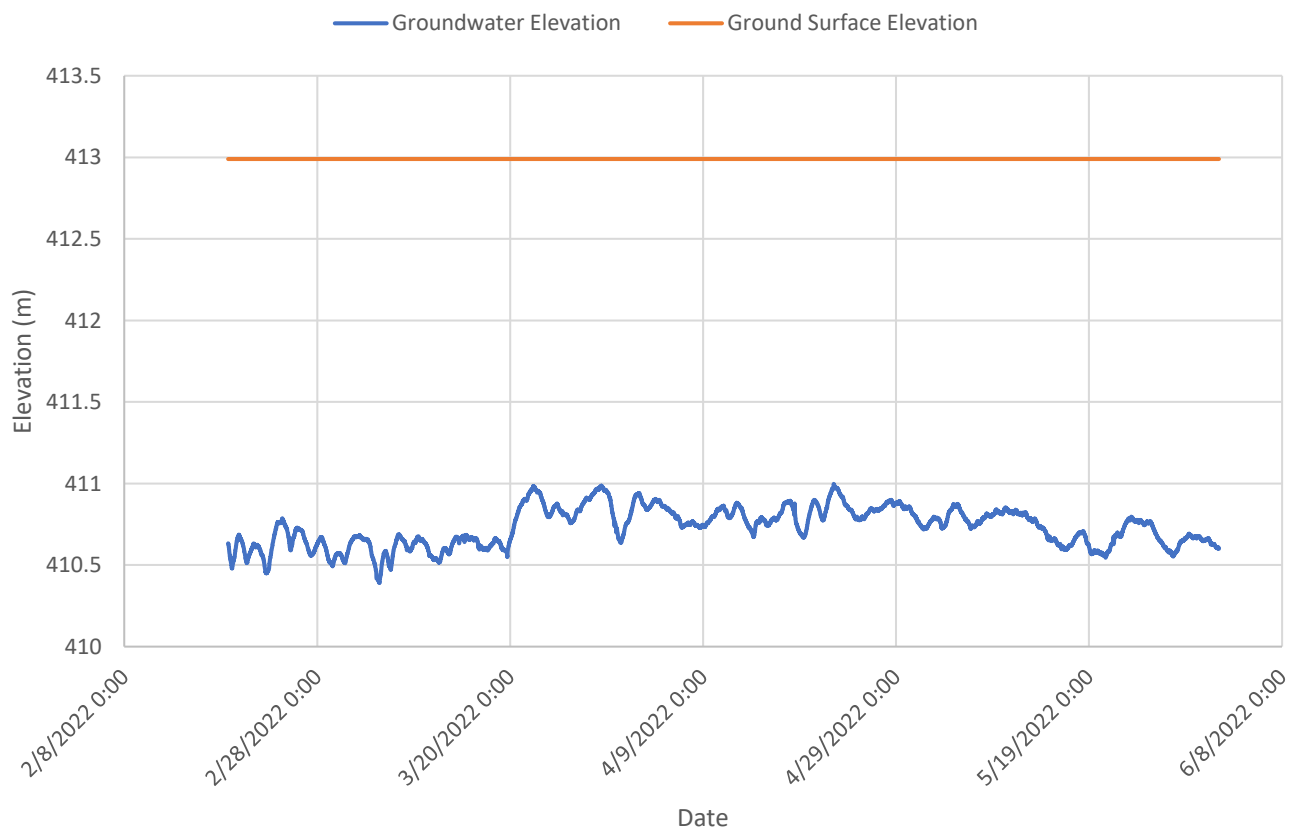
MW 401 Groundwater Elevation July 2022 to May 2023



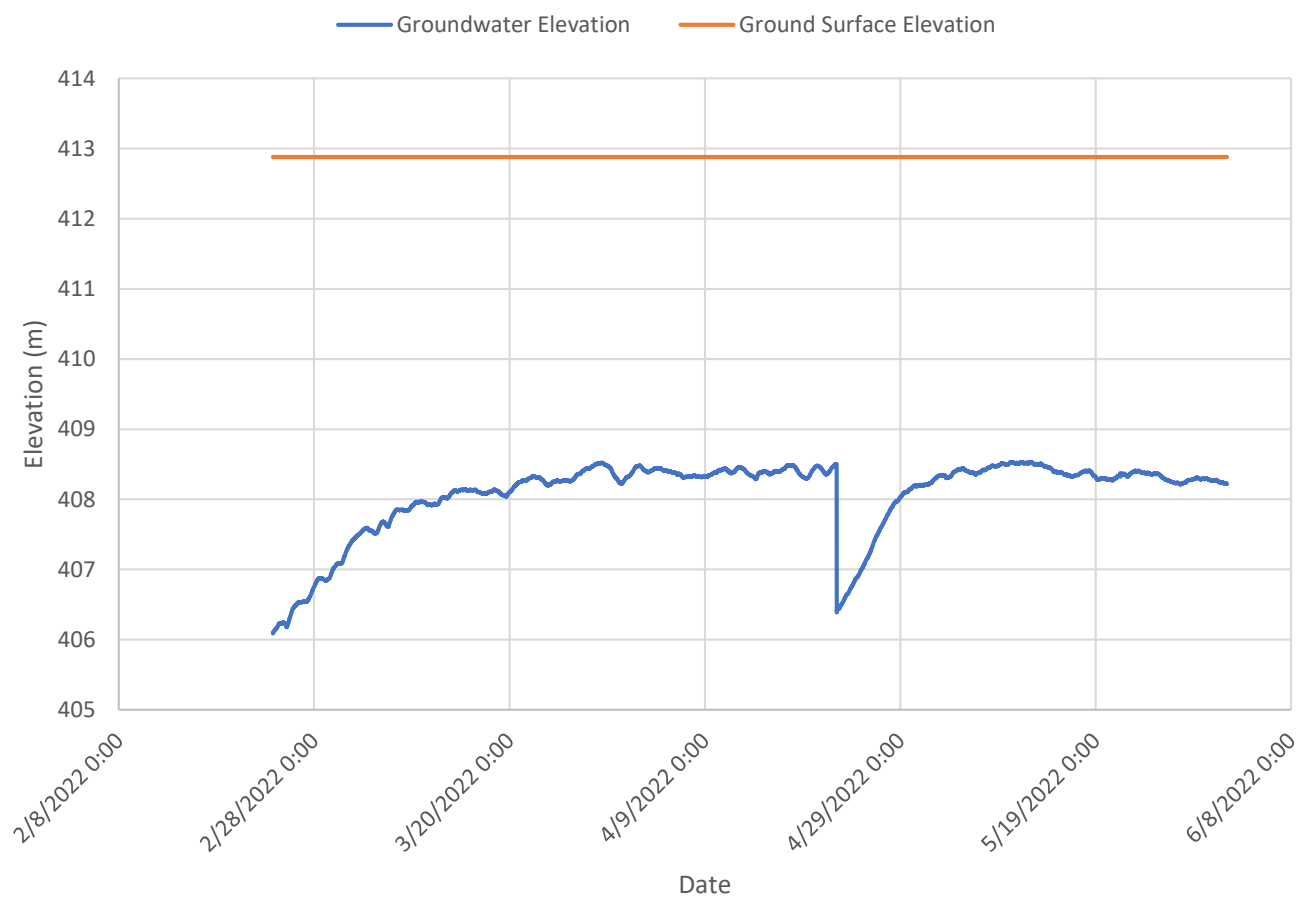
MW 204 (Elevation of 409.57 metres)
February 2022 to June 2022



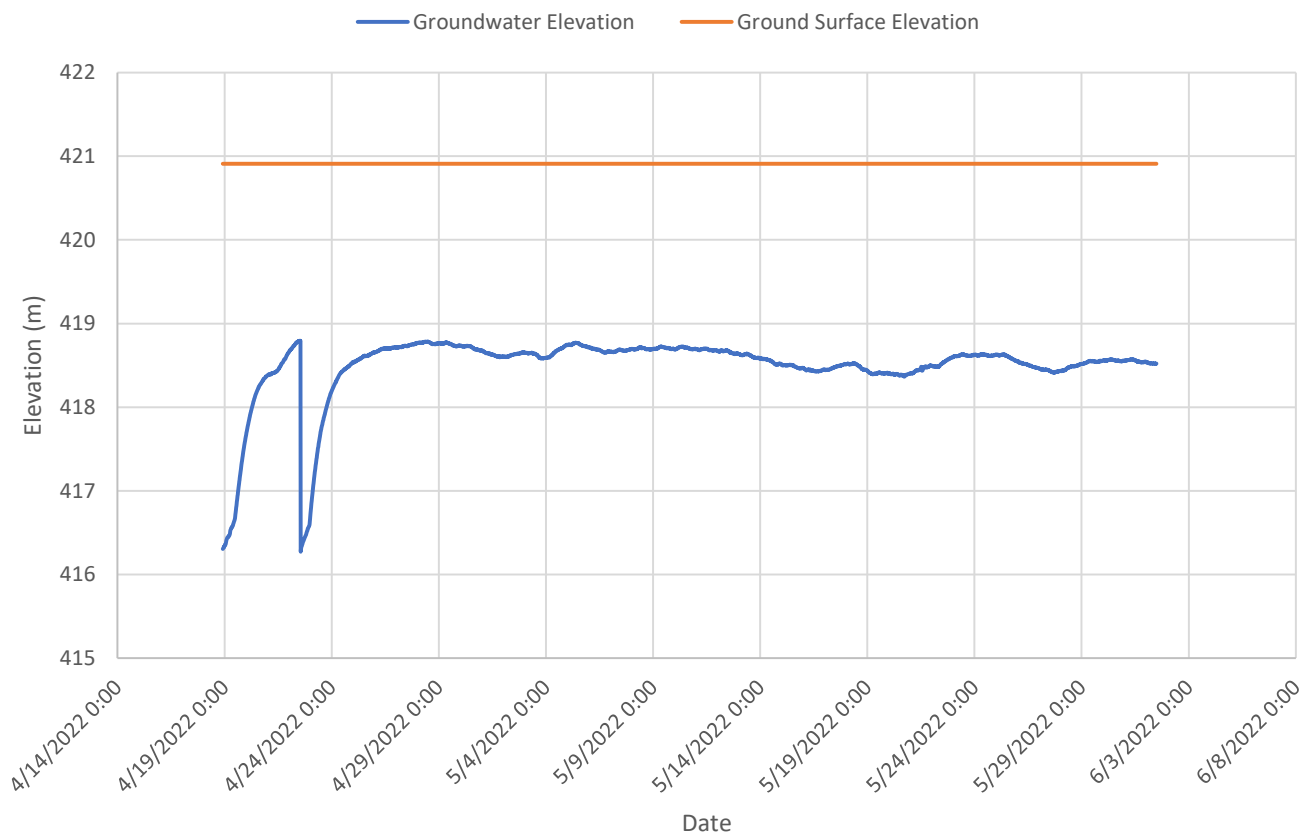
MW 205 (Elevation of 412.99 metres)
February 2022 to June 2022



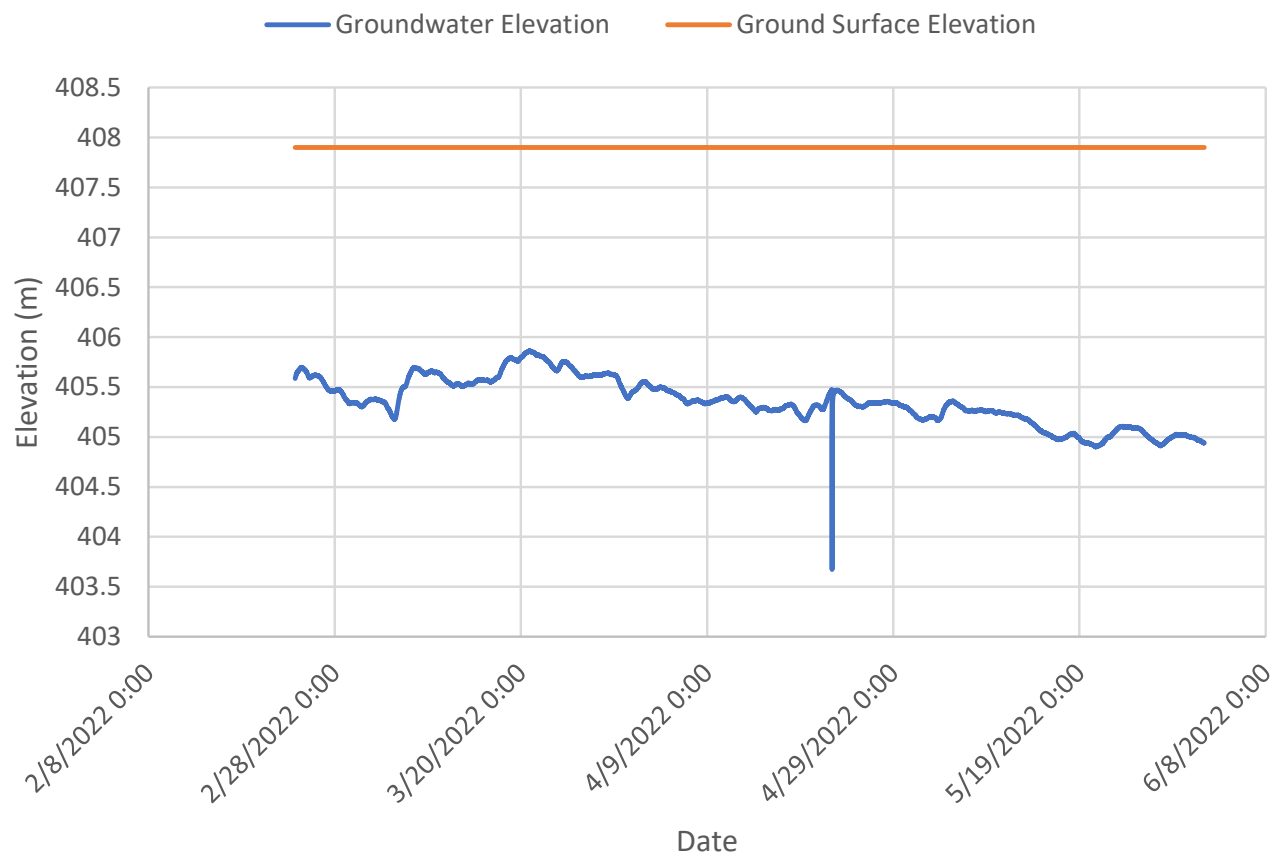
MW 206 (Elevation of 412.88 metres)
February 2022 to June 2022



MW 401 (Elevation of 420.91 metres) April 2022 to June 2022



MW 304 (Elevation of 407.9 metres) February 2022 to June 2022



Appendix E

Source Water Protection Plan Mapping (GRCA)

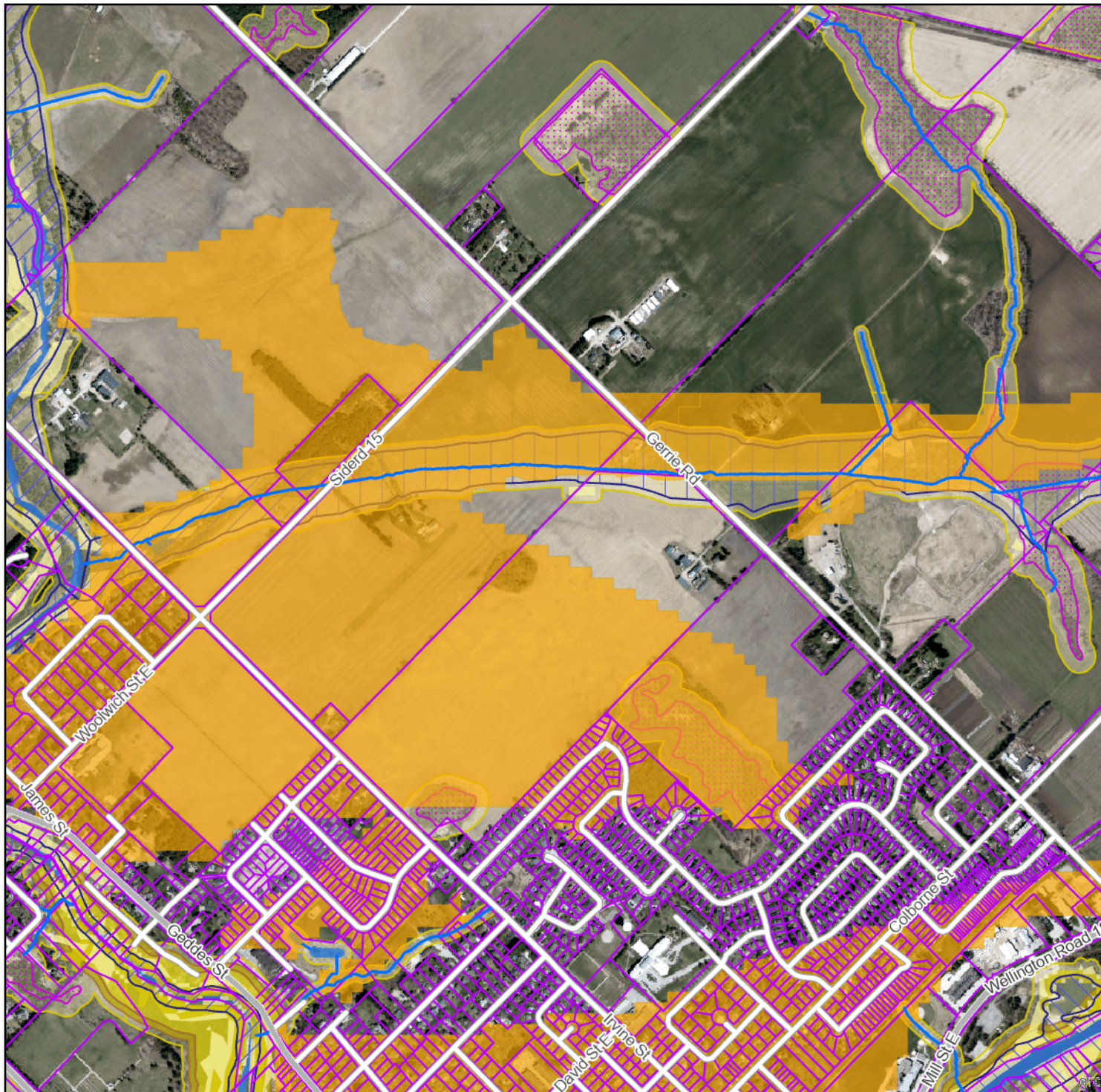




Elora Sands/Keating Lands - SGRA Mapping

Legend

- Regulation Limit (GRCA)
- Floodplain (GRCA)
 - Engineered
 - Estimated
 - Approximate
- Floodplain - Special Policy Area (GRCA)
- Slope Erosion (GRCA)
 - Steep
 - Oversteep
 - Toe
- Slope Valley (GRCA)
 - Steep
 - Oversteep
- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Wetland (GRCA)
- Lake Erie Flood (GRCA)
- Lake Erie Shoreline Reach (GRCA)
- Lake Erie Dynamic Beach (GRCA)
- Lake Erie Erosion (GRCA)
- Parcel - Assessment (MPAC/MNRF)
- Signif. GW Recharge - Tier 2 (GRCA)





Elora Sands/Keating Lands - WHPA Mapping

Legend

- Regulation Limit (GRCA)
- Floodplain (GRCA)
 - Engineered
 - Estimated
 - Approximate
- Floodplain - Special Policy Area (GRCA)
- Slope Erosion (GRCA)
 - Steep
 - Oversteep
 - Toe
- Slope Valley (GRCA)
 - Steep
 - Oversteep
- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Wetland (GRCA)
- Lake Erie Flood (GRCA)
- Lake Erie Shoreline Reach (GRCA)
- Lake Erie Dynamic Beach (GRCA)
- Lake Erie Erosion (GRCA)
- Parcel - Assessment (MPAC/MNRF)
- WHPA-Wellhead Protection Area (GRCA)
 - WHPA-A
 - WHPA-B
 - WHPA-C
 - WHPA-D

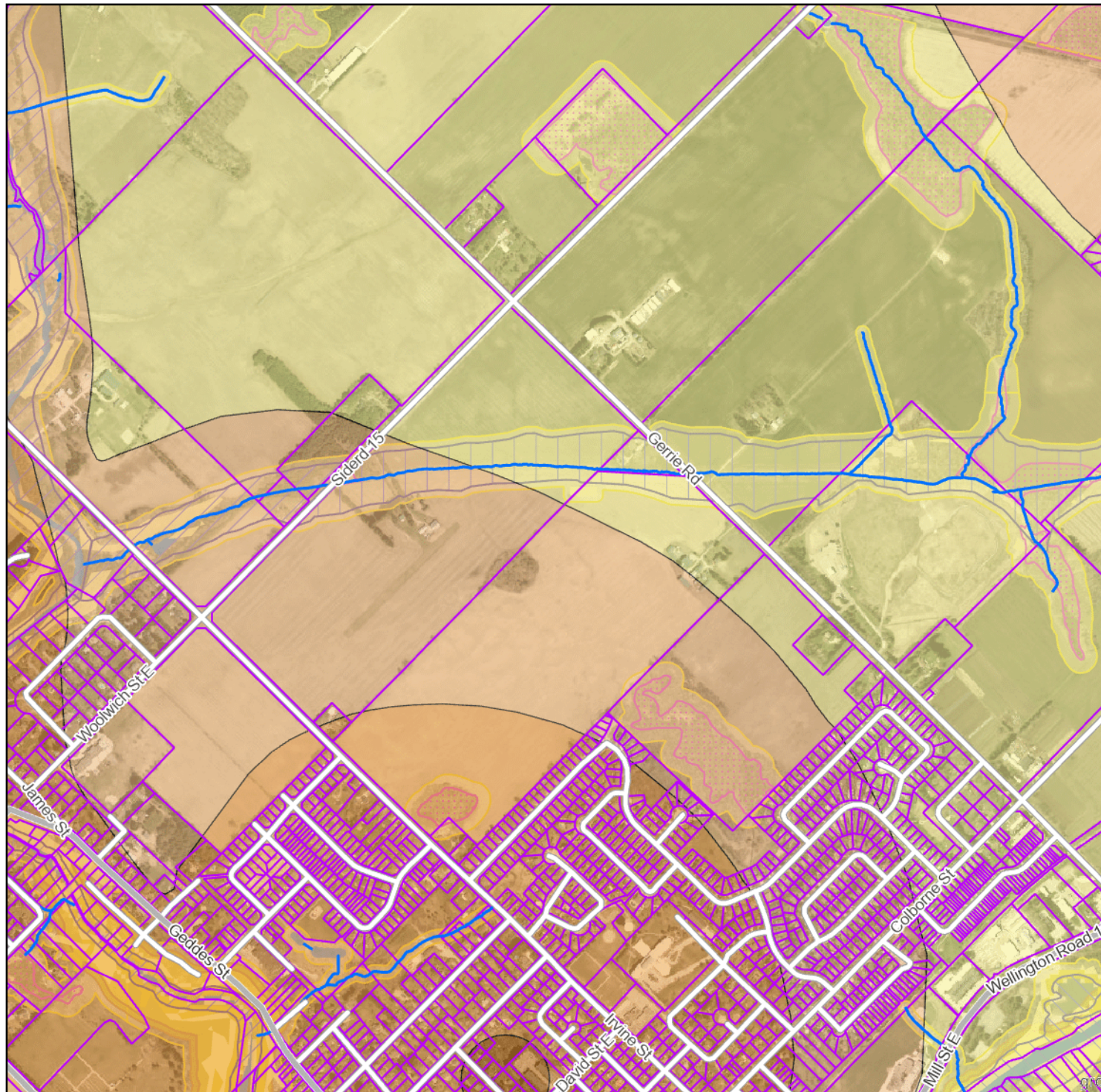
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The source for each data layer is shown in parentheses in the map legend. See [Sources and Citations](#) for details.

Scale 1:12,880

NAD83 UTM zone 17 (EPSG:26917)

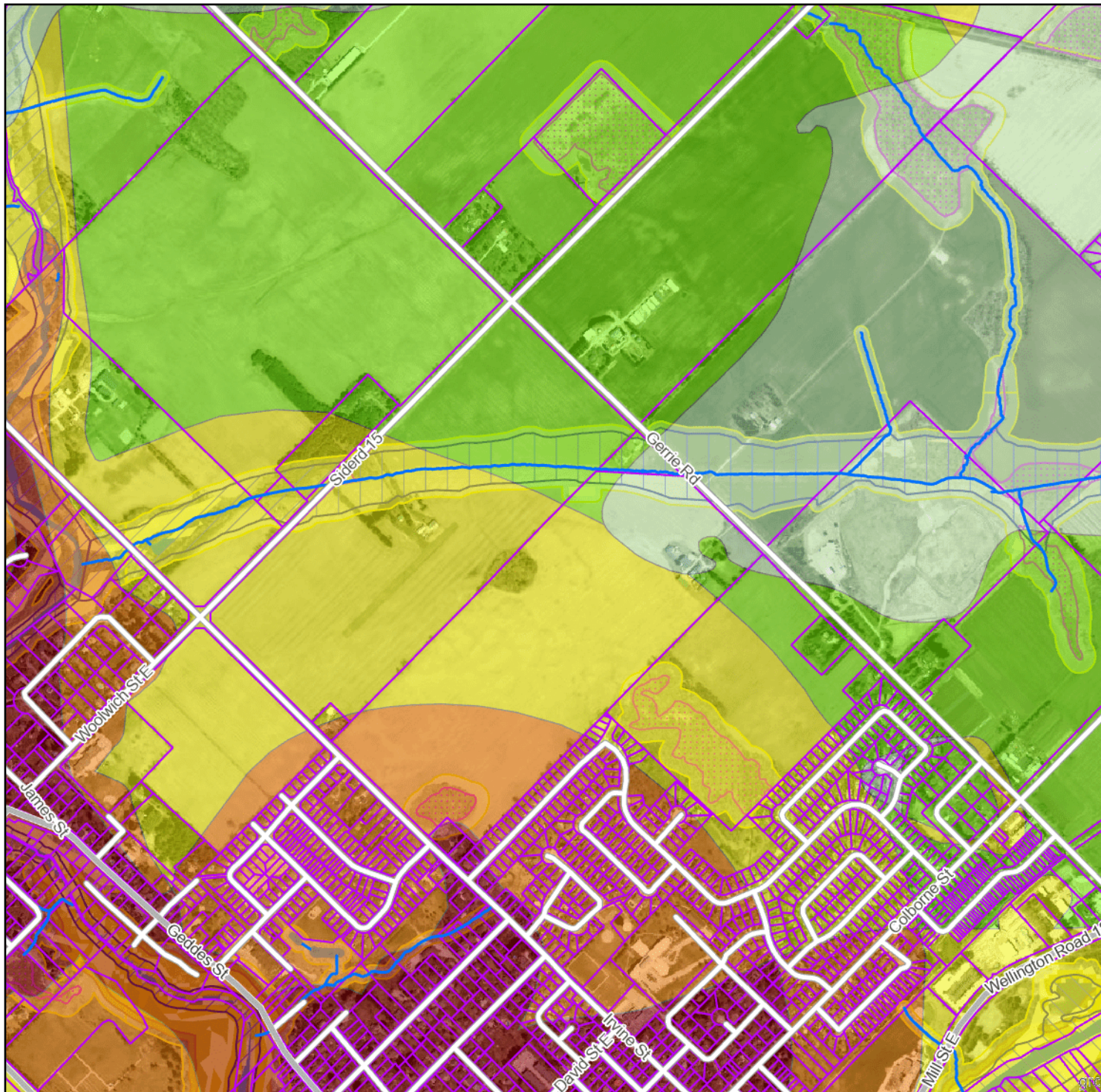




Elora Sands/Keating Lands - WHPA Vulnerability

Legend

- Regulation Limit (GRCA)
- Floodplain (GRCA)
 - Engineered
 - Estimated
 - Approximate
- Floodplain - Special Policy Area (GRCA)
- Slope Erosion (GRCA)
 - Steep
 - Oversteep
 - Toe
- Slope Valley (GRCA)
 - Steep
 - Oversteep
- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Wetland (GRCA)
- Lake Erie Flood (GRCA)
- Lake Erie Shoreline Reach (GRCA)
- Lake Erie Dynamic Beach (GRCA)
- Lake Erie Erosion (GRCA)
- Parcel - Assessment (MPAC/MNRF)
- WHPA Vulnerability (GRCA)
 - 10
 - 8
 - 6
 - 4
 - 2



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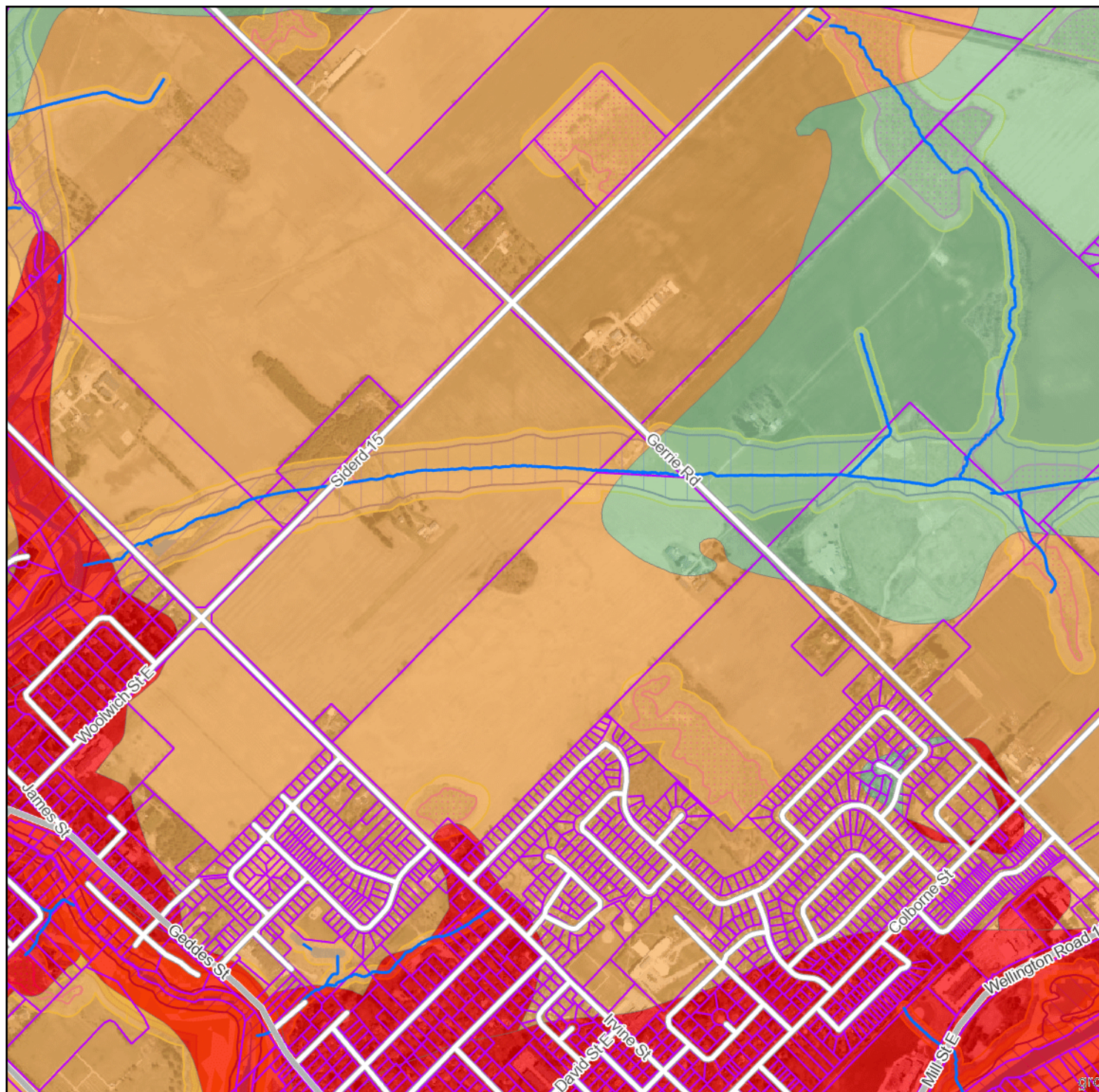




Elora Sands/Keating Lands - Intrinsic Vulnerability

Legend

- Regulation Limit (GRCA)
- Floodplain (GRCA)
 - Engineered
 - Estimated
 - Approximate
- Floodplain - Special Policy Area (GRCA)
- Slope Erosion (GRCA)
 - Steep
 - Oversteep
 - Toe
- Slope Valley (GRCA)
 - Steep
 - Oversteep
- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Wetland (GRCA)
- Lake Erie Flood (GRCA)
- Lake Erie Shoreline Reach (GRCA)
- Lake Erie Dynamic Beach (GRCA)
- Lake Erie Erosion (GRCA)
- Parcel - Assessment (MPAC/MNRF)
- Intrinsic Vulnerability (GRCA)
 - H
 - M
 - L



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The source for each data layer is shown in parentheses in the map legend. See [Sources and Citations](#) for details.



March 6, 2025

Cachet Developments
c/o Brendan Walton, P.Eng.
361 Connie Crescent, Suite 200
Concord, ON L4K 5R2

Re: Source Water Protection Due Diligence Review, Elora Sands, 7581 Sideroad 15 (SR15), and Keating Lands (Part of Lot 17, Concession 12), Salem (Elora), ON

Dear Mr. Walton,

1.0 Introduction, Purpose and Background Information

Terra-Dynamics Inc. (Terra-Dynamics) respectfully submits this source water protection due diligence review of the 39.2 hectares of the Elora Sands property at 7581 Sideroad 15 (SR15), and the 38.7 hectares of the adjacent Keating Lands, Part of Lot 17, Concession 12, Elora (Salem), Township of Centre Wellington, County of Wellington, Ontario (Site). It is our understanding that residential development is proposed for the Site and will be serviced by municipal water and sewage (Malone Given Parsons Ltd., 2024).

The purpose of this Source Water Protection due diligence review is to advise Cachet Developments of future site development limitations with respect to addressing source water protection policies or/and related requirements. It is our understanding that the lands have been historically used for agriculture, e.g. corn, soybeans and pasture and corn.

The Site is currently outside of the existing Settlement Area boundary outlined in the Centre Wellington Official Plan, but it is our understanding that an application may be made to bring the Site into the Settlement Area.

2.0 Scope of Work

A background review of available information was completed that included, but was not limited to:

1. Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) AgMaps, including mapping of tile drainage, municipal drains and soil types.
2. Ontario Geological Survey (OGS) surficial geology and Aggregate Resources Inventory.
3. Consultant reports (e.g. Soil-Mat, Beacon, MTE, Waterloo Geoscience and GM Blue Plan);
4. Ministry of the Environment, Conservation and Parks, Source Protection Information Atlas.

5. Grand River Source Water Protection Area Source Water Protection datasets and reporting, including vulnerable area mapping (e.g. wellhead protection areas and significant groundwater recharge areas).
6. Liaison with Wellington Source Water Protection (Funk, 2025); and
7. Wellington County Official Plan (2024) and Centre Wellington Official Plan (2005).

3.0 Physical Setting Summary

3.1 Surficial Geology

The surficial geology of the Site has been regionally mapped as primarily gravel (59%) and sand (21%) with some sandy silt to silty sand diamicton (20%) (i.e. till) (Ontario Geological Survey (OGS), 2003). The OGS have also mapped much of the Site as a '*selected sand and gravel resource area of primary significance*' with 7 to 14 metres thickness coarse aggregate based upon water well data (OGS, 1999). This significance is recognized in the Centre Wellington Official Plan in Schedule C - Sand and Gravel Resources (Township of Centre Wellington, 2005). However the regional characterization appears to largely over-estimate the amount of high-permeable materials on-site, this is discussed below.

3.1.1 Elora Sands Property

The surficial geology of the Elora Sands property has been regionally mapped as primarily gravel (49%) and sand (38%) with some sandy silt to silty sand diamicton (13%) (i.e. till) (OGS, 2003). However, Site level borehole investigations of the Elora Sands property by Soil-Mat Engineers & Consultants Ltd. (2022) have proven that the regional mapping does not reflect actual site conditions. For example, the fourteen (14) boreholes completed at the Elora Sands property have delineated no gravel at-surface, and the areas of sand (~33% of the Site) are generally limited to between 1 and 2 metres thick in the northwest (i.e. BH006 and MW401 with sand thicknesses of 1.3 m and 1.6 m, respectively), and central portions of the Site (i.e. BH003 and MW201 with sand thicknesses of 1.7 m and 2.2 m, respectively), although at MW205 the sand thickness was 6.1 m (Drawing No.1, Soil-Mat, 2022).

3.1.1 Keating Lands

A borehole investigation southeast of the Keating Lands also suggests much less permeable/high recharge materials than regionally mapped (GM Blue Plan Engineering, 2023).

3.2 Groundwater Recharge

Groundwater recharge rates have been recently modelled as part of the Centre Wellington Tier Three Water Budget Risk Assessment – Risk Assessment Report (Matrix Solutions Inc., 2020) (Map 1, Figure 5). The modelled groundwater recharge rates are largely a reflection of the regional surficial geological mapping, with 60% of the Site modelled as between 300 and 500 mm/year or greater, i.e. equivalent to coarse sand or gravel (MECP, 1995).

These modelled values appear to include over-estimates for recharge at the Site, as much lower permeability soils have been identified based upon the borehole investigations completed by Soil-Mat Engineers & Consultants Ltd (2022). For example, in the central portion of the Elora Sands at borehole BH003 and MW202, clayey to sandy silt soils were identified (e.g. calculated infiltration rates of <10 mm/hour) and none of the regionally mapped gravel was identified (Drawing No. 1). High infiltration rates have been calculated for some boreholes, e.g. 201, 203 and 205 (50 mm/hour or greater).

3.3 Surface Water

The watercourse crossing the Site, the Nichol Drain (or Municipal Drain No.1), was classified by the Department of Fisheries and Oceans (DFO) in 2022 as “Type E”, permanent flow, with a ‘Spring’ season restricted timing window (OMAFRA, 2025, Map 2). The Site north of the drain is mapped as tile-drained, likely installed about 1 metre below ground surface (OMAFRA, 2007), and tile outlets to the drain were observed by Beacon Environmental (2025). Past research suggests tile-drainage may capture between 10 and 15% of infiltration (Mulhern, 2008). The Nichol Drain outlets to Irvine Creek west of the Site.

Beacon Environmental have indicated the *“Nichol Drain should be considered to have coldwater fishery potential and be classified as a coldwater stream for construction and stormwater management perspective. Watercress was visible during the Beacon investigation, supporting this designation”* (Beacon Environmental, 2025). The drain at the Site has been previously mapped by the GRCA as a groundwater discharge area (GRCA, 2024) since the regional water table is higher in elevation than the drain. Groundwater levels at MW004 appear to support the local water table being higher in elevation than the drain (Drawing No.1).

The GRCA have regionally mapped the Site as about 75% within the Nichol Drain catchment and 25% towards the Queen Street Tributary with a small portion along the eastern boundary towards the southeast (GRCA, 2017). The subcatchment divides have been refined via a Site topographic survey to show a slightly larger area draining towards the Queen Street Tributary and not towards the southeast, under-predevelopment conditions (MTE, 2025).

3.4 Southwest Unevaluated Wetland – Keating Lands

The Ministry of Natural Resources and Forestry (MNRF) and GRCA have regionally mapped a 0.78 ha unevaluated wetland in the southern part of the Site adjacent Irvine Street. This wetland vegetation is presented as part of the Core Greenlands within the Wellington County Official Plan (2024). This wetland vegetation has not been staked with the GRCA, but is scheduled for staking in 2025.

Beacon Environmental have identified the wetland vegetation as consisting of primarily Willow Mineral Thicket Swamp and Red-osier Mineral Thicket Swamp, with some Fresh-Moist Lowland Deciduous Forest adjacent and an inclusion of Mineral Shallow Marsh within the swamp with standing water (Beacon Environmental, 2025).

This unevaluated wetland is located on the margin of regionally mapped gravel and sandy silt/silty sand till (OGS, 2003). Geology from nearby Elora Meadows boreholes MW18 and MW19 recorded sand on silty sand till with groundwater levels as high as within 1 m of surface (Waterloo Geoscience, 2005). It is possible the wetland is an area of slower groundwater recharge as GRCA has regionally mapped a weak

downwards vertical gradient (GRCA, 2024). The wetland vegetation does not appear to have a connection to a watercourse, i.e. it may be supplied water by only precipitation and overland runoff.

3.5 Township of Centre Wellington Well Supply Municipal Well E1

Elora municipal well E1 is located 535 m south-southeast of the Site and 860 m south-southeast of the Elora Sands property (Map 3, Figure 8, Matrix Solutions Inc., 2017). This well is constructed to take water from the bedrock aquifer and is 130 metres deep with casing to 19.8 metres below ground surface (Map 4, Figure 13, Matrix Solutions Inc., 2017). The well produced on average 47% of the Elora municipal supply in 2018 (Matrix Solutions Inc., 2020).

The bedrock aquifer beneath the Site has been most recently regionally mapped as having primarily low vulnerability (vulnerability scores of 2, 4 and 6), with a portion of the southern area of the Site mapped as 8 (medium vulnerability score), and a very small portion mapped as 10 (high) (Map 5, Figure 6-29, Grand River Source Protection Committee, 2022a, and Map 5b, MECP, 2025).

4.0 Source Water Protection

The Site is within the Grand River Source Protection Area. The Grand River Source Protection Committee was responsible for mapping four types of vulnerable areas within the Grand River Source Protection Area: (i) wellhead protection areas, (ii) intake protection zones, (iii) highly vulnerable aquifers and (iv) significant groundwater recharge areas. Two of these types of vulnerable areas are mapped at the Site: (1) wellhead protection areas and (2) significant groundwater recharges areas (MECP, 2025).

Wellhead protection areas (WHPAs) can include different zones for water quality protection of a groundwater supply. These different zones are based largely upon the expected travel time of contaminants to the water supply after they enter the aquifer (Table 1, Figure 1 – Illustration of WHPA Zones, MECP, 2006). These zones were mapped using a groundwater flow model to include both areas upgradient of the well as well as cross- and down-gradient as the well captures water from these areas.

Table 1 –Water Quality Well Head Protection Areas (WHPA) Details (MECP, 2006)

WHPA	Description
A	100 m radius
B	2 year Time of Travel
C	2 to 5 year Time of Travel
D	5 to 25 year Time of Travel

WHPAs can also include areas for water quantity protection, called WHPA Q1 and/or Q2. WHPA-Q1 is delineated based upon a combination of the cone of influence of each pumping well and WHPA-Q2 for land areas where reductions in recharge have the potential to have a measurable impact on the municipal wells (Matrix Solutions Inc., 2020).

Significant groundwater recharge areas (SGRAs) were also mapped at the Site, as areas regionally having groundwater recharge 15% above the average watershed rate. The average watershed recharge rate was calculated as 176 mm/year, for an SGRA criterion of greater than 202 mm/year (GRCA, 2023). This mapping was completed as part of the Tier 2 Water Budget Assessment derived from previous GRCA

Hydrologic Response Unit modelling using the Guelph-All-Weather-Storm-Event-Runoff (GAWSER) model which used regional surficial geologic mapping (GRCA, 2023). However, as mentioned in Section 3.2, an analysis of local borehole results is expected to reduce the amount of SGRAs at the Site.

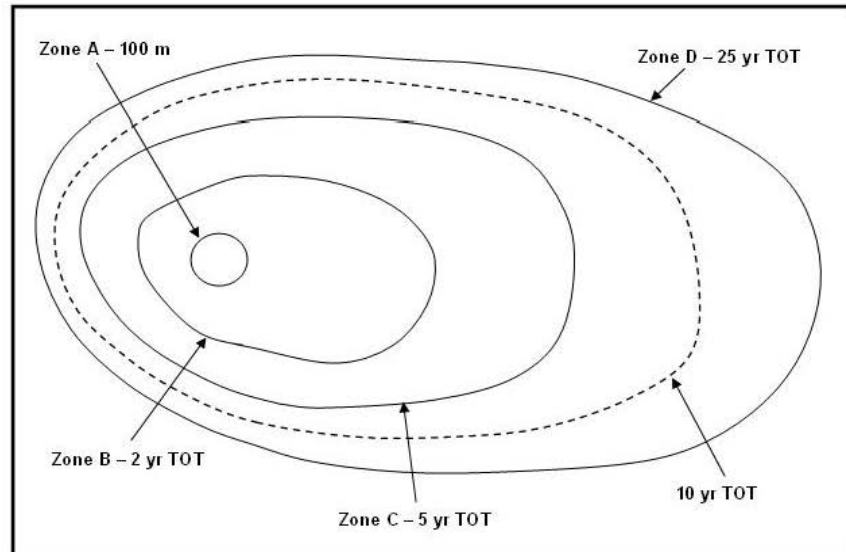


Figure 1 – Illustration of WHPA Zones (MECP, 2006)

4.1 Wellhead Protection Areas

A series of WHPAs for the nearby municipal well E1 extend onto the Site (Map 6, Figure 7.1, Grand River Source Protection Committee, 2022b). The areal coverage and location of these WHPAs is approximated below (Tables 2a and 2b).

A WHPA-Q was also delineated for the Centre Wellington municipal groundwater supplies (Map 7, Figure 11, Matrix Solutions Inc., 2020) as *“the combined area that is the cone of influence of the well... plus the whole of the cones of influence of all other wells... that intersect that area...the WHPA-Q1 and WHPA-Q2 are coincident”* (Matrix Solutions Inc., 2020).

Significant water quality threat policies exist for the WHPA-B and WHPA-C areas that must be conformed to, or complied with (Section 4.3), e.g. regarding dense non-aqueous phase liquids (DNAPLs). Examples of DNAPLs include metal degreasers, paint removers and brake fluid. However, the current Grand River Source Protection Plan does not include policies for moderate and low threats.

With respect to significant water quantity threats, all *“...future areas of recharge reduction (due to land use development within this policy area) (i.e. WHPA-Q) are classified as Significant water quantity threats ...”* (Matrix Solutions Inc., 2020). This preliminary designation was because *“...the potential impact of stormwater management measures and low impact development techniques was not considered when estimating recharge reductions on future land development areas”* (Matrix Solutions Inc., 2020). For example, southwest lands at 75 Woolwich Street East (Elora, Ontario), were mapped as a *‘Groundwater Recharge Reduction Threat’* (Map 7, Figure 11, Matrix Solutions Inc., 2020).

Table 2a – Site WHPA Summary Details (Grand River Source Protection Committee, 2022b)

WHPA	Area (hectares)	Percent of Site	On-site Location	Vulnerability Score	Significant Threat Policy Categories
B	<0.1	<0.2%	Southern	10	Waste Disposal, Sewage Systems, Agricultural Source Material, Non-Agricultural Source Material, Commercial Fertilizer, Pesticide, Road Salt, Storage of Snow, Fuel, DNAPLs, Organic Solvents, Aircraft De-icing, Livestock Area, Oil Pipelines
	10.9	14%	Southern	8	Waste Disposal, Sewage Systems DNAPLs
C	47	60%	Central	6/4/2	DNAPLs
D	20	26%	North/ Northeast	4/2	None
Q1/Q2	Entire Site	100%	NA	NA	To be confirmed

Table 2b – Elora Sands WHPA Summary Details (Grand River Source Protection Committee, 2022b)

WHPA	Area (hectares)	Percent of Site	On-site Location	Vulnerability Score	Significant Threat Policy Categories
B	0.03	<0.1%	South	8	Waste Disposal, Sewage Systems DNAPLs
C	26.5	68%	Southwest	6	DNAPLs
D	12.7	32%	Northeast	4	None
Q1/Q2	Entire Site	100%	NA	NA	To be confirmed

4.2 Significant Groundwater Recharge Areas (SGRAs) Mapping

SGRAs have been regionally mapped to cover about 83% of the Site (Map 8, MECP, 2025). However, this is based upon modelled recharge rates that used regional surficial geologic mapping that appears to over-estimate SGRAs at the Site (Section 3.1). AquaResource Inc. (2009) acknowledge the limitation of regional SGRA modelling and provide the following regarding the SGRA mapping:

“Caution also applies to the use of SGRAs, which are delineated using regional estimates of recharge... For use at a site-specific scale, they should be refined to take into account a more detailed hydrogeological characterization.”

4.3 Source Water Protection Policies

Significant Threat Source Protection Plan policies for consideration include water quality and water quantity. Acronyms used in this section include: WC – Wellington County, CW – Centre Wellington, MC – Must Conform, CWA – Clean Water Act, LID – Low Impact Development and ICA – Issue Contributing Area, TCE – trichloroethylene and EPA – Environmental Protection Act.

The Significant Water Quality Threat policies are presented from greatest to least areal coverage of the Site, i.e. (i) WHPA-C, (ii) WHPA-B vulnerability score of 8, and (iii) WHPA-B vulnerability score of 10.

4.3.1 Significant Water Quality Threats (WHPA-C and WHPA-B vulnerability score of 8)

Within the area of the Site mapped as WHPA-C (or ~60% of the Site), one significant water quality threat may apply, WC-CW-16.3, this policy is listed below (Table 3) (Grand River Source Protection Committee, 2022b). This policy is not expected to exert a constraint on residential development of the Site, as it is intended to inform industrial, commercial, institutional or agricultural activities with respect to the handling and storage of a DNAPL. However, this is expected to be reviewed by the Risk Management Official to determine if a Risk Management Plan is required, and in some cases an Education and Outreach Program for residents will be required.

Table 3 – Relevant DNAPL Policy (Grand River Source Protection Committee, 2022b)

Policy	Text
WC-CW-16.3	To ensure any Future handling and storage of a dense non-aqueous phase liquid (DNAPL) for industrial, commercial, institutional or agricultural purposes within a WHPA-B, C or TCE ICA, never becomes a significant drinking water threat, where this activity would be a significant drinking water threat, this activity shall be designated for the purpose of Section 58 of the CWA and a Risk Management Plan shall be required where the following apply: a. Any quantity of DNAPL in a WHPA-B with a vulnerability score of 10, including within an ICA for trichloroethylene; or b. Any quantity of the following chlorinated solvents in a WHPA-B or WHPA-C, with a vulnerability score < 10, including within an ICA for TCE, or within a WHPA-D in an ICA for TCE: • Dioxane-1,4 • Tetrachloroethylene (PCE), TCE or another DNAPL that could degrade to TCE • Vinyl chloride or another DNAPL that could degrade to vinyl chloride; or c. 25 Litres or greater of Poly Aromatic Hydrocarbons (PAHs) in a WHPA-B or WHPA-C, with a vulnerability score < 10, including within an ICA for TCE, or within a WHPA-D in an ICA for TCE.

Within the area of the Site mapped as WHPA-B vulnerability score 8 (approximately 14%), three significant water quality threats may apply, WC-CW-16.3 (already discussed above) as well as policies WC-MC-2.3 and WC-MC-3.4, and these two additional policies are listed below (Table 4). It is not expected that these policies will exert constraints on residential development of the Site as neither a waste management disposal site (WC-MC-2.3) nor a sewage treatment plant (WC-MC-3.4) are proposed.

**Table 4 – Waste Disposal and Sewage System Relevant Policies
(Grand River Source Protection Committee, 2022b)**

Policy	Text
WC-MC-2.3	To ensure the establishment, operation or maintenance of a Future waste disposal site within the meaning of Part V of the <i>EPA</i> that is subject to an Environmental Compliance Approval, never becomes a significant drinking water threat, where this activity would be a significant drinking water threat, the MECP shall prohibit these activities within the Environmental Compliance Approvals process.

Policy	Text
WC-MC-3.4	To ensure the establishment of Future sewage treatment plants with effluent and/or bypass discharge or Future sewage treatment plants with sewage storage tanks never becomes a significant drinking water threat, where these activities would be a significant drinking water threat, the MECP shall prohibit these activities within the Environmental Compliance Approvals process. This policy does not apply to the expansion, modification, optimization, re-rating, operation, maintenance or replacement of Existing sewage treatment plants.

Each Significant Water Quality Threat Source Protection Plan policy has a legal effect, and these are listed below in Table 5.

Table 5 – Legal Effect of Water Quality Policies (Grand River Source Protection Committee, 2022b)

Policy	Legal Effect
WC-CW-16.3	Section 58 (Risk Management Plans) of the Clean Water Act
WC-MC-2.3	Affects EPA and Ontario Water Resources Act Prescribed Instrument Decisions (e.g. Stormwater management ECA approvals)
WC-MC-3.4	

4.3.2 Significant Water Quantity Threats (WHPA-B vulnerability score of 10)

Within the area of the Site mapped as WHPA-B and a vulnerability score of 10 (or <0.2% of the Site, Map 5b), there are many significant water quality threat policies listed for consideration however many will not require consideration (Grand River Source Protection Committee, 2022b).

For example, the current development plan proposes a southernmost stormwater management facility that covers the WHPA-B with a vulnerability score of 10. Consequently, additional groundwater protection measures will be required by the MECP for the Environmental Compliance Approval (Policy WC-MC-3.7), as well as some Risk Management Plan component (Policy WC-CW-3.8), however these policies do not appear to include prohibition. Also, additional groundwater protection measures will be required for any sanitary sewers in this area by the MECP (WC-MC-3.5), however this policy also does not appear to include prohibition of sanitary sewers and the current design does not appear to have any in this area (MTE, 2025).

The policies discussed in Section 4.3.1 also apply to the small area of WHPA-B with a vulnerability score of 10.

There are also a number of other policies that may apply to this small area regarding road salt, snow storage and fuel storage and handling, e.g. during the construction phase. However, these ‘threats’ are likely to be managed as part of the stormwater ECA for the built-out development.

However, many of the policies are not expected to affect the proposed development because the water quality threats will not be occurring, e.g. waste disposal sites, sewage holding tanks, sewage treatment plant discharge, industrial effluent, application of agricultural source material, storage of agricultural source material, application of non-agricultural source material, handling and storage of non-agricultural source materials, application of commercial fertilizer to land, handling and storage of commercial fertilizer, application of pesticide, handling and storage of pesticides, the handling and storage of an

organic solvent. de-icing aircraft chemical runoff, livestock grazing/animal yards and a liquid hydrocarbon pipeline.

4.3.3 Significant Water Quantity Threats

There are three Significant Water Quantity Source Protection Plan policies that apply to residential development of the Site: (i) WC-MC-23.2, (ii) WC-MC-23.3 and (iii) WC-MC-23.5. These are listed below from the Source Protection Plan in Table 6.

Table 6 – Relevant Water Quantity Policies (Grand River Source Protection Committee, 2022b)

Policy	Text
Common introductory text	To ensure that any Recharge Reducing Activity never becomes a significant drinking water threat, where this activity would be a significant drinking water threat as prescribed by the CWA
WC-MC-23.2	...the MECP should, during any pre-submission consultation for Environmental Compliance Approvals for Stormwater Management Facilities and / or Sewage Works, encourage design and implementation measures for the maintenance of groundwater recharge functions including but not limited to LID, minimizing impervious surfaces, and lot level infiltration. The MECP shall issue Environmental Compliance Approvals for Stormwater Management Facilities and / or Sewage Works that, where appropriate, incorporate conditions that address groundwater recharge considerations. In addition, the MECP, where appropriate, shall consider incorporating conditions in the Environmental Compliance Approvals to address the proper functioning of groundwater recharge measures including, but not limited to, conditions requiring or related to operations, inspection and maintenance of the Stormwater Management Facilities and / or Sewage Works, groundwater or surface water monitoring related to groundwater recharge, and documentation including manuals and maintenance records. For Stormwater Management Facilities and / or Sewage Works located within the WHPA-Q in a Chloride, Sodium or Nitrate ICA, the MECP shall consider conditions that require best management practices that address how recharge will be maintained and water quality will be protected from application and storage of winter maintenance materials including Salt.
WC-MC-23.3	... the County, as the Planning Approval Authority, in consultation with the Municipalities, <u>shall only approve settlement area expansions</u> within a WHPA-Q as part of a municipal comprehensive review or as otherwise provided by the Provincial Growth Plan for the Greater Golden Horseshoe, where it can be adequately demonstrated that recharge functions can be maintained or improved on lands designated as Significant Groundwater Recharge Areas within a WHPA-Q.
WC-MC-23.5	... the Planning Approval Authority shall require that all site plan, subdivision and vacant land condominium applications to facilitate Major Development for new residential, commercial, industrial and institutional uses provide a water balance assessment for the proposed development which addresses each of the following requirements:

Policy	Text
	a. maintain pre-development recharge to the greatest extent feasible through best management practices such as LID, minimizing impervious surfaces, and lot level infiltration; b. where pre-development recharge cannot be maintained on site, implement and maximize off-site recharge enhancement (within the same WHPA-Q) to compensate for any predicted loss of recharge from the development; and c. within a WHPA-Q in a Chloride, Sodium or Nitrate ICA, the water balance assessment must consider water quality when recommending best management practices and address how recharge will be maintained and water quality will be protected including consideration of how water quality will be protected from application and storage of winter maintenance materials including Salt. The Planning Approval Authority shall use its discretion to implement the requirements of this policy to the extent feasible and practicable given the nature of the proposed development, specific circumstances of a site and off-site recharge opportunities.

However, as the Site is not located in a Chloride, Sodium or Nitrate ICA, consequently those portions of these policies should not apply.

Each Significant Water Quantity Threat Source Protection Plan policy has a legal effect, and these are listed below in Table 7.

Table 7 – Legal Effect of Water Quantity Policies (Grand River Source Protection Committee, 2022b)

Policy	Legal Effect
WC-MC-23.2	Affects EPA and Ontario Water Resources Act Prescribed Instrument Decisions (e.g. Stormwater management ECA approvals)
WC-MC-23.3	Affects decisions under the Planning Act and Condominium Act and Imposes obligation on Municipality and Source Protection Authority
WC-MC-23.5	

5.0 Discussion

For expansion of the Settlement Area (and subsequent development of the Site), it will be required to adequately demonstrate that *“recharge functions can be maintained or improved on lands designated as Significant Groundwater Recharge Areas within a WHPA-Q”* (Policy WC-MC-23.3). However, as mentioned in Section 4.2, the amount of SGRAs at the Site may be reduced upon further analysis.

The demonstration of maintenance, or improvement of recharge, is expected to be accomplished through a water balance assessment (and Stormwater Management Plan) that maintains *“...pre-development recharge to the greatest extent feasible through best management practices such as LID, minimizing impervious surfaces, and lot level infiltration...”* (Policy WC-MC-23.5).

However, it is expected that Site development will also require maintenance of baseflow to the Nichol Drain including ecological function with respect to temperature control (CVC, 2012). This may require additional monitoring of the Nichol Drain.

In a somewhat similar proposed residential development that we assisted with, pre-development recharge was primarily maintained through a below grade infiltration facility to allow for centralized infiltration.

Source Protection Plan policies to prevent significant water quality threats are not anticipated to prohibit the development plan but will require some additional coordination to address potential concerns with the MECP and the Source Water Protection Risk Management Officer.

The unevaluated wetland at the southern end of the Site is presumed to be maintained by a combination of precipitation and runoff, however site characterization would be required to confirm, e.g. wetland hydroperiod monitoring, borehole, monitoring well and measurement of the vertical groundwater gradient.

6.0 Conclusions and Recommendations

The following conclusions are provided:

1. Site boreholes have identified less permeable at-surface soils than regionally mapped and used for regional water budget modelling.
2. Recently modelled GRCA Tier 3 Water Budget recharge rates appear to over-estimate actual Site recharge, and historic GRCA Tier 2 Water Budget recharge rates appear to over-estimate the amount of Significant Groundwater Recharge Areas at the Site.
3. The Site primarily drains to the Nichol Drain, which has permanent flow, a coldwater thermal classification and indicators of groundwater discharge.
4. Tile-drainage is mapped in the northeast portion of the Site with some discharge to the Nichol Drain. This tile-drainage may have a role in sustaining the drain flow and temperature regime.
5. The bedrock aquifer beneath the Site has been primarily mapped as having low vulnerability with a portion of the Site mapped as medium and a very small portion mapped as highly vulnerable.
6. The Site overlies Wellhead Protection Areas (WHPAs) for Municipal Well E1 located about 535 m south-southeast. The WHPAs include both quality protection zones (WHPA-B, WHPA-C and WHPA-D) and a quantity protection zone (WHPA-Q, entire Site).
7. Significant Groundwater Recharge Areas (SGRAs) have been regionally mapped over 83% of the Site and are expected to decline in extent following analyses of local geologic conditions.

8. The Site is considered a significant water quantity threat to the municipal groundwater supplies if groundwater recharge is reduced.
9. Source Water Protection Water Quality Threat Policies are not expected to prevent residential development of the Site, however additional coordination with the MECP and the Source Water Protection Risk Management Officer will be required, e.g. with respect to the southernmost stormwater management facility.
10. Source Water Protection Water Quantity Threat Policies are expected to require post-development groundwater recharge at the Site to equal or exceed pre-development groundwater recharge rates. It is expected that the water management approach will require maintenance of groundwater discharge to the drain including coldwater temperature.
11. The unevaluated wetland may be maintained by a combination of precipitation and runoff but field characterization and analyses would be required to confirm.

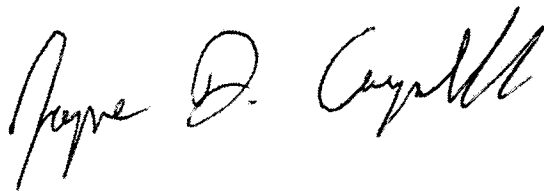
The following recommendations are provided:

1. Project budgeting for residential development of the Site should include consideration for (a) further Site characterization (e.g. Nichol drain flow, level and temperature monitoring and Unevaluated wetland staff gauge, borehole and monitoring well), (b) analyses of local geologic conditions and GRCA modelling to complete the water balance assessment and refined SGRA mapping, and (c) design of Site infiltration measures.
2. Pre-consultation should be completed with the local government agencies (Wellington County, Centre Wellington, Grand River Conservation Authority and Wellington Source Water Protection) in order to scope the level of assessment required.

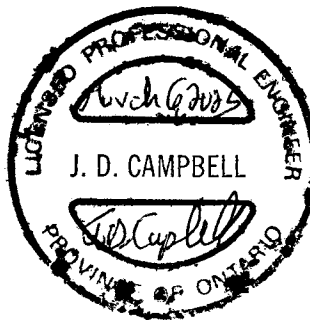
We trust this information is sufficient for your present needs. Please do not hesitate to contact us if you have any questions.

Yours truly,

TERRA-DYNAMICS INC.



Jayme D. Campbell, P. Eng.
Senior Water Resources Engineer



Attachments

Drawing No.1 – Elora Sands Borehole Location Plan

Map 1 – Land Use Change and Future Recharge

Map 2 – OMAFRA Municipal Drain and Tile-Drainage

Map 3 – Surficial Geology

Map 4 – Local Elora Cross Section C-C'

Map 5 – Centre Wellington Wellhead Protection Area Final Vulnerability

Map 5b – Bedrock Aquifer Vulnerability

Map 6 – County of Wellington, Centre Wellington Wells, Significant Drinking Water Threat Applicability

Map 7 – Water Quantity Threats

Map 8 – Significant Groundwater Recharge Areas

7.0 References

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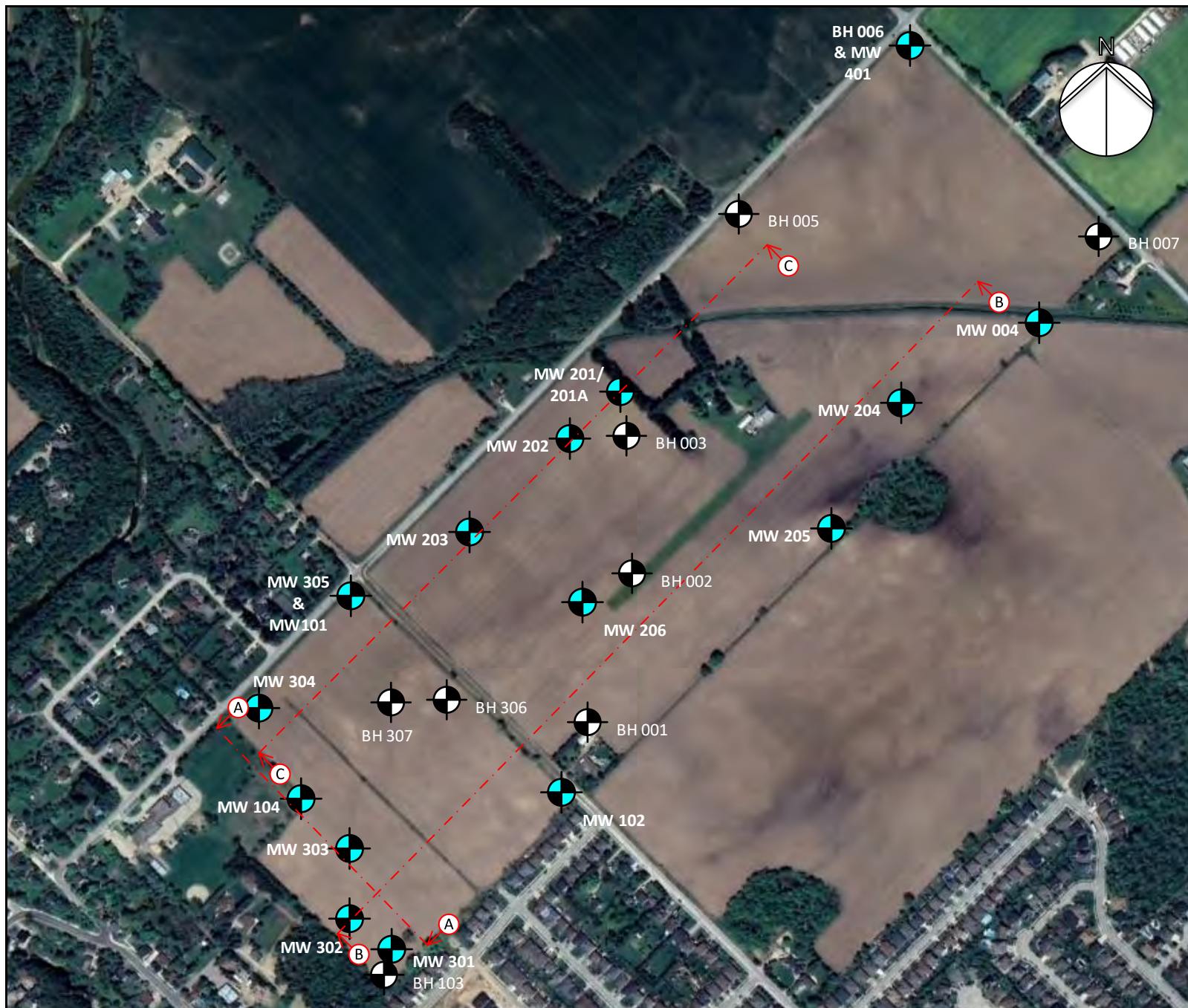
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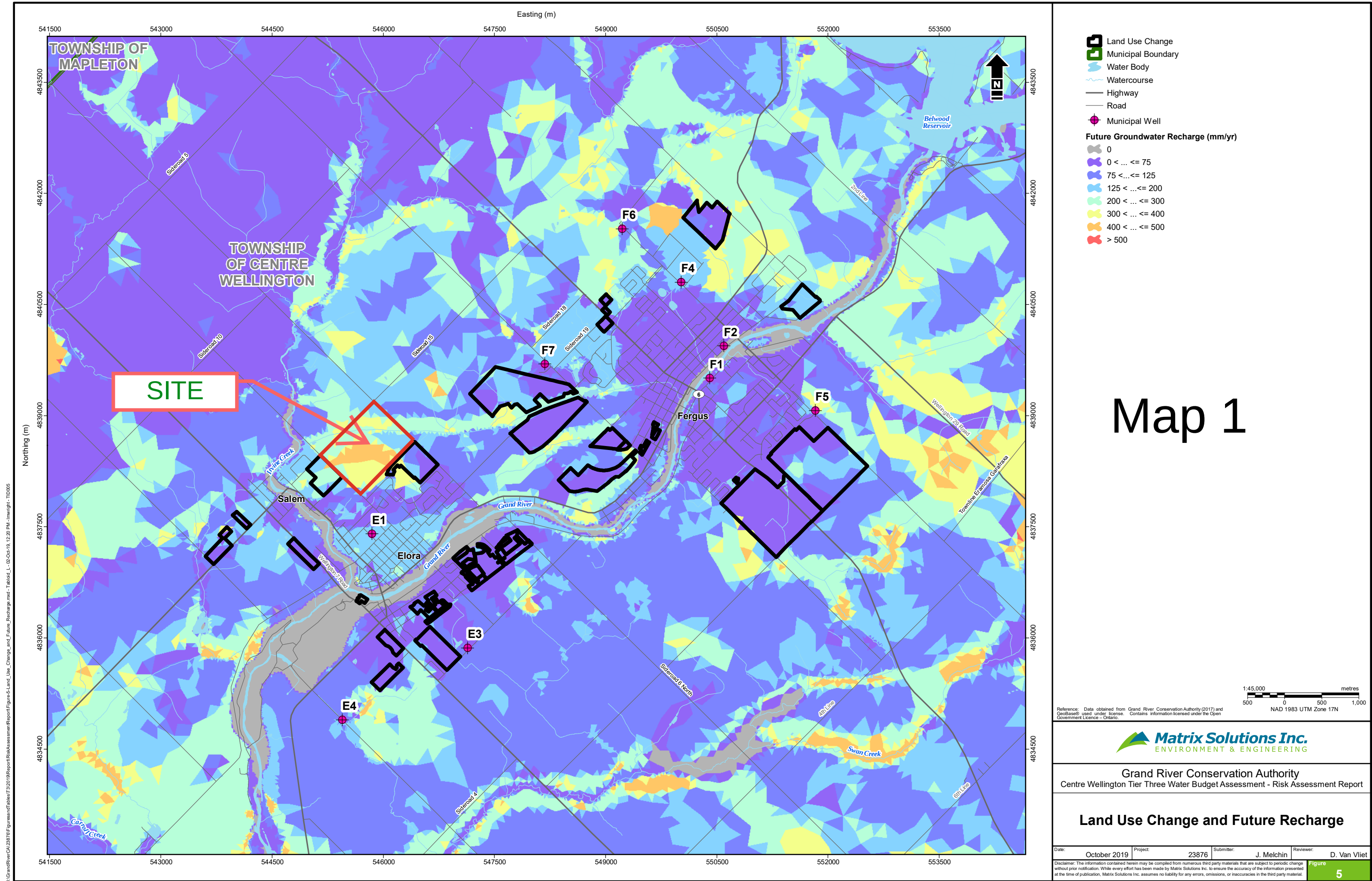
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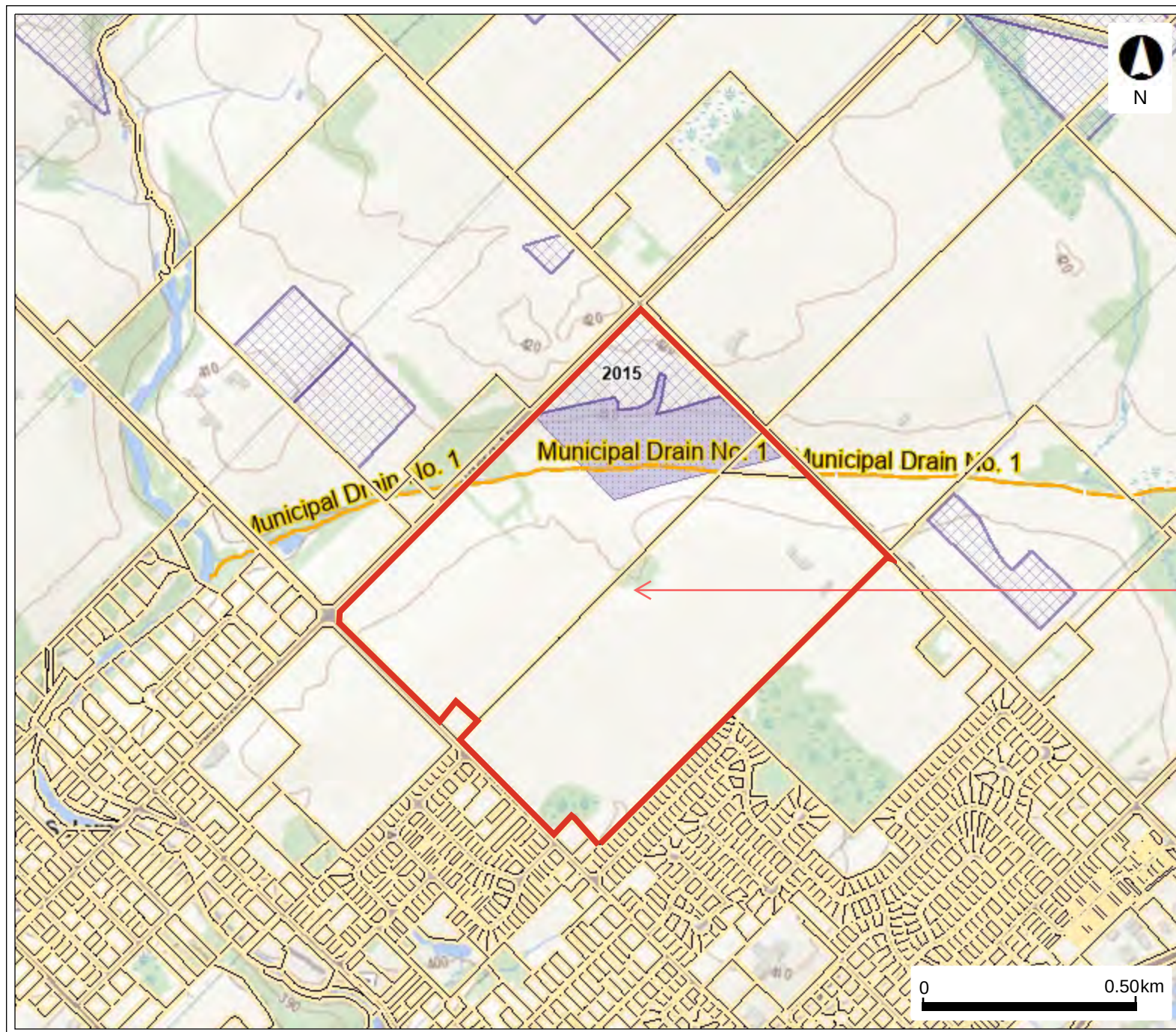
Wellington County, 2024. County of Wellington Official Plan.



LEGEND  Borehole Location BH#  Monitoring Well Location MW#  Geological Cross Section Location	
NOTES 1. This drawing should be read in conjunction with Soil-Mat Engineers & Consultants Ltd. Report No. SM 301591-G. 2. Borehole and monitoring well locations are approximate.	
SOIL-MAT ENGINEERS & CONSULTANTS LTD.	
Geotechnical Investigation Proposed Residential Development 7581 Nichol Road 15 Elora, Ontario	
Borehole Location Plan	
Project No. SM 301591-G	
Date: June 2022	
Drawn: SW	Checked: IS
SM 301591-G Borehole Location Plan	
Drawing No. 1	



OMAFRA Municipal Drain and Tile-Drainage



Legend

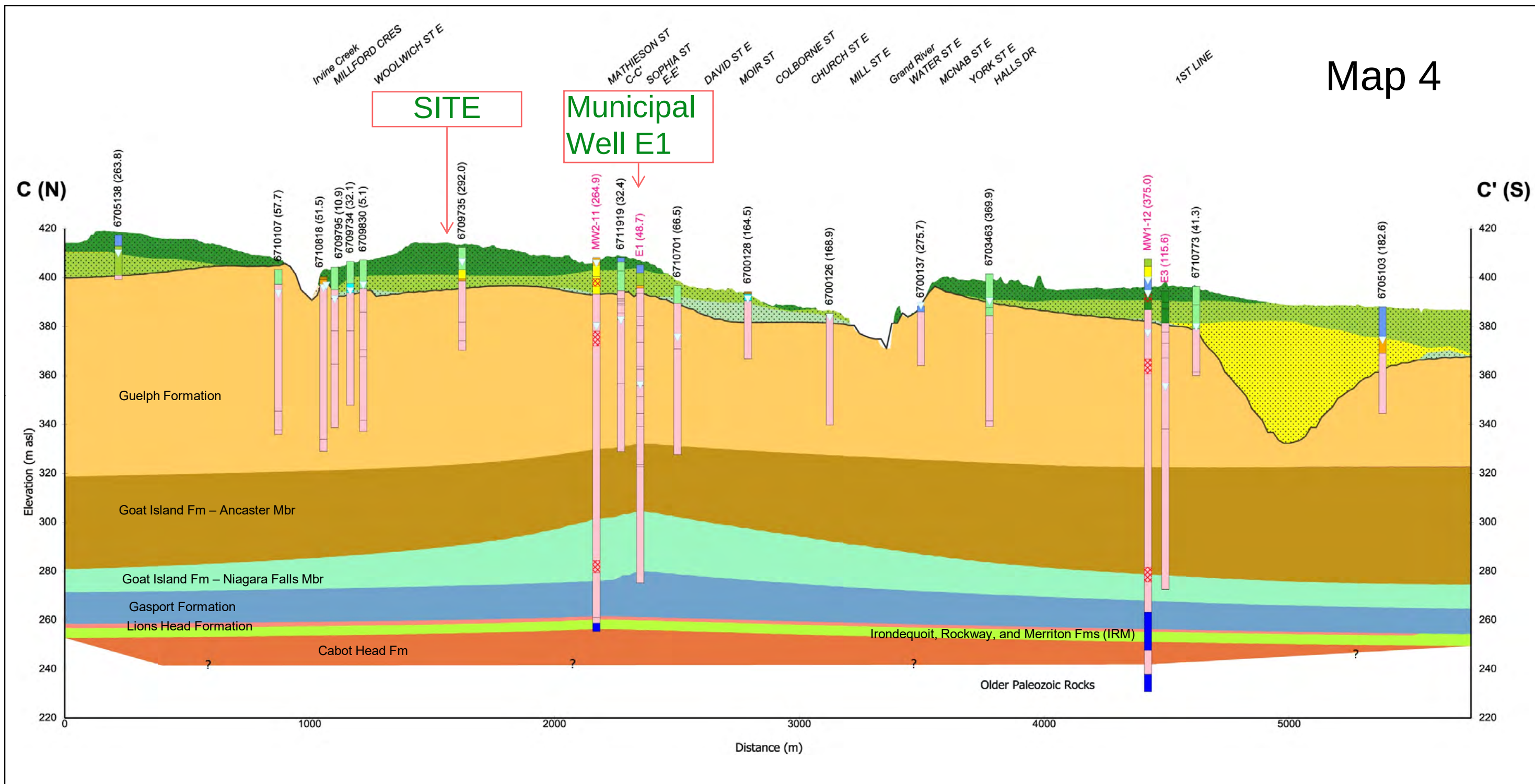
- Assessment Parcel
- Constructed Drains
 - Open or Unknown
 - Closed/Tiled
- Agricultural Tile Drainage
 - Random
 - Systematic

Map 2

SITE

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

Map 4



LEGEND

- | | | | | |
|---|--|--|--|--|
| <ul style="list-style-type: none">RoadDrainageObserved Water LevelProfileTop of BedrockScreened Interval | Borehole Lithology <ul style="list-style-type: none">Topsoil, fillOrganic depositsClay, silty claySilt, clayey silt, sandy siltClay to clayey silt till | <ul style="list-style-type: none">Silt to sandy silt tillSandy tillSand, silty sandGravelly sand, gravelLimestone, DolostoneShale | Interpreted Unit <ul style="list-style-type: none">Grand River Outwash (AFA2)Tavistock, Port Stanley Till (ATB1)Moraine Aquifer (AFB1)Maryhill/ Catfish Creek Drift (ATB3, ATC1, AFC1, ATC2) | <ul style="list-style-type: none">Pre-Catfish Aquifer (AFD1)Canning Drift Aquitard (ATE1)Pre-Canning Aquifer (AFF1)PreCanning Aquitard (ATG1) |
|---|--|--|--|--|

NOTE: Water levels for domestic wells are levels contained within the WWIS. Water levels for high quality wells are from recent, higher quality transient water level observations.

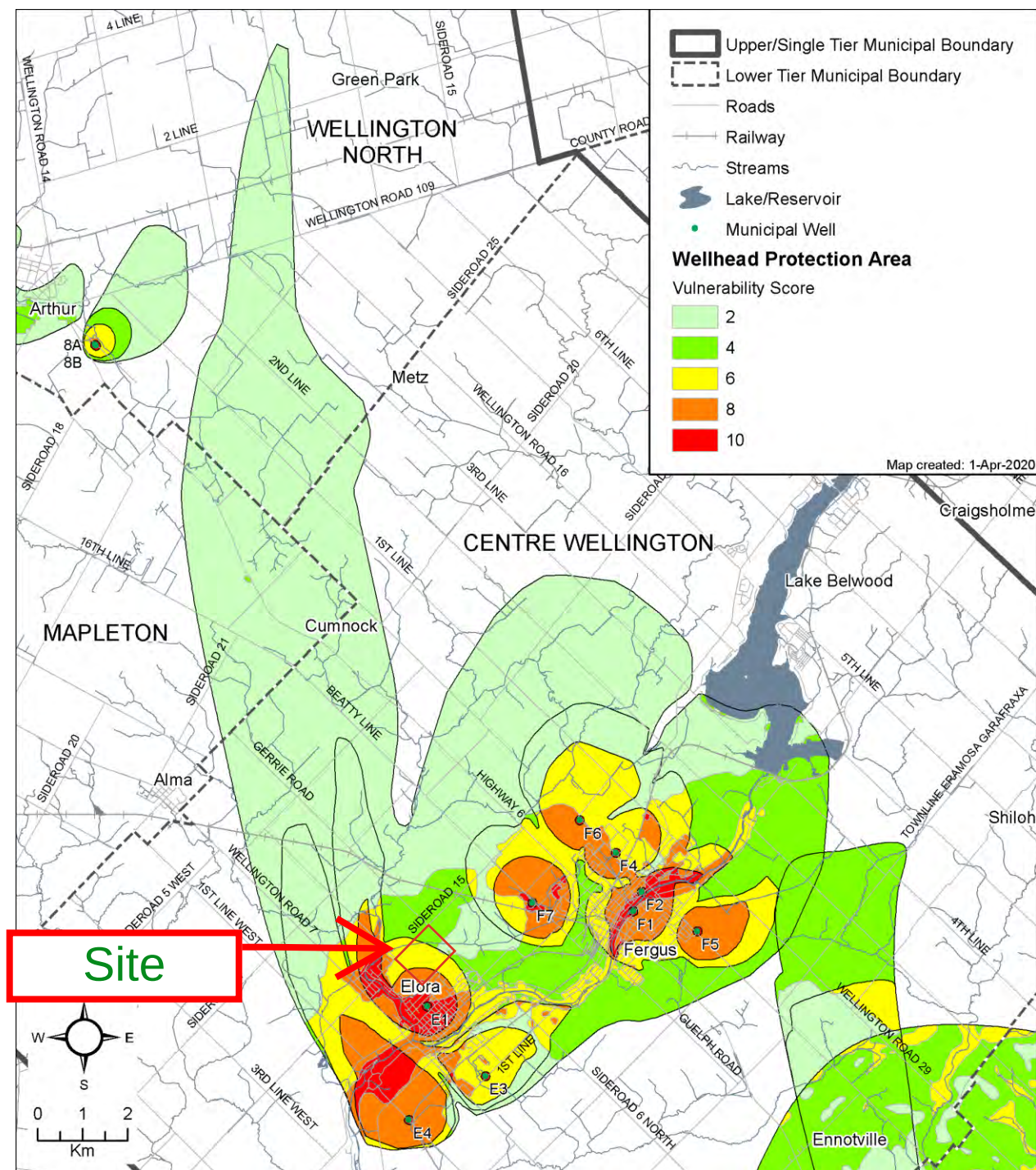


Grand River Conservation Authority
Centre Wellington Tier Three Water Budget and Local Area Risk Assessment

Local Elora Cross Section C-C'

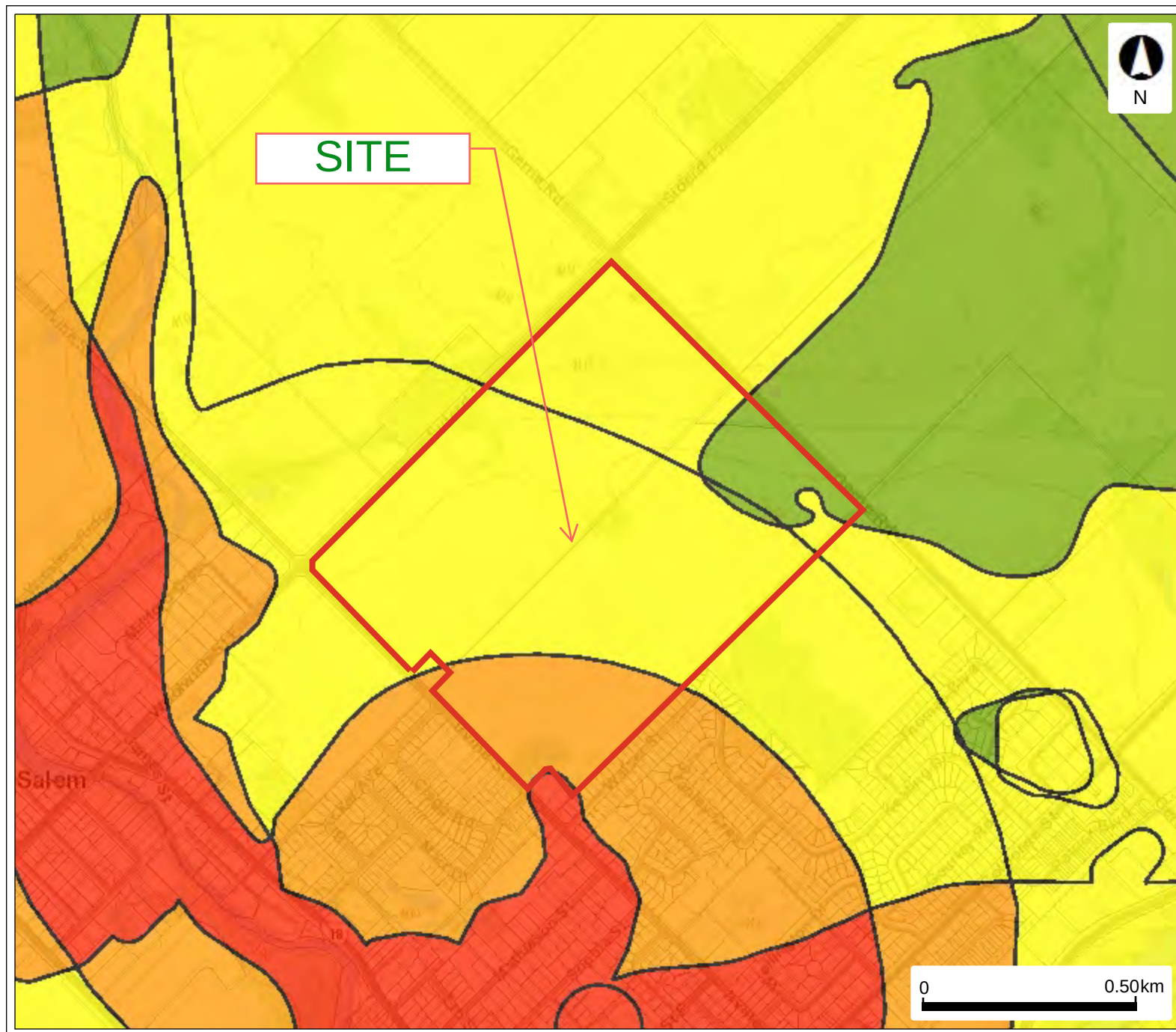
Date: 08 Nov 2017 Project: 23876 Technical: J. Melchin Reviewer: P. Meyer Drawn: C. Curry

Map 6-29: Centre Wellington Wellhead Protection Area Final Vulnerability



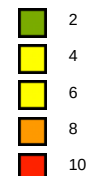
Map 5

MECP Bedrock Groundwater Vulnerability



Legend

Vulnerable Scoring Area - Groundwater

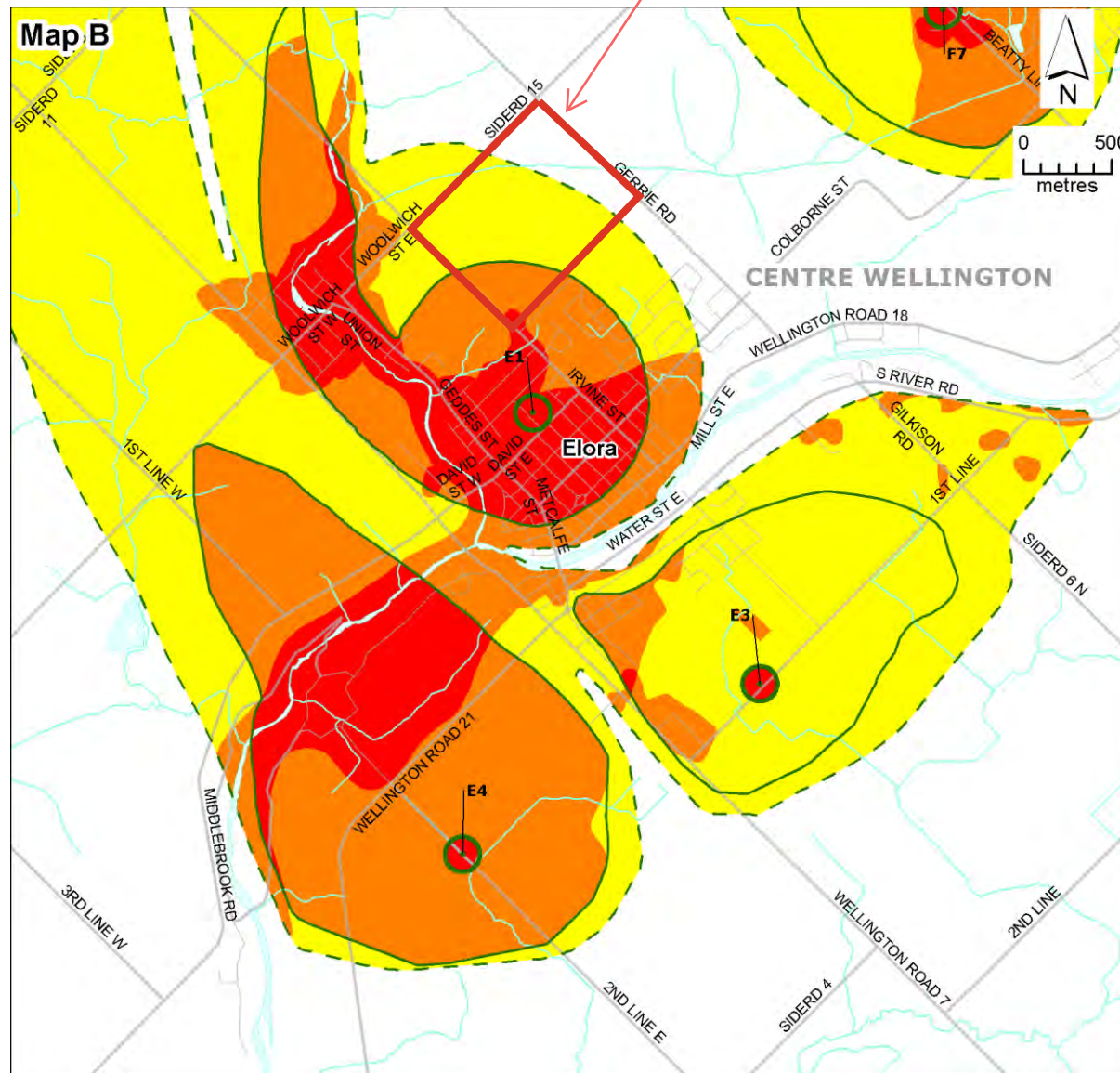


□ Assessment Parcel

Map 5b

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7.12 Schedule F: County of Wellington, Centre Wellington Well, Map B



Significant Drinking Water Threat Policy Applicability

Significant Drinking Water Threat Policy Categories	Vulnerability Scores on Map		
1. Waste Disposal	10	8	2,4,6
2. Sewage Systems			
3, 4. Agricultural Source Material			
6, 7. Non-Agricultural Source Material*			
8, 9. Commercial Fertilizer*			
10, 11. Pesticide			
12, 13. Road Salt*			
14. Storage of Snow			
15. Fuel			
16. DNAPLs			
17. Organic Solvents			
18. Aircraft De-icing			
21. Livestock Area			
22. Oil Pipelines			

Note: This table provides a summary of the activities listed in the Clean Water Act (2006) that apply as Prescribed Drinking Water Threats (PDWT) within Non-GUDI Wellhead Protection Zones on this map. For details refer to the Drinking Water Threats Tables from the Ministry of the Environment and Climate Change, and the text of this Source Protection Plan.
 *Application of Commercial Fertilizer, Non-Agricultural Source Material, and Road Salt may not be a significant drinking water threat in some areas due to the % managed land, livestock density, and/or % impervious surface calculations for these areas. See the text of this plan for further details.

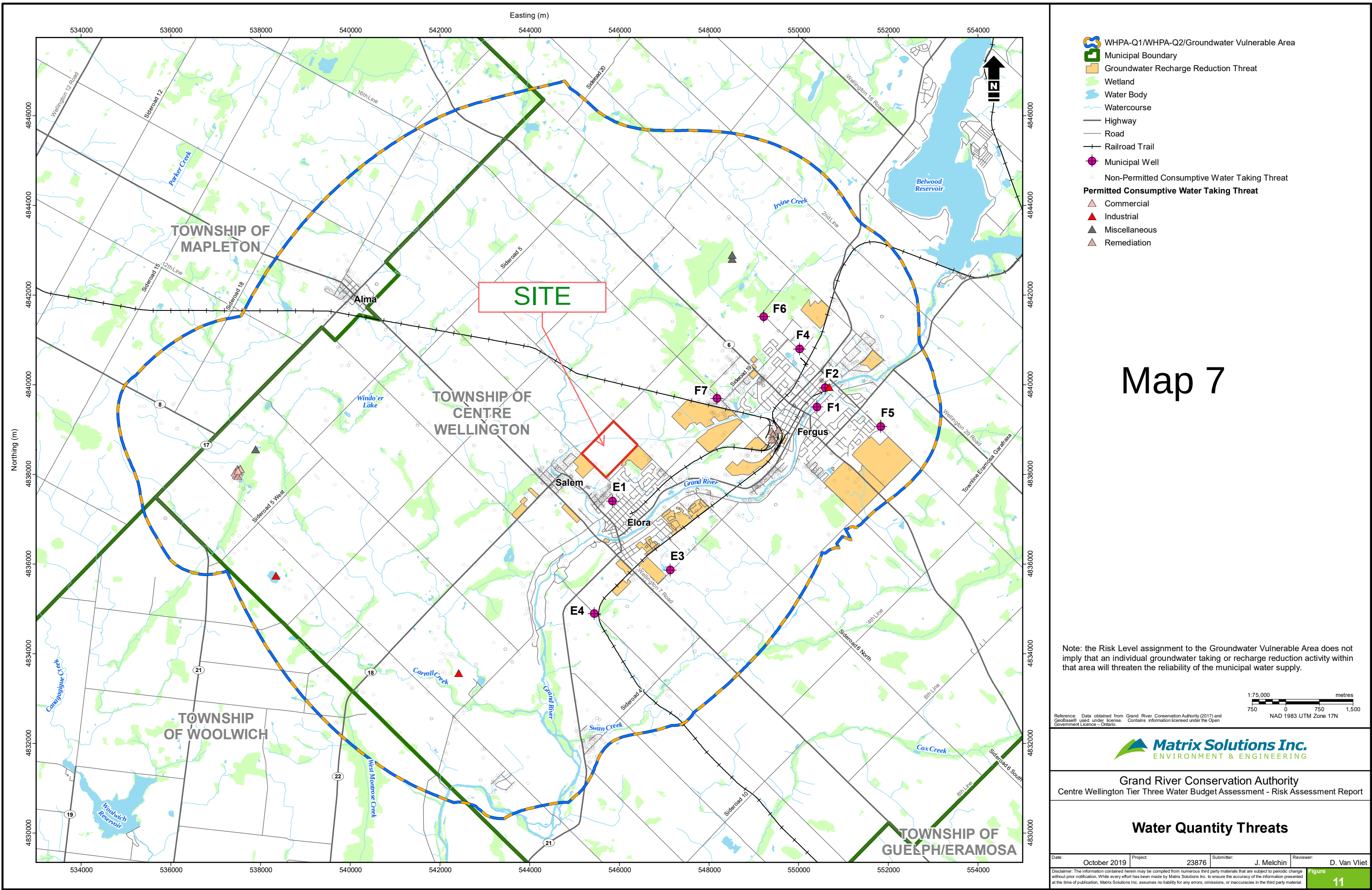


Grand River
Conservation Authority

1. Updated November 08, 2019
 2. Larger scale mapping of some map layers, including roads and vulnerability scores, is available at www.sourcewater.ca.
 3. This map is for illustrative purposes only. Information contained hereon is not a substitute for professional review or a site survey and is subject to change without notice. The Grand River Conservation Authority takes no responsibility for, nor guarantees, the accuracy of the information contained on this map. Any interpretations or conclusions drawn from this map are the sole responsibility of the user.

Map 6

I:\GrandRiver\CA\2019\Figures and Tables\T3\2019 Report Risk Assessment Report\Figure-11\Water_Quantity_Threats.mxd - Tabloid_L - 02-Oct-19, 12:40 PM - inwright - TD005





Grand River Conservation
Authority

Date: Mar 06, 2025

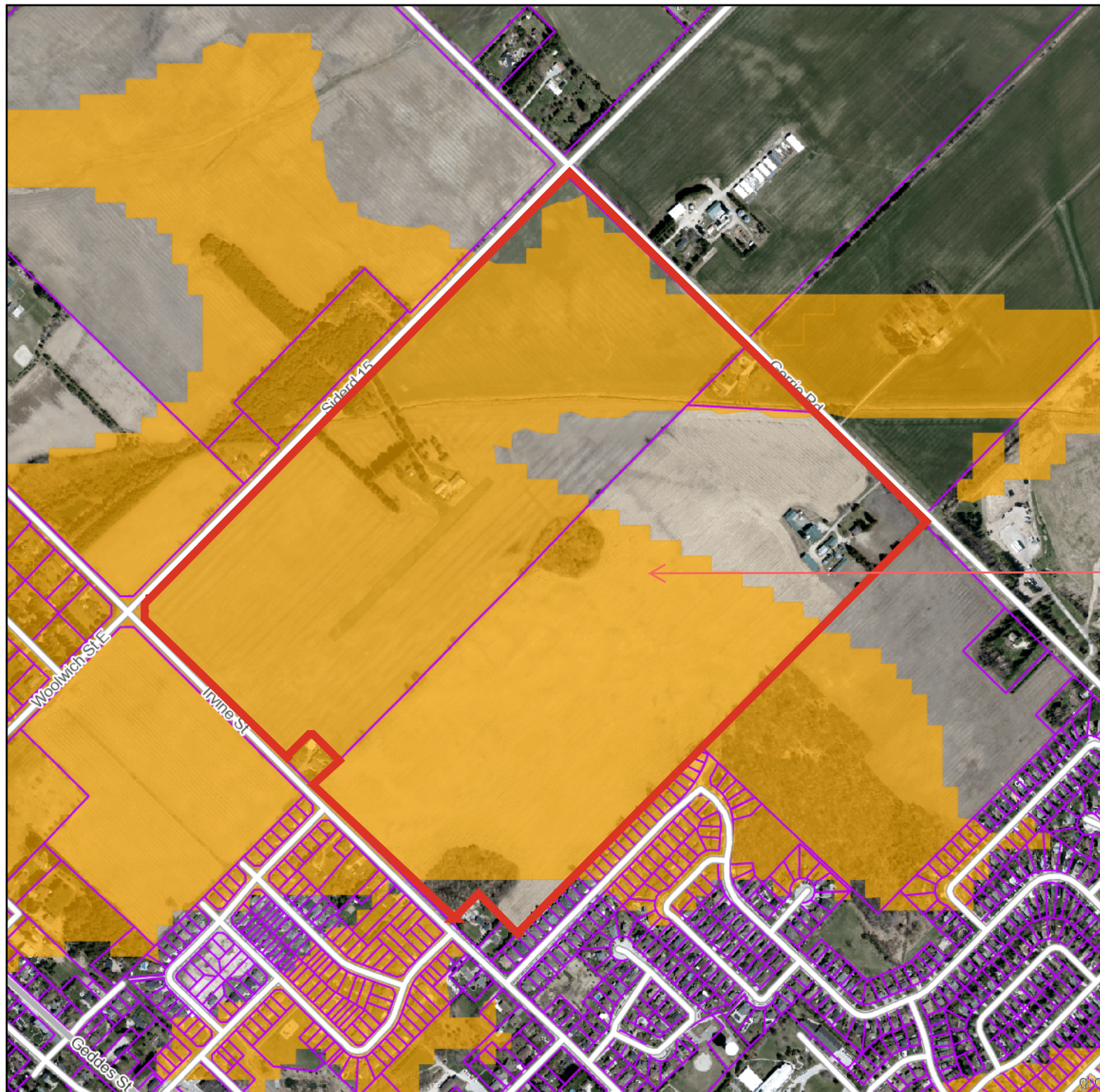
Significant Groundwater Recharge Area

Legend

- Parcel - Assessment (MPAC/MNRF)
- Signif. GW Recharge - Tier 2 (GRCA)

Map 8

SITE



Map Centre (X,Y): 545855.94, 4838565.21 | [Map Link](#)

This map is not to be used for navigation | 2020 Ortho (ON)

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The source for each data layer is shown in parentheses in the map legend. See [Sources and Citations](#) for details.

Scale 1:9,106

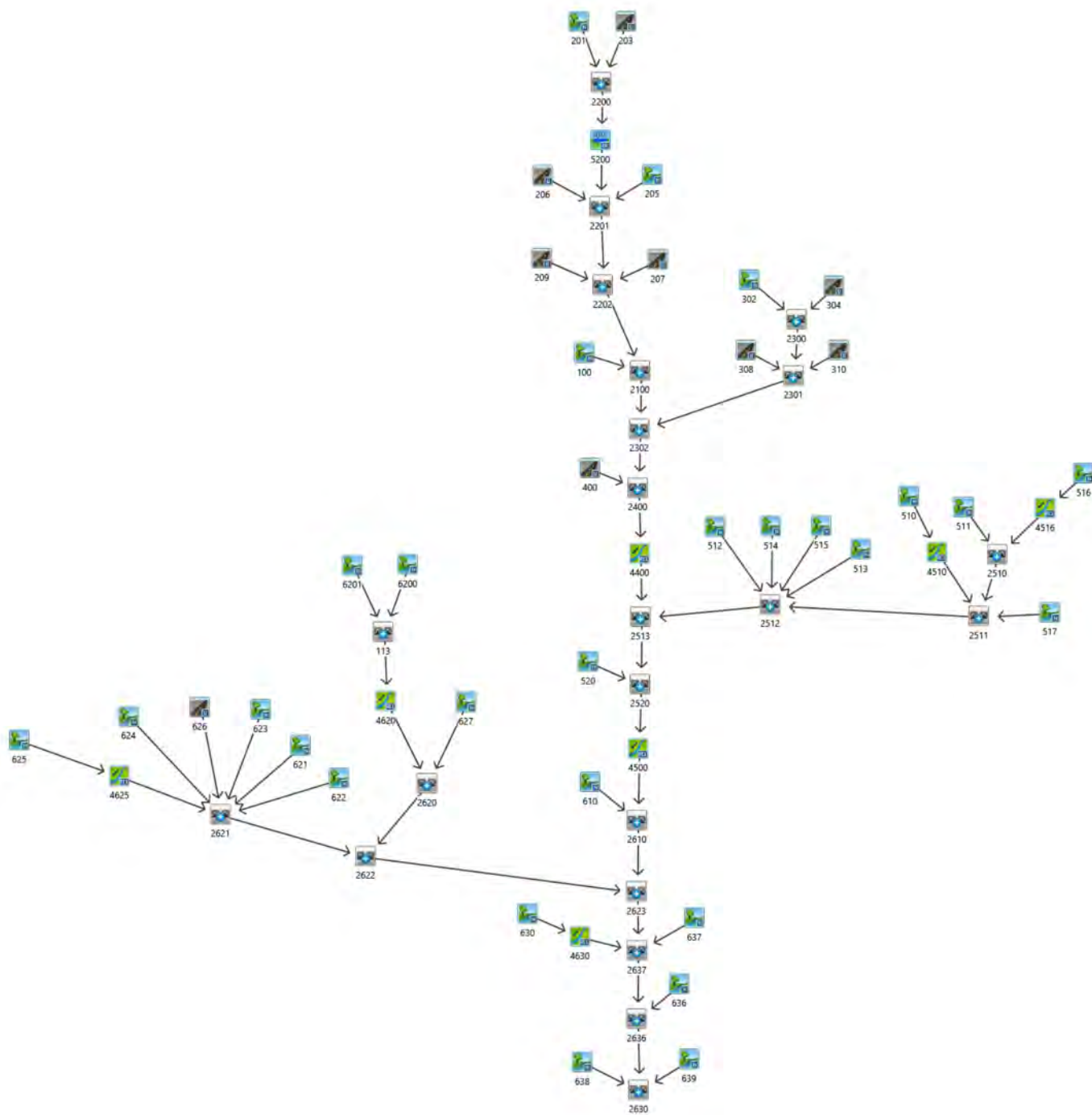
NAD83 UTM zone 17 (EPSG:26917)



Appendix F

Stormwater Management





** SIMULATION : 2 year Fergus Shand Dam Chica **

CHICAGO STORM
Ptotal= 36.04 mm

IDF curve parameters: A= 721.000
B= 6.000
C= 0.796

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

Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.15	1.00	10.02	2.00	6.24	3.00	2.89
0.08	2.28	1.08	15.64	2.08	5.65	3.08	2.77
0.17	2.44	1.17	36.22	2.17	5.18	3.17	2.67
0.25	2.62	1.25	106.90	2.25	4.78	3.25	2.57
0.33	2.83	1.33	46.53	2.33	4.44	3.33	2.48
0.42	3.08	1.42	25.96	2.42	4.15	3.42	2.40
0.50	3.39	1.50	17.80	2.50	3.90	3.50	2.32
0.58	3.79	1.58	13.52	2.58	3.68	3.58	2.25
0.67	4.29	1.67	10.91	2.67	3.49	3.67	2.18
0.75	4.97	1.75	9.16	2.75	3.31	3.75	2.12
0.83	5.94	1.83	7.91	2.83	3.16	3.83	2.06
0.92	7.43	1.92	6.97	2.92	3.02	3.92	2.01

CALIB
NASHYD (0100)
ID= 1 DT= 5.0 min

Area (ha)= 136.98 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.17

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 0.840 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 6.637
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.184

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

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

Area (ha)= 14.60 Curve Number (CN)= 74.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.97

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.153 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 9.637
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.267

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

CALIB
STANDHYD (0203)
ID= 1 DT= 5.0 min

Area (ha)= 8.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 106.90 21.28
over (min)= 5.00 15.00
Storage Coeff. (min)= 1.03 (ii) 12.55 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.34 0.08

PEAK FLOW (cms)= 0.61 0.17 0.650 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 34.04 9.66 15.76
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.27 0.44

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	14.60	0.153	2.58	9.64
+ ID2= 2 (0203):	8.20	0.650	1.33	15.76
=====				
ID = 3 (2200):	22.80	0.655	1.33	11.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)
IN= 2--> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1980	0.2314
0.0040	0.0218	0.2920	0.2621
0.0060	0.0446	0.3980	0.2937
0.0070	0.0683	0.5150	0.3261
0.0080	0.0930	0.8290	0.3592
0.0090	0.1187	1.3520	0.3930
0.0230	0.1453	2.0570	0.4275
0.0610	0.1730	2.9590	0.4629
0.1200	0.2017	0.0000	0.0000

AREA QPEAK TPEAK R.V.

INFLOW : ID= 2 (2200) (ha) (cms) (hrs) (mm)
22.800 0.655 1.33 11.84
OUTFLOW: ID= 1 (5200) 22.800 0.102 4.08 11.78

PEAK FLOW REDUCTION [Qout/Qin](%)= 15.58
TIME SHIFT OF PEAK FLOW (min)=165.00
MAXIMUM STORAGE USED (ha.m.)= 0.1930

CALIB
NASHYD (0205) | Area (ha)= 4.80 Curve Number (CN)= 90.0
ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.190 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.006
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.527

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

CALIB
STANDHYD (0206) | Area (ha)= 0.20
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 106.90 21.28
over (min)= 5.00 15.00
Storage Coeff. (min)= 1.03 (ii) 12.55 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.34 0.08

TOTALS
PEAK FLOW (cms)= 0.01 0.00 0.016 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 34.04 9.66 15.73
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.27 0.44

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.

(ha) (cms) (hrs) (mm)
ID1= 1 (0205): 4.80 0.190 1.83 19.01
+ ID2= 2 (0206): 0.20 0.016 1.33 15.73
=====

ID = 3 (2201): 5.00 0.195 1.83 18.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201) |
3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2201): 5.00 0.195 1.83 18.87
+ ID2= 2 (5200): 22.80 0.102 4.08 11.78
=====

ID = 1 (2201): 27.80 0.202 1.83 13.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0209) | Area (ha)= 2.70
ID= 1 DT= 5.0 min | Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.43 2.27
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 35.00 35.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 106.90 11.67
over (min)= 5.00 20.00
Storage Coeff. (min)= 1.25 (ii) 19.19 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.33 0.06

TOTALS
PEAK FLOW (cms)= 0.06 0.04 0.070 (iii)
TIME TO PEAK (hrs)= 1.33 1.67 1.33
RUNOFF VOLUME (mm)= 34.04 7.85 9.94
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.22 0.28

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0207) | Area (ha)= 1.30
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.58 0.72
Dep. Storage (mm)= 2.00 5.00

Average Slope (%)=	1.20	1.20	
Length (m)=	25.00	25.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	106.90	21.28	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.03 (ii)	12.55 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.34	0.08	
PEAK FLOW (cms)=	0.10	0.03	0.103 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	34.04	9.66	15.75
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.27	0.44

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0207):	1.30	0.103	1.33	15.75
+ ID2= 2 (0209):	2.70	0.070	1.33	9.94
ID = 3 (2202):	4.00	0.173	1.33	11.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2202):	4.00	0.173	1.33	11.83
+ ID2= 2 (2201):	27.80	0.202	1.83	13.05
ID = 1 (2202):	31.80	0.281	1.75	12.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2100)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0100):	136.98	0.840	3.00	6.64
+ ID2= 2 (2202):	31.80	0.281	1.75	12.90
ID = 3 (2100):	168.78	0.969	2.92	7.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB

NASHYD (0302)	Area (ha)=	2.90	Curve Number (CN)=	74.0
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.45		

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)=	0.051 (i)
TIME TO PEAK (hrs)=	1.917
RUNOFF VOLUME (mm)=	9.636
TOTAL RAINFALL (mm)=	36.039
RUNOFF COEFFICIENT =	0.267

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

CALIB	Area (ha)=	4.40	Dir. Conn.(%)=	25.00
STANDHYD (0304)	Total Imp(%)=	45.00		
ID= 1 DT= 5.0 min				

Surface Area (ha)=	1.98	PERVIOUS (i)	2.42
Dep. Storage (mm)=	2.00		5.00
Average Slope (%)=	1.00		1.00
Length (m)=	25.00		25.00
Mannings n =	0.013		0.250

Max.Eff.Inten.(mm/hr)=	106.90	21.28
over (min)	5.00	15.00
Storage Coeff. (min)=	1.08 (ii)	13.25 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.08

PEAK FLOW (cms)=	0.32	0.09	0.347 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	34.04	9.66	15.76
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.27	0.44

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0302):	2.90	0.051	1.92	9.64
+ ID2= 2 (0304):	4.40	0.347	1.33	15.76
ID = 3 (2300):	7.30	0.354	1.33	13.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	0.20
STANDHYD (0308)		

|ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	106.90	21.28
over (min)	5.00	15.00
Storage Coeff. (min)=	1.08 (ii)	13.25 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.08

			TOTALS
PEAK FLOW (cms)=	0.01	0.00	0.016 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	34.04	9.66	15.72
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.27	0.44

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (0310) |
|ID= 1 DT= 5.0 min |

	Area (ha)=	Total Imp(%)=	Dir. Conn.(%)=
	5.70	16.00	8.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.91	4.79
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	106.90	13.48
over (min)	5.00	15.00
Storage Coeff. (min)=	1.03 (ii)	14.86 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.08

			TOTALS
PEAK FLOW (cms)=	0.13	0.11	0.159 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	34.04	7.85	9.94
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.22	0.28

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301) |
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2300):	7.30	0.354	1.33	13.32
+ ID2= 2 (0308):	0.20	0.016	1.33	15.72
ID = 3 (2301):	7.50	0.370	1.33	13.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301) |
| 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2301):	7.50	0.370	1.33	13.39
+ ID2= 2 (0310):	5.70	0.159	1.33	9.94
ID = 1 (2301):	13.20	0.529	1.33	11.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2302) |
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2100):	168.78	0.969	2.92	7.82
+ ID2= 2 (2301):	13.20	0.529	1.33	11.90
ID = 3 (2302):	181.98	1.046	2.83	8.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0400) |
ID= 1 DT= 5.0 min |

	Area (ha)=	Total Imp(%)=	Dir. Conn.(%)=
	82.86	10.00	3.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	8.29	74.57
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	0.70	2.00
Length (m)=	1437.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	53.90	10.84
over (min)	20.00	40.00
Storage Coeff. (min)=	18.02 (ii)	35.18 (ii)
Unit Hyd. Tpeak (min)=	20.00	40.00
Unit Hyd. peak (cms)=	0.06	0.03

			TOTALS
PEAK FLOW (cms)=	0.25	0.90	1.023 (iii)
TIME TO PEAK (hrs)=	1.58	2.08	2.00
RUNOFF VOLUME (mm)=	34.04	7.45	8.24
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.21	0.23

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2400)	264.84	1.94	2.08	8.15	0.72	1.12
OUTFLOW: ID= 1 (4400)	264.84	1.71	2.67	8.15	0.67	1.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Distance	Elevation	Manning	
0.00	411.10	0.0550	
27.30	410.20	0.0550	
77.50	409.10	0.0550	
96.60	409.10	0.0550	
115.80	408.90	0.0550	
124.80	409.10	0.0550	
131.00	408.90	0.0550 / 0.0350	Main Channel
133.60	408.00	0.0350	Main Channel
134.40	407.60	0.0350	Main Channel
135.00	407.50	0.0350	Main Channel
135.80	407.60	0.0350	Main Channel
136.50	408.00	0.0350	Main Channel
139.40	408.80	0.0350 / 0.0550	Main Channel
143.50	408.90	0.0550	
148.50	408.70	0.0550	
163.80	408.90	0.0550	
183.20	408.90	0.0550	
243.70	409.70	0.0550	
278.70	410.20	0.0550	
330.50	411.40	0.0550	

CALIB	Area (ha)=	90.75	Curve Number (CN)=	71.0
NASHYD (0510)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	1.70		

PEAK FLOW	(cms)=	0.466	(i)
TIME TO PEAK	(hrs)=	3.667	
RUNOFF VOLUME	(mm)=	7.148	
TOTAL RAINFALL	(mm)=	36.039	
RUNOFF COEFFICIENT	=	0.198	

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

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CALIB			
NASHYD (0516)	Area (ha)=	11.47	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
-----	U.H. Tp(hrs)=	0.56	

PEAK FLOW	(cms)=	0.124 (i)
TIME TO PEAK	(hrs)=	2.083
RUNOFF VOLUME	(mm)=	7.148
TOTAL RAINFALL	(mm)=	36.039
RUNOFF COEFFICIENT	=	0.198

```
| ROUTE CHN( 4516)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          414.20        0.0350      Main Channel
4.30          412.70        0.0350      Main Channel
8.60          414.20        0.0350      Main Channel

```

**** WARNING: INFLOW HYDROGRAPH IS DRY!!

TRAVEL TIME TABLE					
DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV. TIME (min)
0.08	412.78	.125E+02	0.0	0.27	43.74
0.16	412.86	.500E+02	0.0	0.42	27.55
0.24	412.94	.113E+03	0.1	0.55	21.03
0.32	413.02	.200E+03	0.2	0.67	17.36
0.39	413.09	.313E+03	0.3	0.78	14.96
0.47	413.17	.450E+03	0.6	0.88	13.25
0.55	413.25	.613E+03	0.9	0.98	11.95
0.63	413.33	.801E+03	1.2	1.07	10.93
0.71	413.41	.101E+04	1.7	1.15	10.11
0.79	413.49	.125E+04	2.2	1.24	9.42
0.87	413.57	.151E+04	2.9	1.32	8.84
0.95	413.65	.180E+04	3.6	1.40	8.34
1.03	413.73	.211E+04	4.5	1.47	7.91
1.11	413.81	.245E+04	5.4	1.55	7.53
1.18	413.88	.281E+04	6.5	1.62	7.19
1.26	413.96	.320E+04	7.7	1.69	6.89
1.34	414.04	.362E+04	9.1	1.76	6.62
1.42	414.12	.405E+04	10.6	1.83	6.37
1.50	414.20	.452E+04	12.3	1.90	6.14

	<---- hydrograph <---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW: ID= 2 (0516)	11.47	0.12	2.08	7.15	0.26	0.59
OUTFLOW: ID= 1 (4516)	11.47	0.11	2.42	7.13	0.25	0.57

ADD HYD (2510)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4516):	11.47	0.109	2.42	7.13
+ ID2= 2 (0511):	54.65	0.618	2.00	7.15
=====				
ID = 3 (2510):	66.12	0.711	2.08	7.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0517)				
ID= 1 DT= 5.0 min	Area	(ha)=	1.75	Curve Number (CN)= 71.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.32		

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.027 (i)
 TIME TO PEAK (hrs)= 1.750
 RUNOFF VOLUME (mm)= 7.145
 TOTAL RAINFALL (mm)= 36.039
 RUNOFF COEFFICIENT = 0.198

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

ADD HYD (2511)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2510):	66.12	0.711	2.08	7.14
+ ID2= 2 (4510):	90.75	0.466	3.67	7.15
=====				
ID = 3 (2511):	156.87	0.928	2.33	7.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2511)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2511):	156.87	0.928	2.33	7.15
+ ID2= 2 (0517):	1.75	0.027	1.75	7.15
=====				
ID = 1 (2511):	158.62	0.943	2.25	7.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0512)				
ID= 1 DT= 5.0 min	Area	(ha)=	31.10	Curve Number (CN)= 71.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.71		

Unit Hyd Qpeak (cms)= 1.673

PEAK FLOW (cms)= 0.288 (i)
 TIME TO PEAK (hrs)= 2.333

RUNOFF VOLUME (mm)= 7.148
 TOTAL RAINFALL (mm)= 36.039
 RUNOFF COEFFICIENT = 0.198

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

CALIB				
NASHYD (0514)				
ID= 1 DT= 5.0 min	Area	(ha)=	2.65	Curve Number (CN)= 65.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.60		

Unit Hyd Qpeak (cms)= 0.169

PEAK FLOW (cms)= 0.022 (i)
 TIME TO PEAK (hrs)= 2.167
 RUNOFF VOLUME (mm)= 5.741
 TOTAL RAINFALL (mm)= 36.039
 RUNOFF COEFFICIENT = 0.159

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

CALIB				
NASHYD (0515)				
ID= 1 DT= 5.0 min	Area	(ha)=	5.41	Curve Number (CN)= 65.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.41		

Unit Hyd Qpeak (cms)= 0.504

PEAK FLOW (cms)= 0.056 (i)
 TIME TO PEAK (hrs)= 1.917
 RUNOFF VOLUME (mm)= 5.740
 TOTAL RAINFALL (mm)= 36.039
 RUNOFF COEFFICIENT = 0.159

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

CALIB				
NASHYD (0513)				
ID= 1 DT= 5.0 min	Area	(ha)=	6.68	Curve Number (CN)= 71.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.20		

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.134 (i)
 TIME TO PEAK (hrs)= 1.583
 RUNOFF VOLUME (mm)= 7.134
 TOTAL RAINFALL (mm)= 36.039
 RUNOFF COEFFICIENT = 0.198

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

ADD HYD (2512)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)

```
ID1= 1 ( 2511): 158.62 0.943 2.25 7.15
+ ID2= 2 ( 0512): 31.10 0.288 2.33 7.15
=====
ID = 3 ( 2512): 189.72 1.231 2.33 7.15
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 2512) |
| 3 + 2 = 1 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 2512): 189.72 1.231 2.33 7.15
+ ID2= 2 ( 0513): 6.68 0.134 1.58 7.13
=====
ID = 1 ( 2512): 196.40 1.276 2.25 7.15
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 2512) |
| 1 + 2 = 3 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2512): 196.40 1.276 2.25 7.15
+ ID2= 2 ( 0514): 2.65 0.022 2.17 5.74
=====
ID = 3 ( 2512): 199.05 1.297 2.25 7.13
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 2512) |
| 3 + 2 = 1 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 2512): 199.05 1.297 2.25 7.13
+ ID2= 2 ( 0515): 5.41 0.056 1.92 5.74
=====
ID = 1 ( 2512): 204.46 1.343 2.25 7.09
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 2513) |
| 1 + 2 = 3 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2512): 204.46 1.343 2.25 7.09
+ ID2= 2 ( 4400): 264.84 1.711 2.67 8.15
=====
ID = 3 ( 2513): 469.30 2.986 2.50 7.69
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB
| NASHYD ( 0520) | Area (ha)= 108.36 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 1.20
```

Unit Hyd Qpeak (cms)= 3.449

```
PEAK FLOW (cms)= 0.706 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 7.148
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.198
```

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

```
| ADD HYD ( 2520) |
| 1 + 2 = 3 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2513): 469.30 2.986 2.50 7.69
+ ID2= 2 ( 0520): 108.36 0.706 3.00 7.15
=====
ID = 3 ( 2520): 577.66 3.630 2.58 7.59
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN( 4500) |
| IN= 2--> OUT= 1 | Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 /0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 /0.0550 Main Channel
109.70 404.30 0.0550
128.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
0.68 403.38 .304E+04 1.6 1.03 32.27
1.02 403.72 .718E+04 4.5 1.25 26.57
1.36 404.06 .122E+05 9.7 1.58 20.96
1.70 404.40 .251E+05 18.1 1.44 23.04
2.08 404.78 .650E+05 42.3 1.29 25.62
2.46 405.16 .122E+06 86.3 1.40 23.62
2.84 405.54 .192E+06 151.6 1.57 21.10
3.21 405.91 .270E+06 238.3 1.75 18.90
3.59 406.29 .357E+06 345.8 1.93 17.20
3.97 406.67 .452E+06 474.9 2.09 15.85
4.35 407.05 .554E+06 631.1 2.26 14.63
```

4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	2520)	577.66	3.63	2.58	7.59	0.92	1.17
OUTFLOW: ID= 1 (	4500)	577.66	3.34	3.17	7.59	0.88	1.15

CALIB				
NASHYD (0625)	Area (ha)=	6.72	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.39		

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW	(cms)=	0.088 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	6.886
TOTAL RAINFALL	(mm)=	36.039
RUNOFF COEFFICIENT	=	0.191

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

ROUTE CHN(4625)	
IN= 2--> OUT= 1	Routing time step (min)'= 5.00

Distance	Elevation	Manning	
0.00	414.20	0.0360	Main Channel
4.30	412.70	0.0360	Main Channel
8.60	414.20	0.0360	Main Channel

<----- DATA FOR SECTION (1.1) ----->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.108E+02	0.0	0.24	42.13
0.16	412.86	.434E+02	0.0	0.38	26.54
0.24	412.94	.976E+02	0.1	0.50	20.26
0.32	413.02	.174E+03	0.2	0.61	16.72
0.39	413.09	.271E+03	0.3	0.70	14.41
0.47	413.17	.390E+03	0.5	0.79	12.76
0.55	413.25	.532E+03	0.8	0.88	11.51
0.63	413.33	.694E+03	1.1	0.96	10.53
0.71	413.41	.879E+03	1.5	1.04	9.74
0.79	413.49	.108E+04	2.0	1.11	9.08
0.87	413.57	.131E+04	2.6	1.19	8.52
0.95	413.65	.156E+04	3.2	1.26	8.04
1.03	413.73	.183E+04	4.0	1.33	7.62
1.11	413.81	.213E+04	4.9	1.39	7.25
1.18	413.88	.244E+04	5.9	1.46	6.93
1.26	413.96	.278E+04	7.0	1.52	6.64
1.34	414.04	.313E+04	8.2	1.59	6.37
1.42	414.12	.351E+04	9.5	1.65	6.13
1.50	414.20	.392E+04	11.0	1.71	5.92

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0625)	6.72	0.09	1.83	6.89	0.24	0.51
OUTFLOW: ID= 1 (4625)	6.72	0.07	2.17	6.85	0.22	0.47

CALIB				
NASHYD (0622)	Area (ha)=	9.69	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00

----- U.H. Tp(hrs)= 0.36

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW (cms)= 0.133 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 6.885
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

| CALIB |
| STANDHYD (0626) | Area (ha)= 1.06
| ID= 1 DT= 5.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.64	0.42
Dep. Storage (mm)=	1.00	10.00
Average Slope (%)=	1.00	2.00
Length (m)=	84.06	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	106.90	10.78
over (min)	5.00	20.00
Storage Coeff. (min)=	2.24 (ii)	19.44 (ii)
Unit Hyd. Tpeak (min)=	5.00	20.00
Unit Hyd. peak (cms)=	0.30	0.06

			TOTALS
PEAK FLOW (cms)=	0.15	0.01	0.147 (iii)
TIME TO PEAK (hrs)=	1.33	1.75	1.33
RUNOFF VOLUME (mm)=	35.04	6.83	20.92
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.97	0.19	0.58

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| NASHYD (0621) | Area (ha)= 6.56 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.37

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.089 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 6.885
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

| CALIB |
| NASHYD (0624) | Area (ha)= 11.84 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.51

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 0.131 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

| ADD HYD (2621) |
| 1 + 2 = 3 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)

ID1= 1 (4625): 6.72 0.071 2.17 6.85
+ ID2= 2 (0621): 6.56 0.089 1.83 6.89
=====

ID = 3 (2621): 13.28 0.149 2.00 6.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2621) |
| 3 + 2 = 1 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)

ID1= 3 (2621): 13.28 0.149 2.00 6.87
+ ID2= 2 (0622): 9.69 0.133 1.83 6.89
=====

ID = 1 (2621): 22.97 0.276 1.92 6.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2621) |
| 1 + 2 = 3 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)

ID1= 1 (2621): 22.97 0.276 1.92 6.88
+ ID2= 2 (0623): 19.37 0.231 1.92 6.89
=====

ID = 3 (2621): 42.34 0.507 1.92 6.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2621) |
| 3 + 2 = 1 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)

ID1= 3 (2621): 42.34 0.507 1.92 6.88
+ ID2= 2 (0624): 11.84 0.131 2.00 6.89
=====

ID = 1 (2621): 54.18 0.635 1.92 6.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
1 + 2 = 3				

ID1= 1 (2621):	Area (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (0626):	54.18	0.635	1.92	6.88
=====				
ID = 3 (2621):	55.24	0.654	1.92	7.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0627)				
ID= 1 DT= 5.0 min				

Area (ha)=	6.68	Curve Number (CN)=	70.0	
Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
U.H. Tp(hrs)=	0.20			

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.129 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 6.874
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

CALIB				
NASHYD (6200)	Area (ha)=	6.66	Curve Number (CN)=	74.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
-----	U.H. Tp(hrs)=	0.28		

Unit Hyd Qpeak (cms)= 0.908

PEAK FLOW (cms)= 0.125 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 8.006
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.222

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

CALIB				
NASHYD (6201)		Area (ha)=	0.82	Curve Number (CN)= 74.0
ID= 1 DT= 5.0 min		Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
-----		U.H. Tp(hrs)=	0.15	

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.022 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 7.963
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.221

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

ADD HYD (0113)				
1 + 2 = 3				

ID1= 1 (6200):	Area (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (6201):	6.66	0.125	1.67	8.01
=====				
ID = 3 (0113):	7.48	0.141	1.67	8.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4620)				
IN= 2---> OUT= 1				

Routing time step (min)'= 5.00				

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.456E+01	0.0	0.55	7.70
0.16	412.86	.182E+02	0.1	0.88	4.85
0.24	412.94	.410E+02	0.2	1.15	3.70
0.32	413.02	.729E+02	0.4	1.39	3.05
0.39	413.09	.114E+03	0.7	1.61	2.63
0.47	413.17	.164E+03	1.2	1.82	2.33
0.55	413.25	.223E+03	1.8	2.02	2.10
0.63	413.33	.292E+03	2.5	2.21	1.92
0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

<---- hydrograph ---->				<-pipe / channel->		
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0113)	7.48	0.14	1.67	8.00	0.21	1.03
OUTFLOW: ID= 1 (4620)	7.48	0.14	1.75	8.00	0.21	1.03

ADD HYD (2620)				
1 + 2 = 3				

ID1= 1 (4620):	Area (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (0627):	7.48	0.139	1.75	8.00
=====				
	6.68	0.129	1.58	6.87

=====

ID = 3 (2620):	14.16	0.259	1.67	7.47
-----------------	-------	-------	------	------

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2622)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2620):	14.16	0.259	1.67	7.47
+ ID2= 2 (2621):	55.24	0.654	1.92	7.15
=====				
ID = 3 (2622):	69.40	0.864	1.83	7.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2623)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2610):	655.71	3.882	3.08	7.54
+ ID2= 2 (2622):	69.40	0.864	1.83	7.22
=====				
ID = 3 (2623):	725.11	4.217	3.00	7.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0637)		Area (ha)=	8.36	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min		Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
		U.H. Tp(hrs)=	0.47	

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 0.097 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

CALIB				
NASHYD (0630)		Area (ha)=	33.04	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min		Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
		U.H. Tp(hrs)=	0.38	

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 0.439 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

ROUTE CHN(4630)		
IN= 2--> OUT= 1		Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

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

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

<---- hydrograph ----> <-pipe / channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0630)	33.04	0.44	1.83	6.89	0.50	0.60
OUTFLOW: ID= 1 (4630)	33.04	0.38	2.08	6.88	0.48	0.58

ADD HYD (2637)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2623):	725.11	4.217	3.00	7.51
+ ID2= 2 (4630):	33.04	0.384	2.08	6.88
=====				
ID = 3 (2637):	758.15	4.414	2.92	7.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2637):	758.15	4.414	2.92	7.48
+ ID2= 2 (0637):	8.36	0.097	2.00	6.89
=====				
ID = 1 (2637):	766.51	4.461	2.83	7.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0636) |
| ID= 1 DT= 5.0 min |
|-----|
Area (ha)= 3.32 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.48
```

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.038 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

```
-----
| ADD HYD ( 2636) |
| 1 + 2 = 3 |
|-----|
Area QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2637): 766.51 4.461 2.83 7.47
+ ID2= 2 ( 0636): 3.32 0.038 2.00 6.89
=====
ID = 3 ( 2636): 769.83 4.482 2.83 7.47
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0639) |
| ID= 1 DT= 5.0 min |
|-----|
Area (ha)= 4.60 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.43
```

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.057 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

```
-----
| CALIB
| NASHYD ( 0638) |
| ID= 1 DT= 5.0 min |
|-----|
Area (ha)= 20.63 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.46
```

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 0.243 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

```
-----
| ADD HYD ( 2630) |
| 1 + 2 = 3 |
|-----|
Area QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2636): 769.83 4.482 2.83 7.47
+ ID2= 2 ( 0638): 20.63 0.243 1.92 6.89
=====
ID = 3 ( 2630): 790.46 4.605 2.83 7.45
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2630) |
| 3 + 2 = 1 |
|-----|
Area QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 2630): 790.46 4.605 2.83 7.45
+ ID2= 2 ( 0639): 4.60 0.057 1.92 6.89
=====
ID = 1 ( 2630): 795.06 4.631 2.83 7.45
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

```
=====
** SIMULATION : 5 year Fergus Shand Dam Chica **
=====
```

```
-----
| CHICAGO STORM
| Ptotal= 51.35 mm |
|-----|
IDF curve parameters: A=1436.000
B= 11.000
C= 0.854
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33
```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	2.55	1.00	15.63	2.00	9.04	3.00	3.62
0.08	2.73	1.08	25.44	2.08	8.05	3.08	3.45
0.17	2.95	1.17	57.17	2.17	7.25	3.17	3.29
0.25	3.21	1.25	134.65	2.25	6.59	3.25	3.15
0.33	3.53	1.33	71.87	2.33	6.04	3.33	3.02
0.42	3.91	1.42	42.53	2.42	5.57	3.42	2.90
0.50	4.38	1.50	29.16	2.50	5.17	3.50	2.79
0.58	4.99	1.58	21.78	2.58	4.83	3.58	2.69
0.67	5.80	1.67	17.20	2.67	4.52	3.67	2.59
0.75	6.91	1.75	14.12	2.75	4.26	3.75	2.51
0.83	8.53	1.83	11.92	2.83	4.02	3.83	2.42
0.92	11.09	1.92	10.29	2.92	3.81	3.92	2.35

CALIB
NASHYD (0100)
ID= 1 DT= 5.0 min
Area (ha)= 136.98
Ia (mm)= 5.00
U.H. Tp(hrs)= 1.17
Curve Number (CN)= 69.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 1.783 (i)
TIME TO PEAK (hrs)= 2.917
RUNOFF VOLUME (mm)= 13.390
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.261

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

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min
Area (ha)= 14.60
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.97
Curve Number (CN)= 74.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.296 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 17.868
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.348

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

CALIB
STANDHYD (0203)
ID= 1 DT= 5.0 min
Area (ha)= 8.20
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.69 4.51
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 134.65 48.29
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.93 (ii) 9.24 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

TOTALS
PEAK FLOW (cms)= 0.76 0.40 0.950 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 49.35 18.37 26.12
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.96 0.36 0.51

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0201): 14.60 0.296 2.58 17.87
+ ID2= 2 (0203): 8.20 0.950 1.33 26.12
=====

ID = 3 (2200): 22.80 0.962 1.33 20.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)
IN= 2--> OUT= 1
DT= 5.0 min
OVERFLOW IS OFF
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
0.0000 0.0000 0.1980 0.2314
0.0040 0.0218 0.2920 0.2621
0.0060 0.0446 0.3980 0.2937
0.0070 0.0683 0.5150 0.3261
0.0080 0.0930 0.8290 0.3592
0.0090 0.1187 1.3520 0.3930
0.0230 0.1453 2.0570 0.4275
0.0610 0.1730 2.9590 0.4629
0.1200 0.2017 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2200) 22.800 0.962 1.33 20.84
OUTFLOW: ID= 1 (5200) 22.800 0.276 3.42 20.77

PEAK FLOW REDUCTION [Qout/Qin](%)= 28.67
TIME SHIFT OF PEAK FLOW (min)=125.00
MAXIMUM STORAGE USED (ha.m.)= 0.2568

CALIB
NASHYD (0205)
ID= 1 DT= 5.0 min
Area (ha)= 4.80
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.41
Curve Number (CN)= 90.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.335 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 31.830
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.620

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

CALIB
STANDHYD (0206)
ID= 1 DT= 5.0 min
Area (ha)= 0.20
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.43	2.27
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.20	1.20
Length	(m)=	35.00	35.00

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
-----	(ha)	(cms)	(hrs)	(mm)

ID1= 1 (0207):	1.30	0.151	1.33	26.11
+ ID2= 2 (0209):	2.70	0.126	1.58	18.18
=====				
ID = 3 (2202):	4.00	0.258	1.33	20.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2202):	4.00	0.258	1.33	20.76
+ ID2= 2 (2201):	27.80	0.379	1.92	22.72
=====				
ID = 1 (2202):	31.80	0.519	1.75	22.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2100)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0100):	136.98	1.783	2.92	13.39
+ ID2= 2 (2202):	31.80	0.519	1.75	22.47
=====				
ID = 3 (2100):	168.78	2.159	2.83	15.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0302)			
ID= 1 DT= 5.0 min	Area (ha)=	2.90	Curve Number (CN)= 74.0
	Ia (mm)=	1.50	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.45	

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW	(cms)=	0.100 (i)
TIME TO PEAK	(hrs)=	1.917
RUNOFF VOLUME	(mm)=	17.867
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.348

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

CALIB			
STANDHYD (0304)			
ID= 1 DT= 5.0 min	Area (ha)=	4.40	
	Total Imp(%)=	45.00	Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.98	2.42
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	134.65	48.29
over (min)	5.00	10.00
Storage Coeff. (min)=	0.99 (ii)	9.76 (ii)

Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.11
PEAK FLOW (cms)=	0.41	0.21
TIME TO PEAK (hrs)=	1.33	1.50
RUNOFF VOLUME (mm)=	49.35	18.37
TOTAL RAINFALL (mm)=	51.35	51.35
RUNOFF COEFFICIENT =	0.96	0.36

TOTALS
0.506 (iii)
1.33
26.12
51.35
0.51

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0302):	2.90	0.100	1.92	17.87
+ ID2= 2 (0304):	4.40	0.506	1.33	26.12
=====				
ID = 3 (2300):	7.30	0.520	1.33	22.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0308)			
ID= 1 DT= 5.0 min	Area (ha)=	0.20	
	Total Imp(%)=	45.00	Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	134.65	48.29
over (min)	5.00	10.00
Storage Coeff. (min)=	0.99 (ii)	9.76 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.11

TOTALS
0.023 (iii)
1.33
26.09
51.35
0.51

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0310) |
| ID= 1 DT= 5.0 min |
-----

```

```

Area (ha)= 5.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 134.65 31.72
over (min)= 5.00 15.00
Storage Coeff. (min)= 0.93 (ii) 10.76 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.34 0.09

```

```

*TOTALS*
PEAK FLOW (cms)= 0.17 0.25 0.292 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.50
RUNOFF VOLUME (mm)= 49.35 15.47 18.18
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.96 0.30 0.35

```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. 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 ( 2301) |
| 1 + 2 = 3 |
-----
Area QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2300): 7.30 0.520 1.33 22.84
+ ID2= 2 ( 0308): 0.20 0.023 1.33 26.09
=====
ID = 3 ( 2301): 7.50 0.543 1.33 22.93

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2301) |
| 3 + 2 = 1 |
-----
Area QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 2301): 7.50 0.543 1.33 22.93
+ ID2= 2 ( 0310): 5.70 0.292 1.50 18.18
=====
ID = 1 ( 2301): 13.20 0.781 1.33 20.88

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2302) |
| 1 + 2 = 3 |
-----
Area QPEAK TPEAK R.V.

```

```

-----
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2100): 168.78 2.159 2.83 15.10
+ ID2= 2 ( 2301): 13.20 0.781 1.33 20.88
=====
ID = 3 ( 2302): 181.98 2.289 2.75 15.52

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0400) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 82.86
Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 87.90 25.58
over (min)= 15.00 30.00
Storage Coeff. (min)= 14.81 (ii) 26.99 (ii)
Unit Hyd. Tpeak (min)= 15.00 30.00
Unit Hyd. peak (cms)= 0.08 0.04

```

```

*TOTALS*
PEAK FLOW (cms)= 0.40 2.26 2.496 (iii)
TIME TO PEAK (hrs)= 1.50 1.92 1.83
RUNOFF VOLUME (mm)= 49.35 14.77 15.81
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.96 0.29 0.31

```

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
 YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 70.0 Ia = Dep. 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 ( 2400) |
| 1 + 2 = 3 |
-----
Area QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2302): 181.98 2.289 2.75 15.52
+ ID2= 2 ( 0400): 82.86 2.496 1.83 15.81
=====
ID = 3 ( 2400): 264.84 4.237 1.92 15.61

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 4400) |
| IN= 2---> OUT= 1 |
-----
Routing time step (min)'= 5.00

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550

```

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

[illegible]

TRAVEL TIME TABLE					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN

TRAVEL TIME TABLE						
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)	
0.19	407.69	.366E+03	0.1	0.51	58.83	
0.37	407.87	.106E+04	0.5	0.81	37.08	
0.56	408.06	.199E+04	1.1	1.00	29.93	
0.74	408.24	.328E+04	2.1	1.14	26.32	
0.93	408.43	.498E+04	3.6	1.28	23.32	
1.11	408.61	.708E+04	5.6	1.43	20.94	
1.30	408.80	.105E+05	8.5	1.45	20.61	
1.49	408.99	.247E+05	14.8	1.07	27.91	
1.68	409.18	.601E+05	30.4	0.91	32.97	
1.87	409.37	.109E+06	58.5	0.96	31.05	
2.06	409.56	.166E+06	98.3	1.06	28.11	
2.25	409.75	.231E+06	150.3	1.17	25.57	
2.44	409.94	.303E+06	215.4	1.28	23.46	
2.64	410.14	.383E+06	293.8	1.38	21.74	
2.83	410.33	.470E+06	390.1	1.49	20.10	
3.02	410.52	.563E+06	502.4	1.60	18.66	
3.21	410.71	.660E+06	628.8	1.71	17.48	
3.40	410.90	.762E+06	769.5	1.81	16.49	
3.59	411.09	.868E+06	924.9	1.91	15.65	

<---- hydrograph ---->				<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2400)	264.84	4.24	1.92	15.61	0.99
OUTFLOW: ID= 1 (4400)	264.84	3.72	2.42	15.61	0.94

CALIB	Area (ha)=	90.75	Curve Number (CN)=	71.0
NASHYD (0510)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	1.70		

```
Unit Hyd Qpeak (cms)= 2.039
PEAK FLOW (cms)= 0.961 (i)
TIME TO PEAK (hrs)= 3.583
RUNOFF VOLUME (mm)= 14.315
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.279
```


-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN

**** WARNING: INFLOW HYDROGRAPH IS DRY!!

```
-----
| CALIB
| NASHYD ( 0511)|
| ID= 1 DT= 5.0 min|
|-----|
Unit Hyd Qpeak (cms)= 4.014

PEAK FLOW (cms)= 1.340 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 14.315
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.279

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

```
-----
| CALIB
| NASHYD ( 0516)|
| ID= 1 DT= 5.0 min|
|-----|
Unit Hyd Qpeak (cms)= 0.782

PEAK FLOW (cms)= 0.268 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 14.315
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.279

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

```
-----
| ROUTE CHN( 4516)|
| IN= 2--> OUT= 1|
|-----|
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel
```

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.125E+02	0.0	0.27	43.74
0.16	412.86	.500E+02	0.0	0.42	27.55
0.24	412.94	.113E+03	0.1	0.55	21.03
0.32	413.02	.200E+03	0.2	0.67	17.36
0.39	413.09	.313E+03	0.3	0.78	14.96
0.47	413.17	.450E+03	0.6	0.88	13.25
0.55	413.25	.613E+03	0.9	0.98	11.95
0.63	413.33	.801E+03	1.2	1.07	10.93
0.71	413.41	.101E+04	1.7	1.15	10.11
0.79	413.49	.125E+04	2.2	1.24	9.42
0.87	413.57	.151E+04	2.9	1.32	8.84
0.95	413.65	.180E+04	3.6	1.40	8.34
1.03	413.73	.211E+04	4.5	1.47	7.91
1.11	413.81	.245E+04	5.4	1.55	7.53
1.18	413.88	.281E+04	6.5	1.62	7.19
1.26	413.96	.320E+04	7.7	1.69	6.89
1.34	414.04	.362E+04	9.1	1.76	6.62
1.42	414.12	.405E+04	10.6	1.83	6.37
1.50	414.20	.452E+04	12.3	1.90	6.14

<--- hydrograph --->				<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0516)	11.47	0.27	2.08	14.31	0.35
OUTFLOW: ID= 1 (4516)	11.47	0.24	2.33	14.29	0.70

```
-----
| ADD HYD ( 2510)|
| 1 + 2 = 3 |
|-----|
ID1= 1 ( 4516): 11.47 0.243 2.33 14.29
+ ID2= 2 ( 0511): 54.65 1.340 2.00 14.31
=====
ID = 3 ( 2510): 66.12 1.553 2.08 14.31
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0517)|
| ID= 1 DT= 5.0 min|
|-----|
Unit Hyd Qpeak (cms)= 0.209
```

```
-----
| CALIB
| NASHYD ( 0517)|
| ID= 1 DT= 5.0 min|
|-----|
Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.058 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 14.311
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.279
```

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

ADD HYD (2511)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2510):	66.12	1.553	2.08	14.31
+ ID2= 2 (4510):	90.75	0.961	3.58	14.32
=====				
ID = 3 (2511):	156.87	2.005	2.25	14.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2511)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2511):	156.87	2.005	2.25	14.31
+ ID2= 2 (0517):	1.75	0.058	1.75	14.31
=====				
ID = 1 (2511):	158.62	2.039	2.25	14.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0512)				
ID= 1 DT= 5.0 min	Area	(ha)=	31.10	Curve Number (CN)= 71.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=		0.71	

Unit Hyd Qpeak (cms)= 1.673

PEAK FLOW (cms)= 0.619 (i)
 TIME TO PEAK (hrs)= 2.250
 RUNOFF VOLUME (mm)= 14.315
 TOTAL RAINFALL (mm)= 51.355
 RUNOFF COEFFICIENT = 0.279

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

CALIB				
NASHYD (0514)				
ID= 1 DT= 5.0 min	Area	(ha)=	2.65	Curve Number (CN)= 65.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=		0.60	

Unit Hyd Qpeak (cms)= 0.169

PEAK FLOW (cms)= 0.048 (i)
 TIME TO PEAK (hrs)= 2.167
 RUNOFF VOLUME (mm)= 11.733
 TOTAL RAINFALL (mm)= 51.355
 RUNOFF COEFFICIENT = 0.228

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

CALIB				
NASHYD (0515)				
ID= 1 DT= 5.0 min	Area	(ha)=	5.41	Curve Number (CN)= 65.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=		0.41	

Unit Hyd Qpeak (cms)= 0.504

PEAK FLOW (cms)= 0.125 (i)
 TIME TO PEAK (hrs)= 1.917
 RUNOFF VOLUME (mm)= 11.732
 TOTAL RAINFALL (mm)= 51.355
 RUNOFF COEFFICIENT = 0.228

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

CALIB				
NASHYD (0513)				
ID= 1 DT= 5.0 min	Area	(ha)=	6.68	Curve Number (CN)= 71.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=		0.20	

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.288 (i)
 TIME TO PEAK (hrs)= 1.583
 RUNOFF VOLUME (mm)= 14.288
 TOTAL RAINFALL (mm)= 51.355
 RUNOFF COEFFICIENT = 0.278

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

ADD HYD (2512)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2511):	158.62	2.039	2.25	14.31
+ ID2= 2 (0512):	31.10	0.619	2.25	14.32
=====				
ID = 3 (2512):	189.72	2.658	2.25	14.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2512):	189.72	2.658	2.25	14.31
+ ID2= 2 (0513):	6.68	0.288	1.58	14.29
=====				
ID = 1 (2512):	196.40	2.749	2.25	14.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2512):	196.40	2.749	2.25	14.31
+ ID2= 2 (0514):	2.65	0.048	2.17	11.73
=====				
ID = 3 (2512):	199.05	2.796	2.25	14.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2512):	199.05	2.796	2.25	14.28
+ ID2= 2 (0515):	5.41	0.125	1.92	11.73
=====				
ID = 1 (2512):	204.46	2.902	2.17	14.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2513)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2512):	204.46	2.902	2.17	14.21
+ ID2= 2 (4400):	264.84	3.723	2.42	15.61
=====				
ID = 3 (2513):	469.30	6.565	2.33	15.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0520)				
ID= 1 DT= 5.0 min				
	Area	(ha)=	108.36	Curve Number (CN)= 71.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.20		

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 1.486 (i)
 TIME TO PEAK (hrs)= 2.917
 RUNOFF VOLUME (mm)= 14.315
 TOTAL RAINFALL (mm)= 51.355
 RUNOFF COEFFICIENT = 0.279

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

ADD HYD (2520)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2513):	469.30	6.565	2.33	15.00
+ ID2= 2 (0520):	108.36	1.486	2.92	14.32
=====				
ID = 3 (2520):	577.66	7.835	2.42	14.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4500)				
IN= 2---> OUT= 1				
	Routing time step (min)'= 5.00			

<----- DATA FOR SECTION (1.1) ----->		
Distance	Elevation	Manning
0.00	409.70	0.0550
19.70	408.80	0.0550
41.70	407.20	0.0550

60.50	405.30	0.0550	
80.00	404.50	0.0550	
95.70	404.60	0.0550 /0.0350	Main Channel
98.60	403.40	0.0350	Main Channel
100.40	403.40	0.0350	Main Channel
100.80	402.90	0.0350	Main Channel
101.50	402.70	0.0350	Main Channel
102.30	402.80	0.0350	Main Channel
103.30	403.20	0.0350	Main Channel
104.00	403.20	0.0350	Main Channel
105.60	404.40	0.0350 /0.0550	Main Channel
109.70	404.30	0.0550	
128.60	404.20	0.0550	
154.10	405.40	0.0550	
179.10	406.70	0.0550	
201.90	408.60	0.0550	
224.20	410.60	0.0550	

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.34	403.04	.954E+03	0.3	0.70	47.40
0.68	403.38	.304E+04	1.6	1.03	32.27
1.02	403.72	.718E+04	4.5	1.25	26.57
1.36	404.06	.122E+05	9.7	1.58	20.96
1.70	404.40	.251E+05	18.1	1.44	23.04
2.08	404.78	.650E+05	42.3	1.29	25.62
2.46	405.16	.122E+06	86.3	1.40	23.62
2.84	405.54	.192E+06	151.6	1.57	21.10
3.21	405.91	.270E+06	238.3	1.75	18.90
3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

		<---- hydrograph ---->				<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2520)	577.66	7.84	2.42	14.87		1.24	1.44
OUTFLOW: ID= 1 (4500)	577.66	7.28	2.83	14.87		1.20	1.40

CALIB				
NASHYD (0610)				
ID= 1 DT= 5.0 min				
	Area	(ha)=	78.05	Curve Number (CN)= 71.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.00		

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 1.221 (i)
 TIME TO PEAK (hrs)= 2.667
 RUNOFF VOLUME (mm)= 14.315
 TOTAL RAINFALL (mm)= 51.355
 RUNOFF COEFFICIENT = 0.279

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

```
-----
| ADD HYD ( 2610) |
| 1 + 2 = 3       |
|-----|
| ID1= 1 ( 4500): 577.66 7.279 2.83 14.87 |
| + ID2= 2 ( 0610): 78.05 1.221 2.67 14.32 |
|=====|
| ID = 3 ( 2610): 655.71 8.482 2.83 14.81 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0623) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 19.37 |
| Ia (mm)= 5.00 |
| U.H. Tp(hrs)= 0.45 |
| Curve Number (CN)= 70.0 |
| # of Linear Res.(N)= 3.00 |
|-----|
```

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW (cms)= 0.504 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 13.843
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

```
-----
| CALIB |
| NASHYD ( 0625) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 6.72 |
| Ia (mm)= 5.00 |
| U.H. Tp(hrs)= 0.39 |
| Curve Number (CN)= 70.0 |
| # of Linear Res.(N)= 3.00 |
|-----|
```

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW (cms)= 0.191 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 13.842
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

```
-----
| ROUTE CHN( 4625) |
| IN= 2--> OUT= 1 |
|-----|
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          414.20          0.0360    Main Channel
4.30          412.70          0.0360    Main Channel
8.60          414.20          0.0360    Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH      ELEV      VOLUME      FLOW RATE      VELOCITY      TRAV.TIME
(m)         (m)      (cu.m.)      (cms)      (m/s)      (min)
```

```
0.08 412.78 .108E+02 0.0 0.24 42.13
0.16 412.86 .434E+02 0.0 0.38 26.54
0.24 412.94 .976E+02 0.1 0.50 20.26
0.32 413.02 .174E+03 0.2 0.61 16.72
0.39 413.09 .271E+03 0.3 0.70 14.41
0.47 413.17 .390E+03 0.5 0.79 12.76
0.55 413.25 .532E+03 0.8 0.88 11.51
0.63 413.33 .694E+03 1.1 0.96 10.53
0.71 413.41 .879E+03 1.5 1.04 9.74
0.79 413.49 .108E+04 2.0 1.11 9.08
0.87 413.57 .131E+04 2.6 1.19 8.52
0.95 413.65 .156E+04 3.2 1.26 8.04
1.03 413.73 .183E+04 4.0 1.33 7.62
1.11 413.81 .213E+04 4.9 1.39 7.25
1.18 413.88 .244E+04 5.9 1.46 6.93
1.26 413.96 .278E+04 7.0 1.52 6.64
1.34 414.04 .313E+04 8.2 1.59 6.37
1.42 414.12 .351E+04 9.5 1.65 6.13
1.50 414.20 .392E+04 11.0 1.71 5.92
```

```
<--- hydrograph ---> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 0625) 6.72 0.19 1.83 13.84 0.33 0.62
OUTFLOW: ID= 1 ( 4625) 6.72 0.16 2.08 13.81 0.31 0.59
```

```
-----
| CALIB |
| NASHYD ( 0622) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 9.69 |
| Ia (mm)= 5.00 |
| U.H. Tp(hrs)= 0.36 |
| Curve Number (CN)= 70.0 |
| # of Linear Res.(N)= 3.00 |
|-----|
```

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW (cms)= 0.289 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 13.841
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

```
-----
| CALIB |
| NASHYD ( 0621) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 6.56 |
| Ia (mm)= 5.00 |
| U.H. Tp(hrs)= 0.37 |
| Curve Number (CN)= 70.0 |
| # of Linear Res.(N)= 3.00 |
|-----|
```

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.193 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 13.842
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

CALIB			
NASHYD (0624)	Area (ha)= 11.84	Curve Number (CN)= 70.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.51		

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 0.284 (i)
 TIME TO PEAK (hrs)= 2.000
 RUNOFF VOLUME (mm)= 13.843
 TOTAL RAINFALL (mm)= 51.355
 RUNOFF COEFFICIENT = 0.270

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

CALIB			
STANDHYD (0626)	Area (ha)= 1.06	Dir. Conn.(%)= 50.00	
ID= 1 DT= 5.0 min	Total Imp(%)= 60.00		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.64	0.42
Dep. Storage (mm)=	1.00	10.00
Average Slope (%)=	1.00	2.00
Length (m)=	84.06	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	134.65	28.38
over (min)	5.00	15.00
Storage Coeff. (min)=	2.04 (ii)	13.72 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.31	0.08

TOTALS

PEAK FLOW (cms)=	0.19	0.02	0.192 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	50.35	14.41	32.37
TOTAL RAINFALL (mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT =	0.98	0.28	0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 70.0 Ia = Dep. 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 (2621)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (4625):	6.72	0.163	2.08	13.81
+ ID2= 2 (0621):	6.56	0.193	1.83	13.84
ID = 3 (2621):	13.28	0.336	2.00	13.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2621):	13.28	0.336	2.00	13.83
+ ID2= 2 (0622):	9.69	0.289	1.83	13.84
ID = 1 (2621):	22.97	0.616	1.92	13.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2621):	22.97	0.616	1.92	13.83
+ ID2= 2 (0623):	19.37	0.504	1.92	13.84
ID = 3 (2621):	42.34	1.119	1.92	13.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2621):	42.34	1.119	1.92	13.84
+ ID2= 2 (0624):	11.84	0.284	2.00	13.84
ID = 1 (2621):	54.18	1.398	1.92	13.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2621):	54.18	1.398	1.92	13.84
+ ID2= 2 (0626):	1.06	0.192	1.33	32.37
ID = 3 (2621):	55.24	1.430	1.92	14.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0627)	Area (ha)= 9.39	Curve Number (CN)= 70.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.20		

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.391 (i)
 TIME TO PEAK (hrs)= 1.583
 RUNOFF VOLUME (mm)= 13.818
 TOTAL RAINFALL (mm)= 51.355
 RUNOFF COEFFICIENT = 0.269

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


```
-----
| CALIB |
| NASHYD ( 6200) |
| ID= 1 DT= 5.0 min |
|-----|
Area (ha)= 6.66 Curve Number (CN)= 74.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.28

Unit Hyd Qpeak (cms)= 0.908

PEAK FLOW (cms)= 0.267 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 15.838
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.308

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

```
-----
| CALIB |
| NASHYD ( 6201) |
| ID= 1 DT= 5.0 min |
|-----|
Area (ha)= 0.82 Curve Number (CN)= 74.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.15

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.046 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 15.755
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.307

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

```
-----
| ADD HYD ( 0113) |
| 1 + 2 = 3 |
|-----|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID1= 1 ( 6200): 6.66 0.267 1.67 15.84
+ ID2= 2 ( 6201): 0.82 0.046 1.50 15.75
=====
ID = 3 ( 0113): 7.48 0.303 1.67 15.83

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

```
-----
| ROUTE CHN( 4620) |
| IN= 2---> OUT= 1 |
|-----|
Routing time step (min)'= 5.00

<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
-----
```

0.32	413.02	.729E+02	0.4	1.39	3.05
0.39	413.09	.114E+03	0.7	1.61	2.63
0.47	413.17	.164E+03	1.2	1.82	2.33
0.55	413.25	.223E+03	1.8	2.02	2.10
0.63	413.33	.292E+03	2.5	2.21	1.92
0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

```
-----
<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 0113) 7.48 0.30 1.67 15.83 0.28 1.27
OUTFLOW: ID= 1 ( 4620) 7.48 0.30 1.75 15.83 0.28 1.26
-----
```

```
-----
| ADD HYD ( 2620) |
| 1 + 2 = 3 |
|-----|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID1= 1 ( 4620): 7.48 0.299 1.75 15.83
+ ID2= 2 ( 0627): 9.39 0.391 1.58 13.82
=====
ID = 3 ( 2620): 16.87 0.668 1.67 14.71
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2622) |
| 1 + 2 = 3 |
|-----|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID1= 1 ( 2620): 16.87 0.668 1.67 14.71
+ ID2= 2 ( 2621): 55.24 1.430 1.92 14.19
=====
ID = 3 ( 2622): 72.11 1.967 1.83 14.31
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2623) |
| 1 + 2 = 3 |
|-----|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID1= 1 ( 2610): 655.71 8.482 2.83 14.81
+ ID2= 2 ( 2622): 72.11 1.967 1.83 14.31
=====
ID = 3 ( 2623): 727.82 9.302 2.75 14.76
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB
| NASHYD ( 0637) | Area (ha)= 8.36 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.47
```

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 0.211 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 13.843
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

```
| CALIB
| NASHYD ( 0630) | Area (ha)= 33.04 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.38
```

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 0.956 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 13.842
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

```
| ROUTE CHN( 4630) |
| IN= 2--> OUT= 1 | Routing time step (min)'= 5.00
```

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22

1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0630)	33.04	0.96	1.83	13.84	0.67	0.73
OUTFLOW: ID= 1 (4630)	33.04	0.87	2.00	13.83	0.65	0.71

```
| ADD HYD ( 2637) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2623): 727.82 9.302 2.75 14.76
+ ID2= 2 ( 4630): 33.04 0.866 2.00 13.83
|-----|
| ID = 3 ( 2637): 760.86 9.800 2.67 14.72
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 2637) |
| 3 + 2 = 1 |
|-----|
| ID1= 3 ( 2637): 760.86 9.800 2.67 14.72
+ ID2= 2 ( 0637): 8.36 0.211 2.00 13.84
|-----|
| ID = 1 ( 2637): 769.22 9.921 2.58 14.71
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB
| NASHYD ( 0636) | Area (ha)= 3.32 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.48
```

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.083 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 13.843
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

```
| ADD HYD ( 2636) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2637): 769.22 9.921 2.58 14.71
+ ID2= 2 ( 0636): 3.32 0.083 2.00 13.84
|-----|
| ID = 3 ( 2636): 772.54 9.974 2.58 14.70
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0639)|
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 4.60 Curve Number (CN)= 70.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.43
```

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.123 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 13.843
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

```
-----
| CALIB
| NASHYD ( 0638)|
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 20.63 Curve Number (CN)= 70.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.46
```

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 0.528 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 13.843
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

```
-----
| ADD HYD ( 2630)|
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
| ID1= 1 ( 2636): 772.54 9.974 2.58 14.70
| + ID2= 2 ( 0638): 20.63 0.528 1.92 13.84
|=====|
| ID = 3 ( 2630): 793.17 10.297 2.58 14.68
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2630)|
| 3 + 2 = 1 |
|-----|
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
| ID1= 3 ( 2630): 793.17 10.297 2.58 14.68
| + ID2= 2 ( 0639): 4.60 0.123 1.92 13.84
|=====|
| ID = 1 ( 2630): 797.77 10.366 2.58 14.68
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

```
=====
*****
** SIMULATION : 10 year Fergus Shand Dam Chic **
*****
```

```
-----
| CHICAGO STORM |
| Ptotal= 61.34 mm |
|-----|
IDF curve parameters: A=2126.000
B= 15.000
C= 0.890
used in: INTENSITY = A / (t + B)^C
Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33
```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	2.71	1.00	19.98	2.00	11.15	3.00	4.04
0.08	2.94	1.08	32.79	2.08	9.83	3.08	3.82
0.17	3.21	1.17	70.46	2.17	8.76	3.17	3.63
0.25	3.53	1.25	147.79	2.25	7.89	3.25	3.45
0.33	3.92	1.33	87.01	2.33	7.16	3.33	3.29
0.42	4.40	1.42	53.99	2.42	6.55	3.42	3.14
0.50	5.01	1.50	37.57	2.50	6.03	3.50	3.01
0.58	5.79	1.58	28.09	2.58	5.58	3.58	2.89
0.67	6.84	1.67	22.06	2.67	5.19	3.67	2.77
0.75	8.31	1.75	17.96	2.75	4.84	3.75	2.67
0.83	10.47	1.83	15.02	2.83	4.54	3.83	2.57
0.92	13.90	1.92	12.83	2.92	4.27	3.92	2.48

```
-----
| CALIB
| NASHYD ( 0100)|
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 136.98 Curve Number (CN)= 69.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 1.17
```

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 2.536 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 18.624
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.304

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

```
-----
| CALIB
| NASHYD ( 0201)|
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 14.60 Curve Number (CN)= 74.0
| Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.97
```

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.407 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 24.021

TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.392

0.0610 0.1730 | 2.9590 0.4629
0.1200 0.2017 | 0.0000 0.0000

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

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2200) 22.800 1.131 1.33 27.43
OUTFLOW: ID= 1 (5200) 22.800 0.410 3.17 27.37

PEAK FLOW REDUCTION [Qout/Qin](%)= 36.23
TIME SHIFT OF PEAK FLOW (min)=110.00
MAXIMUM STORAGE USED (ha.m.)= 0.2970

CALIB
STANDHYD (0203) | Area (ha)= 8.20
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.69 4.51
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 147.79 63.41
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.90 (ii) 8.35 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

TOTALS
PEAK FLOW (cms)= 0.84 0.56 1.115 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 59.34 24.87 33.49
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.41 0.55

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200) |
1 + 2 = 3 |
ID1= 1 (0201): 14.60 0.407 2.58 24.02
+ ID2= 2 (0203): 8.20 1.115 1.33 33.49
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200) |
IN= 2---> OUT= 1 |
DT= 5.0 min |
OVERFLOW IS OFF
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1980 0.2314
0.0040 0.0218 | 0.2920 0.2621
0.0060 0.0446 | 0.3980 0.2937
0.0070 0.0683 | 0.5150 0.3261
0.0080 0.0930 | 0.8290 0.3592
0.0090 0.1187 | 1.3520 0.3930
0.0230 0.1453 | 2.0570 0.4275

CALIB
NASHYD (0205) | Area (ha)= 4.80 Curve Number (CN)= 90.0
ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.433 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.661
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.663

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

CALIB
STANDHYD (0206) | Area (ha)= 0.20
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 63.41
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.90 (ii) 8.35 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

TOTALS
PEAK FLOW (cms)= 0.02 0.01 0.027 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 59.34 24.87 33.46
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.41 0.55

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2201)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0205):      AREA   QPEAK   TPEAK   R.V.
+ ID2= 2 ( 0206):      (ha)   (cms)   (hrs)   (mm)
=====
ID = 3 ( 2201):      5.00   0.443   1.83   40.37

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2201)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2201):      AREA   QPEAK   TPEAK   R.V.
+ ID2= 2 ( 5200):      (ha)   (cms)   (hrs)   (mm)
=====
ID = 1 ( 2201):      27.80   0.579   2.00   29.70

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| STANDHYD ( 0209)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 2.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

```

```

-----
IMPervIOUS   PERVIOUS (i)
Surface Area (ha)= 0.43 2.27
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 35.00 35.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 37.22
over (min) 5.00 15.00
Storage Coeff. (min)= 1.10 (ii) 12.38 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.34 0.08

```

```

*TOTALS*
PEAK FLOW (cms)= 0.09 0.16 0.181 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.58
RUNOFF VOLUME (mm)= 59.34 21.28 24.32
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.35 0.40

```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB
| STANDHYD ( 0207)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 1.30
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

```

```

-----
IMPervIOUS   PERVIOUS (i)
Surface Area (ha)= 0.58 0.72
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 63.41
over (min) 5.00 10.00
Storage Coeff. (min)= 0.90 (ii) 8.35 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

PEAK FLOW (cms)= 0.13 0.09 0.177 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 59.34 24.87 33.49
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.41 0.55

```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2202)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0207):      AREA   QPEAK   TPEAK   R.V.
+ ID2= 2 ( 0209):      (ha)   (cms)   (hrs)   (mm)
=====
ID = 3 ( 2202):      4.00   0.313   1.50   27.30

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2202)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2202):      AREA   QPEAK   TPEAK   R.V.
+ ID2= 2 ( 2201):      (ha)   (cms)   (hrs)   (mm)
=====
ID = 1 ( 2202):      31.80   0.740   1.83   29.40

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2100)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0100):      AREA   QPEAK   TPEAK   R.V.
+ ID2= 2 ( 2202):      (ha)   (cms)   (hrs)   (mm)
=====
ID = 3 ( 2100):      168.78   3.097   2.83   20.65

```


NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0302) | Area (ha)= 2.90 Curve Number (CN)= 74.0
| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
|-----|
| U.H. Tp(hrs)= 0.45
|
| Unit Hyd Qpeak (cms)= 0.246
|
| PEAK FLOW (cms)= 0.138 (i)
| TIME TO PEAK (hrs)= 1.917
| RUNOFF VOLUME (mm)= 24.019
| TOTAL RAINFALL (mm)= 61.344
| RUNOFF COEFFICIENT = 0.392
|-----|
```

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

```
-----
| CALIB
| STANDHYD ( 0304) | Area (ha)= 4.40
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
|-----|
| IMPERVIOUS PERVIOUS (i)
| Surface Area (ha)= 1.98 2.42
| Dep. Storage (mm)= 2.00 5.00
| Average Slope (%)= 1.00 1.00
| Length (m)= 25.00 25.00
| Mannings n = 0.013 0.250
|
| Max.Eff.Inten.(mm/hr)= 147.79 63.41
| over (min)= 5.00 10.00
| Storage Coeff. (min)= 0.95 (ii) 8.82 (ii)
| Unit Hyd. Tpeak (min)= 5.00 10.00
| Unit Hyd. peak (cms)= 0.34 0.12
|
| *TOTALS*
| PEAK FLOW (cms)= 0.45 0.29 0.593 (iii)
| TIME TO PEAK (hrs)= 1.33 1.50 1.33
| RUNOFF VOLUME (mm)= 59.34 24.87 33.49
| TOTAL RAINFALL (mm)= 61.34 61.34 61.34
| RUNOFF COEFFICIENT = 0.97 0.41 0.55
|-----|
```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2300) |
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
| ID1= 1 ( 0302): 2.90 0.138 1.92 24.02
| + ID2= 2 ( 0304): 4.40 0.593 1.33 33.49
|=====|
| ID = 3 ( 2300): 7.30 0.613 1.33 29.73
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 0308) | Area (ha)= 0.20
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
|-----|
| IMPERVIOUS PERVIOUS (i)
| Surface Area (ha)= 0.09 0.11
| Dep. Storage (mm)= 2.00 5.00
| Average Slope (%)= 1.00 1.00
| Length (m)= 25.00 25.00
| Mannings n = 0.013 0.250
|
| Max.Eff.Inten.(mm/hr)= 147.79 63.41
| over (min)= 5.00 10.00
| Storage Coeff. (min)= 0.95 (ii) 8.82 (ii)
| Unit Hyd. Tpeak (min)= 5.00 10.00
| Unit Hyd. peak (cms)= 0.34 0.12
|
| *TOTALS*
| PEAK FLOW (cms)= 0.02 0.01 0.027 (iii)
| TIME TO PEAK (hrs)= 1.33 1.50 1.33
| RUNOFF VOLUME (mm)= 59.34 24.87 33.47
| TOTAL RAINFALL (mm)= 61.34 61.34 61.34
| RUNOFF COEFFICIENT = 0.97 0.41 0.55
|-----|
```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 0310) | Area (ha)= 5.70
| ID= 1 DT= 5.0 min | Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00
|-----|
| IMPERVIOUS PERVIOUS (i)
| Surface Area (ha)= 0.91 4.79
| Dep. Storage (mm)= 2.00 5.00
| Average Slope (%)= 1.20 1.20
| Length (m)= 25.00 25.00
| Mannings n = 0.013 0.250
|
| Max.Eff.Inten.(mm/hr)= 147.79 42.42
| over (min)= 5.00 10.00
| Storage Coeff. (min)= 0.90 (ii) 9.64 (ii)
| Unit Hyd. Tpeak (min)= 5.00 10.00
| Unit Hyd. peak (cms)= 0.34 0.11
|
| *TOTALS*
| PEAK FLOW (cms)= 0.19 0.38 0.447 (iii)
| TIME TO PEAK (hrs)= 1.33 1.50 1.50
| RUNOFF VOLUME (mm)= 59.34 21.28 24.32
| TOTAL RAINFALL (mm)= 61.34 61.34 61.34
| RUNOFF COEFFICIENT = 0.97 0.35 0.40
|-----|
```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 71.0 Ia = Dep. 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 (2301)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2300):	7.30	0.613	1.33	29.73
+ ID2= 2 (0308):	0.20	0.027	1.33	33.47
=====				
ID = 3 (2301):	7.50	0.640	1.33	29.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2301):	7.50	0.640	1.33	29.83
+ ID2= 2 (0310):	5.70	0.447	1.50	24.32
=====				
ID = 1 (2301):	13.20	1.046	1.42	27.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2302)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2100):	168.78	3.097	2.83	20.65
+ ID2= 2 (2301):	13.20	1.046	1.42	27.45
=====				
ID = 3 (2302):	181.98	3.268	2.75	21.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	82.86
STANDHYD (0400)	Total Imp(%)=	10.00
ID= 1 DT= 5.0 min	Dir. Conn.(%)=	3.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	8.29	74.57
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	0.70	2.00
Length (m)=	1437.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	101.75	34.92
over (min)	15.00	25.00
Storage Coeff. (min)=	13.97 (ii)	24.72 (ii)
Unit Hyd. Tpeak (min)=	15.00	25.00
Unit Hyd. peak (cms)=	0.08	0.05

TOTALS
PEAK FLOW (cms)= 0.48 3.39 3.711 (iii)
TIME TO PEAK (hrs)= 1.50 1.83 1.75
RUNOFF VOLUME (mm)= 59.34 20.39 21.56

TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.97	0.33	0.35

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2400)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2302):	181.98	3.268	2.75	21.15
+ ID2= 2 (0400):	82.86	3.711	1.75	21.56
=====				
ID = 3 (2400):	264.84	6.060	1.83	21.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4400)	Routing time step (min)='	5.00
IN= 2---> OUT= 1		

<----- DATA FOR SECTION (1.1) ----->		
Distance	Elevation	Manning
0.00	411.10	0.0550
27.30	410.20	0.0550
77.50	409.10	0.0550
96.60	409.10	0.0550
115.80	408.90	0.0550
124.80	409.10	0.0550
131.00	408.90	0.0550 / 0.0350
133.60	408.00	0.0350
134.40	407.60	0.0350
135.00	407.50	0.0350
135.80	407.60	0.0350
136.50	408.00	0.0350
139.40	408.80	0.0350 / 0.0550
143.50	408.90	0.0550
148.50	408.70	0.0550
163.80	408.90	0.0550
183.20	408.90	0.0550
243.70	409.70	0.0550
278.70	410.20	0.0550
330.50	411.40	0.0550

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.19	407.69	.366E+03	0.1	0.51	58.83
0.37	407.87	.106E+04	0.5	0.81	37.08
0.56	408.06	.199E+04	1.1	1.00	29.93
0.74	408.24	.328E+04	2.1	1.14	26.32
0.93	408.43	.498E+04	3.6	1.28	23.32
1.11	408.61	.708E+04	5.6	1.43	20.94
1.30	408.80	.105E+05	8.5	1.45	20.61
1.49	408.99	.247E+05	14.8	1.07	27.91

-0.00	0.00	0.0350	Main Channel
-0.00	0.00	0.0350	Main Channel
-0.00	0.00	0.0350	Main Channel
-0.00	0.00	0.0350	in Channel
-0.00	0.00	0.0350	hannel
-0.00	0.00	0.0350	el
-0.00	0.00	0.0350	
-0.00	0.00	0.0350	
-0.00	0.00	0.0350	
-0.00	0.00	0.0350	
-0.00	0.00	0.0350	

-0.00	0.00	0.0350
-0.00	0.00	0.0350
-0.00	0.00	0.0350
-0.00	0.00	0.0350
-0.00	0.00	0.0350
-0.00	0.00	0.0350
-0.00	0.00	0.0350
-0.00	0.00	0.0350
-0.00	0.00	0.0350
-0.00	0.00	0.0350
0.00	0.00	0.0350
1.00	1.00	0.0350
4510.00	2.00	0.0000

4510.00	2.00	0.0000
---------	------	--------

PEAK FLOW	(cms)=	1.351	(i)
TIME TO PEAK	(hrs)=	3.500	
RUNOFF VOLUME	(mm)=	19.830	
TOTAL RAINFALL	(mm)=	61.344	
RUNOFF COEFFICIENT	=	0.323	

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

[illegible]

CALIB			
NASHVD (0511)	Area (ha)=	54.65	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.52	

PEAK FLOW (cms)= 1.908 (i)

TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 19.829
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

CALIB
NASHYD (0516)
ID= 1 DT= 5.0 min
Area (ha)= 11.47
Ia (mm)= 5.00
U.H. Tp(hrs)= 0.56
Curve Number (CN)= 71.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 0.782

PEAK FLOW (cms)= 0.382 (i)
TIME TO PEAK (hrs)= 2.003
RUNOFF VOLUME (mm)= 19.829
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

ROUTE CHN(4516)
IN= 2--> OUT= 1
Routing time step (min)'= 5.00

----- DATA FOR SECTION (1.1) -----
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

----- TRAVEL TIME TABLE -----
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .125E+02 0.0 0.27 43.74
0.16 412.86 .500E+02 0.0 0.42 27.55
0.24 412.94 .113E+03 0.1 0.55 21.03
0.32 413.02 .200E+03 0.2 0.67 17.36
0.39 413.09 .313E+03 0.3 0.78 14.96
0.47 413.17 .450E+03 0.6 0.88 13.25
0.55 413.25 .613E+03 0.9 0.98 11.95
0.63 413.33 .801E+03 1.2 1.07 10.93
0.71 413.41 .101E+04 1.7 1.15 10.11
0.79 413.49 .125E+04 2.2 1.24 9.42
0.87 413.57 .151E+04 2.9 1.32 8.84
0.95 413.65 .180E+04 3.6 1.40 8.34
1.03 413.73 .211E+04 4.5 1.47 7.91
1.11 413.81 .245E+04 5.4 1.55 7.53
1.18 413.88 .281E+04 6.5 1.62 7.19
1.26 413.96 .320E+04 7.7 1.69 6.89
1.34 414.04 .362E+04 9.1 1.76 6.62
1.42 414.12 .405E+04 10.6 1.83 6.37
1.50 414.20 .452E+04 12.3 1.90 6.14

----- hydrograph -----<-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0516) 11.47 0.38 2.08 19.83 0.41 0.79
OUTFLOW: ID= 1 (4516) 11.47 0.35 2.33 19.81 0.40 0.78

ADD HYD (2510)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (4516): 11.47 0.353 2.33 19.81
+ ID2= 2 (0511): 54.65 1.908 2.00 19.83
=====

ID = 3 (2510): 66.12 2.222 2.08 19.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0517)
ID= 1 DT= 5.0 min
Area (ha)= 1.75
Ia (mm)= 5.00
U.H. Tp(hrs)= 0.32
Curve Number (CN)= 71.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.083 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 19.824
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

ADD HYD (2511)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2510): 66.12 2.222 2.08 19.83
+ ID2= 2 (4510): 90.75 1.351 3.50 19.83
=====

ID = 3 (2511): 156.87 2.865 2.25 19.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2511)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2511): 156.87 2.865 2.25 19.83
+ ID2= 2 (0517): 1.75 0.083 1.75 19.82
=====

ID = 1 (2511): 158.62 2.913 2.25 19.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0512)
ID= 1 DT= 5.0 min
Area (ha)= 31.10
Ia (mm)= 5.00
U.H. Tp(hrs)= 0.71
Curve Number (CN)= 71.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 1.673

PEAK FLOW (cms)= 0.881 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 19.830
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

CALIB			
NASHYD (0514)	Area (ha)=	2.65	Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.60	

Unit Hyd Qpeak (cms)= 0.169

PEAK FLOW (cms)= 0.069 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 16.438
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.268

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

CALIB			
NASHYD (0515)	Area (ha)=	5.41	Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.41	

Unit Hyd Qpeak (cms)= 0.504

PEAK FLOW (cms)= 0.180 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 16.437
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.268

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

CALIB			
NASHYD (0513)	Area (ha)=	6.68	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.20	

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.405 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 19.792
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

ADD HYD (2512)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2511):	158.62	2.913	2.25	19.83
+ ID2= 2 (0512):	31.10	0.881	2.25	19.83
ID = 3 (2512):	189.72	3.794	2.25	19.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2512):	189.72	3.794	2.25	19.83
+ ID2= 2 (0513):	6.68	0.405	1.58	19.79
ID = 1 (2512):	196.40	3.922	2.25	19.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2512):	196.40	3.922	2.25	19.83
+ ID2= 2 (0514):	2.65	0.069	2.17	16.44
ID = 3 (2512):	199.05	3.991	2.17	19.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2512):	199.05	3.991	2.17	19.78
+ ID2= 2 (0515):	5.41	0.180	1.92	16.44
ID = 1 (2512):	204.46	4.146	2.17	19.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2513)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2512):	204.46	4.146	2.17	19.69
+ ID2= 2 (4400):	264.84	5.341	2.33	21.28
ID = 3 (2513):	469.30	9.460	2.25	20.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0520)	Area (ha)=	108.36	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00

----- U.H. Tp(hrs)= 1.20

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 2.103 (i)
TIME TO PEAK (hrs)= 2.917
RUNOFF VOLUME (mm)= 19.830
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

| ADD HYD (2520)|
1 + 2 = 3
ID1= 1 (2513): 469.30 9.460 2.25 20.59
+ ID2= 2 (0520): 108.36 2.103 2.92 19.83
=====

ID = 3 (2520): 577.66 11.180 2.33 20.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4500)|
| IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 / 0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 / 0.0550 Main Channel
109.70 404.30 0.0550
128.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
0.68 403.38 .304E+04 1.6 1.03 32.27
1.02 403.72 .718E+04 4.5 1.25 26.57
1.36 404.06 .122E+05 9.7 1.58 20.96
1.70 404.40 .251E+05 18.1 1.44 23.04
2.08 404.78 .650E+05 42.3 1.29 25.62
2.46 405.16 .122E+06 86.3 1.40 23.62
2.84 405.54 .192E+06 151.6 1.57 21.10

3.21	405.91	.270E+06	238.3	1.75	18.90
3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (2520) 577.66 11.18 2.33 20.44 1.42 1.55
OUTFLOW: ID= 1 (4500) 577.66 10.48 2.83 20.44 1.39 1.57

| CALIB
| NASHYD (0610)|
ID= 1 DT= 5.0 min
Area (ha)= 78.05 Curve Number (CN)= 71.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.00

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 1.733 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 19.830
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

| ADD HYD (2610)|
1 + 2 = 3
ID1= 1 (4500): 577.66 10.482 2.83 20.44
+ ID2= 2 (0610): 78.05 1.733 2.67 19.83
=====

ID = 3 (2610): 655.71 12.194 2.75 20.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0623)|
ID= 1 DT= 5.0 min
Area (ha)= 19.37 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.45

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW (cms)= 0.718 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 19.215
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| CALIB
| NASHYD ( 0625) | Area (ha)= 6.72 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.39
```

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW (cms)= 0.272 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.214
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| ROUTE CHN( 4625) |
| IN= 2--> OUT= 1 | Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0360 Main Channel
4.30 412.70 0.0360 Main Channel
8.60 414.20 0.0360 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .108E+02 0.0 0.24 42.13
0.16 412.86 .434E+02 0.0 0.38 26.54
0.24 412.94 .976E+02 0.1 0.50 20.26
0.32 413.02 .174E+03 0.2 0.61 16.72
0.39 413.09 .271E+03 0.3 0.70 14.41
0.47 413.17 .390E+03 0.5 0.79 12.76
0.55 413.25 .532E+03 0.8 0.88 11.51
0.63 413.33 .694E+03 1.1 0.96 10.53
0.71 413.41 .879E+03 1.5 1.04 9.74
0.79 413.49 .108E+04 2.0 1.11 9.08
0.87 413.57 .131E+04 2.6 1.19 8.52
0.95 413.65 .156E+04 3.2 1.26 8.04
1.03 413.73 .183E+04 4.0 1.33 7.62
1.11 413.81 .213E+04 4.9 1.39 7.25
1.18 413.88 .244E+04 5.9 1.46 6.93
1.26 413.96 .278E+04 7.0 1.52 6.64
1.34 414.04 .313E+04 8.2 1.59 6.37
1.42 414.12 .351E+04 9.5 1.65 6.13
1.50 414.20 .392E+04 11.0 1.71 5.92
```

```
<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 0625) 6.72 0.27 1.83 19.21 0.37 0.67
OUTFLOW: ID= 1 ( 4625) 6.72 0.24 2.08 19.18 0.35 0.65
```

```
-----
| CALIB
| NASHYD ( 0622) | Area (ha)= 9.69 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.36
```

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW (cms)= 0.412 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.213
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| CALIB
| NASHYD ( 0621) | Area (ha)= 6.56 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.37
```

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.274 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.213
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| CALIB
| NASHYD ( 0624) | Area (ha)= 11.84 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.51
```

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 0.405 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 19.216
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| CALIB
| STANDHYD ( 0626) | Area (ha)= 1.06
| ID= 1 DT= 5.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00
```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.64 0.42
Dep. Storage (mm)= 1.00 10.00
Average Slope (%)= 1.00 2.00
Length (m)= 84.06 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)=	147.79	45.03	
over (min)=	5.00	15.00	
Storage Coeff. (min)=	1.97 (ii)	11.68 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.31	0.09	
			TOTALS
PEAK FLOW (cms)=	0.21	0.03	0.215 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	60.34	20.26	40.30
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.98	0.33	0.66

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2621)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4625):	6.72	0.236	2.08	19.18
+ ID2= 2 (0621):	6.56	0.274	1.83	19.21
=====				
ID = 3 (2621):	13.28	0.487	1.92	19.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2621):	13.28	0.487	1.92	19.20
+ ID2= 2 (0622):	9.69	0.412	1.83	19.21
=====				
ID = 1 (2621):	22.97	0.887	1.92	19.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2621):	22.97	0.887	1.92	19.20
+ ID2= 2 (0623):	19.37	0.718	1.92	19.22
=====				
ID = 3 (2621):	42.34	1.604	1.92	19.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2621):	42.34	1.604	1.92	19.21

+ ID2= 2 (0624):	11.84	0.405	2.00	19.22
=====				
ID = 1 (2621):	54.18	2.001	1.92	19.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2621):	54.18	2.001	1.92	19.21
+ ID2= 2 (0626):	1.06	0.215	1.33	40.30
=====				
ID = 3 (2621):	55.24	2.045	1.92	19.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0627)				
Area	(ha)=	9.39	Curve Number	(CN)= 70.0
Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.20			

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)=	0.550 (i)
TIME TO PEAK (hrs)=	1.583
RUNOFF VOLUME (mm)=	19.180
TOTAL RAINFALL (mm)=	61.344
RUNOFF COEFFICIENT =	0.313

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

CALIB				
NASHYD (6200)				
Area	(ha)=	6.66	Curve Number	(CN)= 74.0
Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.28			

Unit Hyd Qpeak (cms)= 0.908

PEAK FLOW (cms)=	0.374 (i)
TIME TO PEAK (hrs)=	1.667
RUNOFF VOLUME (mm)=	21.794
TOTAL RAINFALL (mm)=	61.344
RUNOFF COEFFICIENT =	0.355

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

CALIB				
NASHYD (6201)				
Area	(ha)=	0.82	Curve Number	(CN)= 74.0
Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.15			

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)=	0.063 (i)
TIME TO PEAK (hrs)=	1.500
RUNOFF VOLUME (mm)=	21.679

TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.353

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

```
-----  
| ADD HYD ( 0113)|  
| 1 + 2 = 3 |  
-----  
ID1= 1 ( 6200): 6.66 0.374 1.67 21.79  
+ ID2= 2 ( 6201): 0.82 0.063 1.50 21.68  
=====
```

ID = 3 (0113): 7.48 0.425 1.67 21.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----  
| ROUTE CHN( 4620)|  
| IN= 2---> OUT= 1 |  
-----  
Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->  
Distance Elevation Manning  
0.00 414.20 0.0350 Main Channel  
4.30 412.70 0.0350 Main Channel  
8.60 414.20 0.0350 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->  
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME  
(m) (m) (cu.m.) (cms) (m/s) (min)  
0.08 412.78 .456E+01 0.0 0.55 7.70  
0.16 412.86 .182E+02 0.1 0.88 4.85  
0.24 412.94 .410E+02 0.2 1.15 3.70  
0.32 413.02 .729E+02 0.4 1.39 3.05  
0.39 413.09 .114E+03 0.7 1.61 2.63  
0.47 413.17 .164E+03 1.2 1.82 2.33  
0.55 413.25 .223E+03 1.8 2.02 2.10  
0.63 413.33 .292E+03 2.5 2.21 1.92  
0.71 413.41 .369E+03 3.5 2.39 1.78  
0.79 413.49 .456E+03 4.6 2.56 1.66  
0.87 413.57 .551E+03 5.9 2.73 1.56  
0.95 413.65 .656E+03 7.4 2.89 1.47  
1.03 413.73 .770E+03 9.2 3.05 1.39  
1.11 413.81 .893E+03 11.2 3.21 1.32  
1.18 413.88 .103E+04 13.5 3.36 1.27  
1.26 413.96 .117E+04 16.0 3.51 1.21  
1.34 414.04 .132E+04 18.9 3.65 1.16  
1.42 414.12 .148E+04 22.0 3.79 1.12  
1.50 414.20 .165E+04 25.4 3.93 1.08
```

```
<---- hydrograph ----> <-pipe / channel->  
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL  
(ha) (cms) (hrs) (mm) (m) (m/s)  
INFLOW : ID= 2 ( 0113) 7.48 0.42 1.67 21.78 0.32 1.41  
OUTFLOW: ID= 1 ( 4620) 7.48 0.42 1.67 21.78 0.32 1.41
```

```
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.  
----- (ha) (cms) (hrs) (mm)  
ID1= 1 ( 4620): 7.48 0.422 1.67 21.78  
+ ID2= 2 ( 0627): 9.39 0.550 1.58 19.18  
=====
```

ID = 3 (2620): 16.87 0.947 1.67 20.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----  
| ADD HYD ( 2622)|  
| 1 + 2 = 3 |  
-----  
ID1= 1 ( 2620): 16.87 0.947 1.67 20.33  
+ ID2= 2 ( 2621): 55.24 2.045 1.92 19.61  
=====
```

ID = 3 (2622): 72.11 2.806 1.83 19.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----  
| ADD HYD ( 2623)|  
| 1 + 2 = 3 |  
-----  
ID1= 1 ( 2610): 655.71 12.194 2.75 20.37  
+ ID2= 2 ( 2622): 72.11 2.806 1.83 19.78  
=====
```

ID = 3 (2623): 727.82 13.433 2.58 20.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----  
| CALIB  
| NASHYD ( 0637)| Area (ha)= 8.36 Curve Number (CN)= 70.0  
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00  
-----  
U.H. Tp(hrs)= 0.47
```

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 0.301 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 19.215
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----  
| CALIB  
| NASHYD ( 0630)| Area (ha)= 33.04 Curve Number (CN)= 70.0  
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00  
-----  
U.H. Tp(hrs)= 0.38
```

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 1.360 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.214
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

ROUTE CHN(4630)|
IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .893E+01 0.0 0.17 47.72
0.16 412.86 .357E+02 0.0 0.28 30.06
0.24 412.94 .804E+02 0.1 0.36 22.94
0.32 413.02 .143E+03 0.1 0.44 18.94
0.39 413.09 .223E+03 0.2 0.51 16.32
0.47 413.17 .322E+03 0.4 0.58 14.45
0.55 413.25 .438E+03 0.6 0.64 13.04
0.63 413.33 .572E+03 0.8 0.70 11.93
0.71 413.41 .724E+03 1.1 0.76 11.03
0.79 413.49 .893E+03 1.4 0.81 10.28
0.87 413.57 .108E+04 1.9 0.86 9.65
0.95 413.65 .129E+04 2.4 0.92 9.10
1.03 413.73 .151E+04 2.9 0.97 8.63
1.11 413.81 .175E+04 3.6 1.01 8.22
1.18 413.88 .201E+04 4.3 1.06 7.85
1.26 413.96 .229E+04 5.1 1.11 7.52
1.34 414.04 .258E+04 6.0 1.15 7.22
1.42 414.12 .289E+04 6.9 1.20 6.95
1.50 414.20 .323E+04 8.0 1.24 6.70

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0630) 33.04 1.36 1.83 19.21 0.77 0.80
OUTFLOW: ID= 1 (4630) 33.04 1.25 2.00 19.21 0.75 0.78

ADD HYD (2637)|
1 + 2 = 3 |
ID1= 1 (2623): 727.82 13.433 2.58 20.31
+ ID2= 2 (4630): 33.04 1.251 2.00 19.21
===== ID = 3 (2637): 760.86 14.235 2.50 20.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637)|
3 + 2 = 1 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

ID1= 3 (2637): 760.86 14.235 2.50 20.26
+ ID2= 2 (0637): 8.36 0.301 2.00 19.22
===== ID = 1 (2637): 769.22 14.442 2.50 20.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0636)| Area (ha)= 3.32 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.48

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.118 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 19.215
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

ADD HYD (2636)|
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2637): 769.22 14.442 2.50 20.25
+ ID2= 2 (0636): 3.32 0.118 2.00 19.22
===== ID = 3 (2636): 772.54 14.524 2.50 20.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0639)| Area (ha)= 4.60 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.43

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.176 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 19.215
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

CALIB
NASHYD (0638)| Area (ha)= 20.63 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.46

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 0.753 (i)
TIME TO PEAK (hrs)= 1.917

RUNOFF VOLUME (mm)= 19.215
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
ADD HYD ( 2630)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2636): 772.54 14.524 2.50 20.25
+ ID2= 2 ( 0638): 20.63 0.753 1.92 19.22
=====
ID = 3 ( 2630): 793.17 15.027 2.50 20.22
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
ADD HYD ( 2630)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 2630): 793.17 15.027 2.50 20.22
+ ID2= 2 ( 0639): 4.60 0.176 1.92 19.21
=====
ID = 1 ( 2630): 797.77 15.134 2.50 20.22
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

** SIMULATION : 25 year Fergus Shand Dam Chic **

```
CHICAGO STORM
Ptotal= 74.68 mm
IDF curve parameters: A=3023.000
B= 18.000
C= 0.916
used in: INTENSITY = A / (t + B)^C
Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.03	1.00	25.41	2.00	13.91	3.00	4.68
0.08	3.31	1.08	41.74	2.08	12.18	3.08	4.41
0.17	3.65	1.17	86.90	2.17	10.79	3.17	4.17
0.25	4.05	1.25	170.99	2.25	9.65	3.25	3.95
0.33	4.54	1.33	106.07	2.33	8.70	3.33	3.75
0.42	5.15	1.42	67.82	2.42	7.91	3.42	3.56
0.50	5.92	1.50	47.76	2.50	7.23	3.50	3.40
0.58	6.93	1.58	35.82	2.58	6.65	3.58	3.24
0.67	8.29	1.67	28.10	2.67	6.15	3.67	3.10
0.75	10.20	1.75	22.79	2.75	5.71	3.75	2.97
0.83	13.02	1.83	18.97	2.83	5.33	3.83	2.85

0.92 17.51 | 1.92 16.11 | 2.92 4.99 | 3.92 2.74

```
CALIB
NASHYD ( 0100)
ID= 1 DT= 5.0 min
Area (ha)= 136.98
Ia (mm)= 5.00
Curve Number (CN)= 69.0
# of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.17
```

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 3.656 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 26.414
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.354

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

```
CALIB
NASHYD ( 0201)
ID= 1 DT= 5.0 min
Area (ha)= 14.60
Ia (mm)= 1.50
Curve Number (CN)= 74.0
# of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.97
```

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.567 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 32.968
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.441

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

```
CALIB
STANDHYD ( 0203)
ID= 1 DT= 5.0 min
Area (ha)= 8.20
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 170.99 86.41
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.85 (ii) 7.43 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.13

		TOTALS
PEAK FLOW (cms)=	0.97	0.80 1.394 (iii)
TIME TO PEAK (hrs)=	1.33	1.50 1.33
RUNOFF VOLUME (mm)=	72.68	34.28 43.88
TOTAL RAINFALL (mm)=	74.68	74.68 74.68
RUNOFF COEFFICIENT =	0.97	0.46 0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	14.60	0.567	2.58	32.97
+ ID2= 2 (0203):	8.20	1.394	1.33	43.88
=====				
ID = 3 (2200):	22.80	1.419	1.33	36.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)				
IN= 2--> OUT= 1				
DT= 5.0 min				
OVERFLOW IS OFF				
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1980	0.2314
	0.0040	0.0218	0.2920	0.2621
	0.0060	0.0446	0.3980	0.2937
	0.0070	0.0683	0.5150	0.3261
	0.0080	0.0930	0.8290	0.3592
	0.0090	0.1187	1.3520	0.3930
	0.0230	0.1453	2.0570	0.4275
	0.0610	0.1730	2.9590	0.4629
	0.1200	0.2017	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2200)	22.800	1.419	1.33	36.89
OUTFLOW: ID= 1 (5200)	22.800	0.653	2.83	36.83

PEAK FLOW REDUCTION [Qout/Qin](%)= 46.01
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.3407

CALIB				
NASHYD (0205)				
ID= 1 DT= 5.0 min				
	Area (ha)=	4.80	Curve Number (CN)=	90.0
	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.41		

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.568 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 52.802
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.707

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

CALIB				
STANDHYD (0206)				
ID= 1 DT= 5.0 min				
	Area (ha)=	0.20	Total Imp(%)=	45.00
			Dir. Conn.(%)=	25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	86.41
over (min)	5.00	10.00
Storage Coeff. (min)=	0.85 (ii)	7.43 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

PEAK FLOW (cms)=	0.02	0.02	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	0.034 (iii)
RUNOFF VOLUME (mm)=	72.68	34.28	1.33
TOTAL RAINFALL (mm)=	74.68	74.68	43.85
RUNOFF COEFFICIENT =	0.97	0.46	74.68
			0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0205):	4.80	0.568	1.83	52.80
+ ID2= 2 (0206):	0.20	0.034	1.33	43.85
=====				
ID = 3 (2201):	5.00	0.581	1.83	52.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201)				
3 + 2 = 1				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2201):	5.00	0.581	1.83	52.44
+ ID2= 2 (5200):	22.80	0.653	2.83	36.83
=====				
ID = 1 (2201):	27.80	0.888	2.00	39.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0209)				
ID= 1 DT= 5.0 min				
	Area (ha)=	2.70	Total Imp(%)=	16.00
			Dir. Conn.(%)=	8.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.43	2.27

Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 35.00 35.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 170.99 58.93
over (min)= 5.00 15.00
Storage Coeff. (min)= 1.04 (ii) 10.42 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.34 0.09

PEAK FLOW (cms)= 0.10 0.24 0.268 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.58
RUNOFF VOLUME (mm)= 72.68 29.82 33.25
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.40 0.45

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0207)
ID= 1 DT= 5.0 min
Area (ha)= 1.30
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.58 0.72
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 170.99 86.41
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.85 (ii) 7.43 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.13

PEAK FLOW (cms)= 0.15 0.13 0.221 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 72.68 34.28 43.88
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.46 0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0207): 1.30 0.221 1.33 43.88
+ ID2= 2 (0209): 2.70 0.268 1.58 33.25
ID = 3 (2202): 4.00 0.452 1.50 36.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2202): 4.00 0.452 1.50 36.70
+ ID2= 2 (2201): 27.80 0.888 2.00 39.64
ID = 1 (2202): 31.80 1.104 1.83 39.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2100)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0100): 136.98 3.656 2.83 26.41
+ ID2= 2 (2202): 31.80 1.104 1.83 39.27
ID = 3 (2100): 168.78 4.532 2.75 28.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0302)
ID= 1 DT= 5.0 min
Area (ha)= 2.90
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.45
Curve Number (CN)= 74.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.192 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 32.965
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.441

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

CALIB
STANDHYD (0304)
ID= 1 DT= 5.0 min
Area (ha)= 4.40
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.98 2.42
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)=	170.99	86.41	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.90 (ii)	7.85 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.13	
			TOTALS
PEAK FLOW (cms)=	0.52	0.42	0.741 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	72.68	34.28	43.88
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.97	0.46	0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0302):	2.90	0.192	1.92	32.97
+ ID2= 2 (0304):	4.40	0.741	1.33	43.88
=====				
ID = 3 (2300):	7.30	0.780	1.42	39.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0308)	
ID= 1 DT= 5.0 min	Area (ha)= 0.20
	Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	86.41
over (min)	5.00	10.00
Storage Coeff. (min)=	0.90 (ii)	7.85 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

			TOTALS
PEAK FLOW (cms)=	0.02	0.02	0.034 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	72.68	34.28	43.86
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.97	0.46	0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

CALIB	
STANDHYD (0310)	
ID= 1 DT= 5.0 min	Area (ha)= 5.70
	Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.91	4.79
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	58.93
over (min)	5.00	10.00
Storage Coeff. (min)=	0.85 (ii)	8.52 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.12

			TOTALS
PEAK FLOW (cms)=	0.22	0.56	0.645 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.50
RUNOFF VOLUME (mm)=	72.68	29.82	33.25
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.97	0.40	0.45

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2300):	7.30	0.780	1.42	39.54
+ ID2= 2 (0308):	0.20	0.034	1.33	43.86
=====				
ID = 3 (2301):	7.50	0.813	1.42	39.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2301):	7.50	0.813	1.42	39.66
+ ID2= 2 (0310):	5.70	0.645	1.50	33.25
=====				
ID = 1 (2301):	13.20	1.452	1.42	36.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2302)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2100): 168.78 4.532 2.75 28.84
+ ID2= 2 ( 2301): 13.20 1.452 1.42 36.89
=====
ID = 3 ( 2302): 181.98 4.761 2.75 29.42
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 0400)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 82.86
Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00
```

```

          IMPERVIOUS   PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250
```

```

Max.Eff.Inten.(mm/hr)= 121.32 55.40
over (min) 15.00 25.00
Storage Coeff. (min)= 13.02 (ii) 21.96 (ii)
Unit Hyd. Tpeak (min)= 15.00 25.00
Unit Hyd. peak (cms)= 0.08 0.05
                                     *TOTALS*
PEAK FLOW (cms)= 0.60 5.12 5.557 (iii)
TIME TO PEAK (hrs)= 1.50 1.83 1.75
RUNOFF VOLUME (mm)= 72.68 28.68 30.00
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.38 0.40
```

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 ( 2400)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2302): 181.98 4.761 2.75 29.42
+ ID2= 2 ( 0400): 82.86 5.557 1.75 30.00
=====
ID = 3 ( 2400): 264.84 8.919 1.83 29.60
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTE CHN( 4400)|
| IN= 2--> OUT= 1 |
-----
Routing time step (min)'= 5.00
```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
```

```

          0.00      411.10      0.0550
          27.30      410.20      0.0550
          77.50      409.10      0.0550
          96.60      409.10      0.0550
          115.80      408.90      0.0550
          124.80      409.10      0.0550
          131.00      408.90      0.0550 / 0.0350 Main Channel
          133.60      408.00      0.0350 Main Channel
          134.40      407.60      0.0350 Main Channel
          135.00      407.50      0.0350 Main Channel
          135.80      407.60      0.0350 Main Channel
          136.50      408.00      0.0350 Main Channel
          139.40      408.80      0.0350 / 0.0550 Main Channel
          143.50      408.90      0.0550
          148.50      408.70      0.0550
          163.80      408.90      0.0550
          183.20      408.90      0.0550
          243.70      409.70      0.0550
          278.70      410.20      0.0550
          330.50      411.40      0.0550
```

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.19	407.69	.366E+03	0.1	0.51	58.83
0.37	407.87	.106E+04	0.5	0.81	37.08
0.56	408.06	.199E+04	1.1	1.00	29.93
0.74	408.24	.328E+04	2.1	1.14	26.32
0.93	408.43	.498E+04	3.6	1.28	23.32
1.11	408.61	.708E+04	5.6	1.43	20.94
1.30	408.80	.105E+05	8.5	1.45	20.61
1.49	408.99	.247E+05	14.8	1.07	27.91
1.68	409.18	.601E+05	30.4	0.91	32.97
1.87	409.37	.109E+06	58.5	0.96	31.05
2.06	409.56	.166E+06	98.3	1.06	28.11
2.25	409.75	.231E+06	150.3	1.17	25.57
2.44	409.94	.303E+06	215.4	1.28	23.46
2.64	410.14	.383E+06	293.8	1.38	21.74
2.83	410.33	.470E+06	390.1	1.49	20.10
3.02	410.52	.563E+06	502.4	1.60	18.66
3.21	410.71	.660E+06	628.8	1.71	17.48
3.40	410.90	.762E+06	769.5	1.81	16.49
3.59	411.09	.868E+06	924.9	1.91	15.65

```

                                     <---- hydrograph ---->
                                     AREA   QPEAK   TPEAK   R.V.
                                     (ha)   (cms)   (hrs)   (mm)
INFLOW : ID= 2 ( 2400) 264.84 8.92 1.83 29.60
OUTFLOW: ID= 1 ( 4400) 264.84 7.72 2.33 29.60
                                     MAX DEPTH MAX VEL
                                     (m) (m/s)
```

```
-----
| CALIB
| NASHYD ( 0510)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 90.75 Curve Number (CN)= 71.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.70
```

Unit Hyd Qpeak (cms)= 2.039

PEAK FLOW (cms)= 1.929 (i)
TIME TO PEAK (hrs)= 3.500

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

[illegible][illegible]

CALIB			
NASHVD (0511)	Area (ha)=	54.65	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.52	

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

CALIB			
NASHVD (0516)	Area (ha)=	11.47	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.56	

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

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
```

0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.125E+02	0.0	0.27	43.74
0.16	412.86	.500E+02	0.0	0.42	27.55
0.24	412.94	.113E+03	0.1	0.55	21.03
0.32	413.02	.200E+03	0.2	0.67	17.36
0.39	413.09	.313E+03	0.3	0.78	14.96
0.47	413.17	.450E+03	0.6	0.88	13.25
0.55	413.25	.613E+03	0.9	0.98	11.95
0.63	413.33	.801E+03	1.2	1.07	10.93
0.71	413.41	.101E+04	1.7	1.15	10.11
0.79	413.49	.125E+04	2.2	1.24	9.42
0.87	413.57	.151E+04	2.9	1.32	8.84
0.95	413.65	.180E+04	3.6	1.40	8.34
1.03	413.73	.211E+04	4.5	1.47	7.91
1.11	413.81	.245E+04	5.4	1.55	7.53
1.18	413.88	.281E+04	6.5	1.62	7.19
1.26	413.96	.320E+04	7.7	1.69	6.89
1.34	414.04	.362E+04	9.1	1.76	6.62
1.42	414.12	.405E+04	10.6	1.83	6.37
1.50	414.20	.452E+04	12.3	1.90	6.14

<----- hydrograph ----->				<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	MAX DEPTH MAX VEL
INFLOW : ID= 2 (0516)	11.47	0.55	2.08	27.99	0.47 0.87
OUTFLOW: ID= 1 (4516)	11.47	0.51	2.25	27.97	0.45 0.85

ADD HYD (2510)				
1 + 2 = 3				
ID1= 1 (4516):	11.47	0.513	2.25	27.97
+ ID2= 2 (0511):	54.65	2.750	2.00	27.99
=====				
ID = 3 (2510):	66.12	3.214	2.08	27.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0517)	Area (ha)=	1.75	Curve Number (CN)=	71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.32		

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.119 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 27.985
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.375

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

ADD HYD (2511)				
1 + 2 = 3				
ID1= 1 (2510):	66.12	3.214	2.08	27.99
+ ID2= 2 (4510):	90.75	1.929	3.50	27.99
=====				
ID = 3 (2511):	156.87	4.133	2.25	27.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2511)				
3 + 2 = 1				
ID1= 3 (2511):	156.87	4.133	2.25	27.99
+ ID2= 2 (0517):	1.75	0.119	1.75	27.98
=====				
ID = 1 (2511):	158.62	4.202	2.25	27.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0512)	Area (ha)=	31.10	Curve Number (CN)=	71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.71		

Unit Hyd Qpeak (cms)= 1.673

PEAK FLOW (cms)= 1.269 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 27.993
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.375

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

CALIB				
NASHYD (0514)	Area (ha)=	2.65	Curve Number (CN)=	65.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.60		

Unit Hyd Qpeak (cms)= 0.169

PEAK FLOW (cms)= 0.101 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 23.515
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.315

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

CALIB				
NASHYD (0515)	Area (ha)=	5.41	Curve Number (CN)=	65.0

| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

 U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.504

PEAK FLOW (cms)= 0.262 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 23.513
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.315

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

| CALIB
| NASHYD (0513) | Area (ha)= 6.68 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

 U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.579 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 27.940
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.374

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

| ADD HYD (2512) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 1 (2511): 158.62 4.202 2.25 27.99
+ ID2= 2 (0512): 31.10 1.269 2.25 27.99
=====

ID = 3 (2512): 189.72 5.471 2.25 27.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2512) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 3 (2512): 189.72 5.471 2.25 27.99
+ ID2= 2 (0513): 6.68 0.579 1.58 27.94
=====

ID = 1 (2512): 196.40 5.663 2.17 27.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2512) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 1 (2512): 196.40 5.663 2.17 27.99
+ ID2= 2 (0514): 2.65 0.101 2.17 23.51
=====

ID = 3 (2512): 199.05 5.763 2.17 27.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2512) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 3 (2512): 199.05 5.763 2.17 27.93
+ ID2= 2 (0515): 5.41 0.262 1.92 23.51
=====

ID = 1 (2512): 204.46 5.988 2.17 27.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2513) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 1 (2512): 204.46 5.988 2.17 27.81
+ ID2= 2 (4400): 264.84 7.720 2.33 29.60
=====

ID = 3 (2513): 469.30 13.670 2.25 28.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0520) | Area (ha)= 108.36 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

 U.H. Tp(hrs)= 1.20

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 3.015 (i)
TIME TO PEAK (hrs)= 2.917
RUNOFF VOLUME (mm)= 27.993
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.375

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

| ADD HYD (2520) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 1 (2513): 469.30 13.670 2.25 28.82
+ ID2= 2 (0520): 108.36 3.015 2.92 27.99
=====

ID = 3 (2520): 577.66 16.134 2.33 28.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4500) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning

0.00	409.70	0.0550	
19.70	408.80	0.0550	
41.70	407.20	0.0550	
60.50	405.30	0.0550	
80.00	404.50	0.0550	
95.70	404.60	0.0550 / 0.0350	Main Channel
98.60	403.40	0.0350	Main Channel
100.40	403.40	0.0350	Main Channel
100.80	402.90	0.0350	Main Channel
101.50	402.70	0.0350	Main Channel
102.30	402.80	0.0350	Main Channel
103.30	403.20	0.0350	Main Channel
104.00	403.20	0.0350	Main Channel
105.60	404.40	0.0350 / 0.0550	Main Channel
109.70	404.30	0.0550	
128.60	404.20	0.0550	
154.10	405.40	0.0550	
179.10	406.70	0.0550	
201.90	408.60	0.0550	
224.20	410.60	0.0550	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.34	403.04	.954E+03	0.3	0.70	47.40
0.68	403.38	.304E+04	1.6	1.03	32.27
1.02	403.72	.718E+04	4.5	1.25	26.57
1.36	404.06	.122E+05	9.7	1.58	20.96
1.70	404.40	.251E+05	18.1	1.44	23.04
2.08	404.78	.650E+05	42.3	1.29	25.62
2.46	405.16	.122E+06	86.3	1.40	23.62
2.84	405.54	.192E+06	151.6	1.57	21.10
3.21	405.91	.270E+06	238.3	1.75	18.90
3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

<---- hydrograph ---->

<-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (2520)	577.66	16.13	2.33	28.67	1.62	1.47
OUTFLOW: ID= 1 (4500)	577.66	14.84	2.83	28.67	1.57	1.49

RUNOFF VOLUME (mm)= 27.993
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.375

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

ADD HYD (2610)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (4500)	577.66	14.837	2.83	28.67
+ ID2= 2 (0610)	78.05	2.489	2.67	27.99
ID = 3 (2610)	655.71	17.274	2.83	28.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0623)	Area (ha)	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min	19.37	# of Linear Res.(N)= 3.00
	5.00	
	0.45	

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW (cms)= 1.037 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 27.190
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

CALIB NASHYD (0625)	Area (ha)	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min	6.72	# of Linear Res.(N)= 3.00
	5.00	
	0.39	

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW (cms)= 0.393 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 27.188
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

CALIB NASHYD (0610)	Area (ha)	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	78.05	# of Linear Res.(N)= 3.00
	5.00	
	1.00	

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 2.489 (i)
TIME TO PEAK (hrs)= 2.667

ROUTE CHN(4625)	Routing time step (min)'= 5.00		
IN= 2---> OUT= 1			
<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	414.20	0.0360	Main Channel
4.30	412.70	0.0360	Main Channel
8.60	414.20	0.0360	Main Channel

TRAVEL TIME TABLE					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.108E+02	0.0	0.24	42.13
0.16	412.86	.434E+02	0.0	0.38	26.54
0.24	412.94	.976E+02	0.1	0.50	20.26
0.32	413.02	.174E+03	0.2	0.61	16.72
0.39	413.09	.271E+03	0.3	0.70	14.41
0.47	413.17	.390E+03	0.5	0.79	12.76
0.55	413.25	.532E+03	0.8	0.88	11.51
0.63	413.33	.694E+03	1.1	0.96	10.53
0.71	413.41	.879E+03	1.5	1.04	9.74
0.79	413.49	.108E+04	2.0	1.11	9.08
0.87	413.57	.131E+04	2.6	1.19	8.52
0.95	413.65	.156E+04	3.2	1.26	8.04
1.03	413.73	.183E+04	4.0	1.33	7.62
1.11	413.81	.213E+04	4.9	1.39	7.25
1.18	413.88	.244E+04	5.9	1.46	6.93
1.26	413.96	.278E+04	7.0	1.52	6.64
1.34	414.04	.313E+04	8.2	1.59	6.37
1.42	414.12	.351E+04	9.5	1.65	6.13
1.50	414.20	.392E+04	11.0	1.71	5.92

<---- hydrograph ---->				<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0625)	6.72	0.39	1.83	27.19	0.43
OUTFLOW: ID= 1 (4625)	6.72	0.35	2.08	27.15	0.41

CALIB					
NASHYD (0622)					
ID= 1 DT= 5.0 min	Area	(ha)=	9.69	Curve Number	(CN)= 70.0
	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.36			
Unit Hyd Qpeak	(cms)=	1.028			
PEAK FLOW	(cms)=	0.594 (i)			
TIME TO PEAK	(hrs)=	1.833			
RUNOFF VOLUME	(mm)=	27.187			
TOTAL RAINFALL	(mm)=	74.676			
RUNOFF COEFFICIENT	=	0.364			

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

CALIB					
NASHYD (0621)					
ID= 1 DT= 5.0 min	Area	(ha)=	6.56	Curve Number	(CN)= 70.0
	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.37			

Unit Hyd Qpeak	(cms)=	0.677
PEAK FLOW	(cms)=	0.396 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	27.188
TOTAL RAINFALL	(mm)=	74.676
RUNOFF COEFFICIENT	=	0.364

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

CALIB					
NASHYD (0624)					
ID= 1 DT= 5.0 min	Area	(ha)=	11.84	Curve Number	(CN)= 70.0
	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.51			

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW	(cms)=	0.585 (i)
TIME TO PEAK	(hrs)=	2.000
RUNOFF VOLUME	(mm)=	27.191
TOTAL RAINFALL	(mm)=	74.676
RUNOFF COEFFICIENT	=	0.364

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

CALIB					
STANDHYD (0626)					
ID= 1 DT= 5.0 min	Area	(ha)=	1.06	Total Imp(%)=	60.00
				Dir. Conn.(%)=	50.00

IMPERVIOUS			PERVIOUS (i)	
Surface Area	(ha)=	0.64		0.42
Dep. Storage	(mm)=	1.00		10.00
Average Slope	(%)=	1.00		2.00
Length	(m)=	84.06		40.00
Mannings n	=	0.013		0.250

Max.Eff.Inten.(mm/hr)=	170.99	64.62
over (min)	5.00	15.00
Storage Coeff. (min)=	1.86 (ii)	10.26 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.32	0.09

PEAK FLOW	(cms)=	0.24	0.05	*TOTALS*
TIME TO PEAK	(hrs)=	1.33	1.58	0.256 (iii)
RUNOFF VOLUME	(mm)=	73.68	28.91	1.33
TOTAL RAINFALL	(mm)=	74.68	74.68	51.29
RUNOFF COEFFICIENT	=	0.99	0.39	74.68
				0.69

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2621)					
1 + 2 = 3					
ID1= 1 (4625):	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
+ ID2= 2 (0621):	6.72	0.349	2.08	27.15	
	6.56	0.396	1.83	27.19	
ID = 3 (2621):	13.28	0.715	1.92	27.17	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2621)|
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 2621):  13.28  0.715  1.92  27.17
+ ID2= 2 ( 0622):   9.69  0.594  1.83  27.19
=====
ID = 1 ( 2621):  22.97  1.291  1.92  27.18
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2621)|
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 2621):  22.97  1.291  1.92  27.18
+ ID2= 2 ( 0623):  19.37  1.037  1.92  27.19
=====
ID = 3 ( 2621):  42.34  2.328  1.92  27.18
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2621)|
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 2621):  42.34  2.328  1.92  27.18
+ ID2= 2 ( 0624):  11.84  0.585  2.00  27.19
=====
ID = 1 ( 2621):  54.18  2.902  1.92  27.18
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2621)|
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 2621):  54.18  2.902  1.92  27.18
+ ID2= 2 ( 0626):   1.06  0.256  1.33  51.29
=====
ID = 3 ( 2621):  55.24  2.900  1.92  27.65
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0627)|
| ID= 1 DT= 5.0 min |
-----
Area  (ha)= 9.39  Curve Number (CN)= 70.0
Ia    (mm)= 5.00  # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20
```

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.788 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 27.140
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.363

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

```
-----
| CALIB
| NASHYD ( 6200)|
| ID= 1 DT= 5.0 min |
-----
Area  (ha)= 6.66  Curve Number (CN)= 74.0
Ia    (mm)= 5.00  # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.28
```

Unit Hyd Qpeak (cms)= 0.908

PEAK FLOW (cms)= 0.533 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 30.533
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.409

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

```
-----
| CALIB
| NASHYD ( 6201)|
| ID= 1 DT= 5.0 min |
-----
Area  (ha)= 0.82  Curve Number (CN)= 74.0
Ia    (mm)= 5.00  # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.15
```

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.089 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 30.372
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.407

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

```
-----
| ADD HYD ( 0113)|
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 6200):   6.66  0.533  1.67  30.53
+ ID2= 2 ( 6201):   0.82  0.089  1.50  30.37
=====
ID = 3 ( 0113):   7.48  0.606  1.67  30.52
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTE CHN( 4620)|
| IN= 2---> OUT= 1 |
-----
Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          414.20          0.0350  Main Channel
4.30          412.70          0.0350  Main Channel
8.60          414.20          0.0350  Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH  ELEV  VOLUME  FLOW RATE  VELOCITY  TRAV.TIME
(m)    (m)   (cu.m.) (cms)      (m/s)     (min)
```

0.08	412.78	.456E+01	0.0	0.55	7.70
0.16	412.86	.182E+02	0.1	0.88	4.85
0.24	412.94	.410E+02	0.2	1.15	3.70
0.32	413.02	.729E+02	0.4	1.39	3.05
0.39	413.09	.114E+03	0.7	1.61	2.63
0.47	413.17	.164E+03	1.2	1.82	2.33
0.55	413.25	.223E+03	1.8	2.02	2.10
0.63	413.33	.292E+03	2.5	2.21	1.92
0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0113)	7.48	0.61	1.67	30.52	0.37	1.53
OUTFLOW: ID= 1 (4620)	7.48	0.60	1.67	30.51	0.36	1.52

ADD HYD (2620)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4620):	7.48	0.600	1.67	30.51
+ ID2= 2 (0627):	9.39	0.788	1.58	27.14
ID = 3 (2620):	16.87	1.354	1.67	28.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2622)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2620):	16.87	1.354	1.67	28.64
+ ID2= 2 (2621):	55.24	2.960	1.92	27.65
ID = 3 (2622):	72.11	4.051	1.83	27.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2623)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2610):	655.71	17.274	2.83	28.59
+ ID2= 2 (2622):	72.11	4.051	1.83	27.88
ID = 3 (2623):	727.82	18.903	2.67	28.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area	(ha)=	8.36	Curve Number	(CN)= 70.0
NASHYD (0637)	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.47			

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW	(cms)=	0.434 (i)
TIME TO PEAK	(hrs)=	2.000
RUNOFF VOLUME	(mm)=	27.190
TOTAL RAINFALL	(mm)=	74.676
RUNOFF COEFFICIENT	=	0.364

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

CALIB	Area	(ha)=	33.04	Curve Number	(CN)= 70.0
NASHYD (0630)	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.38			

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW	(cms)=	1.963 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	27.188
TOTAL RAINFALL	(mm)=	74.676
RUNOFF COEFFICIENT	=	0.364

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

ROUTE CHN(4630)	Routing time step (min)='	5.00
IN= 2--> OUT= 1		

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22

1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

		<--- hydrograph --->				<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0630)	33.04	1.96	1.83	27.19	0.88	0.87	
OUTFLOW: ID= 1 (4630)	33.04	1.83	2.00	27.18	0.86	0.86	

ADD HYD (2637)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2623):	727.82	18.903	2.67	28.52
+ ID2= 2 (4630):	33.04	1.829	2.00	27.18
=====				
ID = 3 (2637):	760.86	19.940	2.58	28.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2637):	760.86	19.940	2.58	28.46
+ ID2= 2 (0637):	8.36	0.434	2.00	27.19
=====				
ID = 1 (2637):	769.22	20.214	2.50	28.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0636)			
ID= 1 DT= 5.0 min	Area (ha)=	3.32	Curve Number (CN)= 70.0
	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.48	

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.170 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 27.190
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

ADD HYD (2636)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2637):	769.22	20.214	2.50	28.44
+ ID2= 2 (0636):	3.32	0.170	2.00	27.19

=====

ID = 3 (2636):	772.54	20.332	2.50	28.44
-----------------	--------	--------	------	-------

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0639)			
ID= 1 DT= 5.0 min	Area (ha)=	4.60	Curve Number (CN)= 70.0
	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.43	

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.253 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 27.190
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

CALIB			
NASHYD (0638)			
ID= 1 DT= 5.0 min	Area (ha)=	20.63	Curve Number (CN)= 70.0
	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.46	

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 1.087 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 27.190
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

ADD HYD (2630)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2636):	772.54	20.332	2.50	28.44
+ ID2= 2 (0638):	20.63	1.087	1.92	27.19
=====				
ID = 3 (2630):	793.17	21.049	2.50	28.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2630)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2630):	793.17	21.049	2.50	28.41
+ ID2= 2 (0639):	4.60	0.253	1.92	27.19
=====				
ID = 1 (2630):	797.77	21.202	2.50	28.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

 ** SIMULATION : 50 year Fergus Shand Dam Chic **

CHICAGO STORM
 Ptotal= 84.43 mm

IDF curve parameters: A=3574.000
 B= 19.000
 C= 0.924

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

Duration of storm = 4.00 hrs
 Storm time step = 5.00 min
 Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.36	1.00	29.13	2.00	15.89	3.00	5.24
0.08	3.68	1.08	47.79	2.08	13.89	3.08	4.93
0.17	4.06	1.17	98.38	2.17	12.28	3.17	4.65
0.25	4.51	1.25	189.90	2.25	10.96	3.25	4.40
0.33	5.08	1.33	119.63	2.33	9.87	3.33	4.17
0.42	5.77	1.42	77.23	2.42	8.95	3.42	3.96
0.50	6.66	1.50	54.63	2.50	8.18	3.50	3.77
0.58	7.83	1.58	41.06	2.58	7.51	3.58	3.60
0.67	9.40	1.67	32.23	2.67	6.93	3.67	3.44
0.75	11.60	1.75	26.13	2.75	6.42	3.75	3.29
0.83	14.86	1.83	21.72	2.83	5.98	3.83	3.15
0.92	20.04	1.92	18.43	2.92	5.59	3.92	3.03

CALIB
 NASHYD (0100)
 ID= 1 DT= 5.0 min

Area (ha)= 136.98 Curve Number (CN)= 69.0
 Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 U.H. Tp(hrs)= 1.17

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 4.537 (i)
 TIME TO PEAK (hrs)= 2.833
 RUNOFF VOLUME (mm)= 32.598
 TOTAL RAINFALL (mm)= 84.430
 RUNOFF COEFFICIENT = 0.386

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

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

Area (ha)= 14.60 Curve Number (CN)= 74.0
 Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
 U.H. Tp(hrs)= 0.97

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.690 (i)
 TIME TO PEAK (hrs)= 2.583
 RUNOFF VOLUME (mm)= 39.944

TOTAL RAINFALL (mm)= 84.430
 RUNOFF COEFFICIENT = 0.473

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

CALIB
 STANDHYD (0203)
 ID= 1 DT= 5.0 min

Area (ha)= 8.20
 Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS Pervious (i)
 Surface Area (ha)= 3.69 4.51
 Dep. Storage (mm)= 2.00 5.00
 Average Slope (%)= 1.20 1.20
 Length (m)= 25.00 25.00
 Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 104.78
 over (min)= 5.00 10.00
 Storage Coeff. (min)= 0.81 (ii) 6.90 (ii)
 Unit Hyd. Tpeak (min)= 5.00 10.00
 Unit Hyd. peak (cms)= 0.34 0.14

TOTALS

PEAK FLOW (cms)= 1.08 0.99 1.639 (iii)
 TIME TO PEAK (hrs)= 1.33 1.50 1.42
 RUNOFF VOLUME (mm)= 82.43 41.59 51.80
 TOTAL RAINFALL (mm)= 84.43 84.43 84.43
 RUNOFF COEFFICIENT = 0.98 0.49 0.61

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. 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 (2200)
 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	14.60	0.690	2.58	39.94
+ ID2= 2 (0203):	8.20	1.639	1.42	51.80
=====				
ID = 3 (2200):	22.80	1.706	1.42	44.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)
 IN= 2---> OUT= 1
 DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1980	0.2314
0.0040	0.0218	0.2920	0.2621
0.0060	0.0446	0.3980	0.2937
0.0070	0.0683	0.5150	0.3261
0.0080	0.0930	0.8290	0.3592
0.0090	0.1187	1.3520	0.3930
0.0230	0.1453	2.0570	0.4275

0.0610 0.1730 | 2.9590 0.4629
0.1200 0.2017 | 0.0000 0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2200)	22.800	1.706	1.42	44.21
OUTFLOW: ID= 1 (5200)	22.800	0.840	2.67	44.15

PEAK FLOW REDUCTION [Qout/Qin](%)= 49.23
TIME SHIFT OF PEAK FLOW (min)= 75.00
MAXIMUM STORAGE USED (ha.m.)= 0.3599

CALIB	Area (ha)=	4.80	Curve Number (CN)=	90.0
NASHYD (0205)	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.41		

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.668 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 61.867
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.733

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

CALIB	Area (ha)=	0.20	Dir. Conn.(%)=	25.00
STANDHYD (0206)	Total Imp(%)=	45.00		
ID= 1 DT= 5.0 min				

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	189.90	104.78
over (min)	5.00	10.00
Storage Coeff. (min)=	0.81 (ii)	6.90 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.14

TOTALS

PEAK FLOW (cms)=	0.03	0.02	0.040 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.42
RUNOFF VOLUME (mm)=	82.43	41.59	51.77
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.98	0.49	0.61

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 71.0 Ia = Dep. 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 (2201)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0205):	4.80	0.668	1.83	61.87
+ ID2= 2 (0206):	0.20	0.040	1.42	51.77
ID = 3 (2201):	5.00	0.683	1.83	61.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (2201):	5.00	0.683	1.83	61.46
+ ID2= 2 (5200):	22.80	0.840	2.67	44.15
ID = 1 (2201):	27.80	1.195	2.25	47.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	2.70	Dir. Conn.(%)=	8.00
STANDHYD (0209)	Total Imp(%)=	16.00		
ID= 1 DT= 5.0 min				

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.43	2.27
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	35.00	35.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	189.90	72.28
over (min)	5.00	10.00
Storage Coeff. (min)=	1.00 (ii)	9.64 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.11

TOTALS

PEAK FLOW (cms)=	0.11	0.31	0.358 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.50
RUNOFF VOLUME (mm)=	82.43	36.53	40.20
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.98	0.43	0.48

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 71.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

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

CALIB	Area (ha)=	1.30	Dir. Conn.(%)=	25.00
STANDHYD (0207)	Total Imp(%)=	45.00		
ID= 1 DT= 5.0 min				


```

-----
Surface Area (ha)= 0.58 0.72
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 104.78
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.81 (ii) 6.90 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

PEAK FLOW (cms)= 0.17 0.16
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 82.43 41.59
TOTAL RAINFALL (mm)= 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.49 0.61

*TOTALS*
0.260 (iii)
1.42
51.80
84.43
0.61

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2202) |
| 1 + 2 = 3 |
-----
ID1= 1 ( 0207): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 ( 0209): 1.30 0.260 1.42 51.80
2.70 0.358 1.50 40.20
=====
ID = 3 ( 2202): 4.00 0.610 1.42 43.97

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2202) |
| 3 + 2 = 1 |
-----
ID1= 3 ( 2202): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 ( 2201): 4.00 0.610 1.42 43.97
27.80 1.195 2.25 47.26
=====
ID = 1 ( 2202): 31.80 1.368 1.83 46.85

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2100) |
| 1 + 2 = 3 |
-----
ID1= 1 ( 0100): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 ( 2202): 136.98 4.537 2.83 32.60
31.80 1.368 1.83 46.85
=====
ID = 3 ( 2100): 168.78 5.637 2.75 35.28

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0302) | Area (ha)= 2.90 Curve Number (CN)= 74.0
| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= 0.45

```

Unit Hyd Qpeak (cms)= 0.246

```

PEAK FLOW (cms)= 0.234 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 39.941
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.473

```

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

```

-----
| CALIB |
| STANDHYD ( 0304) | Area (ha)= 4.40
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
-----

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.98 2.42
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 189.90 104.78
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.86 (ii) 7.29 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

```

```

PEAK FLOW (cms)= 0.58 0.53
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 82.43 41.59
TOTAL RAINFALL (mm)= 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.49 0.61

*TOTALS*
0.867 (iii)
1.42
51.80
84.43
0.61

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2300) |
| 1 + 2 = 3 |
-----
ID1= 1 ( 0302): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 ( 0304): 2.90 0.234 1.92 39.94
4.40 0.867 1.42 51.80
=====
ID = 3 ( 2300): 7.30 0.941 1.42 47.09

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| STANDHYD ( 0308) |
| ID= 1 DT= 5.0 min |
|-----

```

```

Area (ha)= 0.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 189.90 104.78
over (min) 5.00 10.00
Storage Coeff. (min)= 0.86 (ii) 7.29 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

```

```

PEAK FLOW (cms)= 0.03 0.02
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 82.43 41.59
TOTAL RAINFALL (mm)= 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.49

```

```

*TOTALS*
0.039 (iii)
1.42
51.78
84.43
0.61

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB
| STANDHYD ( 0310) |
| ID= 1 DT= 5.0 min |
|-----

```

```

Area (ha)= 5.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 189.90 72.28
over (min) 5.00 10.00
Storage Coeff. (min)= 0.81 (ii) 7.88 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.13

```

```

PEAK FLOW (cms)= 0.24 0.71
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 82.43 36.53
TOTAL RAINFALL (mm)= 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.43

```

```

*TOTALS*
0.803 (iii)
1.50
40.20
84.43
0.48

```

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

- CN* = 71.0 Ia = Dep. 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 ( 2301) |
| 1 + 2 = 3 |
|-----

```

```

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2300): 7.30 0.941 1.42 47.09
+ ID2= 2 ( 0308): 0.20 0.039 1.42 51.78
=====
ID = 3 ( 2301): 7.50 0.980 1.42 47.21

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2301) |
| 3 + 2 = 1 |
|-----

```

```

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 2301): 7.50 0.980 1.42 47.21
+ ID2= 2 ( 0310): 5.70 0.803 1.50 40.20
=====
ID = 1 ( 2301): 13.20 1.782 1.42 44.19

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2302) |
| 1 + 2 = 3 |
|-----

```

```

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2100): 168.78 5.637 2.75 35.28
+ ID2= 2 ( 2301): 13.20 1.782 1.42 44.19
=====
ID = 3 ( 2302): 181.98 5.927 2.67 35.93

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| STANDHYD ( 0400) |
| ID= 1 DT= 5.0 min |
|-----

```

```

Area (ha)= 82.86
Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250

```

```

Max.Eff.Inten.(mm/hr)= 154.76 68.11
over (min) 10.00 25.00
Storage Coeff. (min)= 11.81 (ii) 20.04 (ii)
Unit Hyd. Tpeak (min)= 10.00 25.00
Unit Hyd. peak (cms)= 0.10 0.05

```

```

PEAK FLOW (cms)= 0.71 6.64
TIME TO PEAK (hrs)= 1.42 1.75
RUNOFF VOLUME (mm)= 82.43 35.21

```

```

*TOTALS*
7.075 (iii)
1.75
36.63

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	411.10	0.0550	
27.30	410.20	0.0550	
77.50	409.10	0.0550	
96.60	409.10	0.0550	
115.80	408.90	0.0550	
124.80	409.10	0.0550	
131.00	408.90	0.0550 / 0.0350	Main Channel
133.60	408.00	0.0350	Main Channel
134.40	407.60	0.0350	Main Channel
135.00	407.50	0.0350	Main Channel
135.80	407.60	0.0350	Main Channel
136.50	408.00	0.0350	Main Channel
139.40	408.80	0.0350 / 0.0550	Main Channel
143.50	408.90	0.0550	
148.50	408.70	0.0550	
163.80	408.90	0.0550	
183.20	408.90	0.0550	
243.70	409.70	0.0550	
278.70	410.20	0.0550	
330.50	411.40	0.0550	

TRAVEL TIME TABLE					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV. TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.19	407.69	.366E+03	0.1	0.51	58.83
0.37	407.87	.106E+04	0.5	0.81	37.08
0.56	408.06	.199E+04	1.1	1.00	29.93
0.74	408.24	.328E+04	2.1	1.14	26.32
0.93	408.43	.498E+04	3.6	1.28	23.32
1.11	408.61	.708E+04	5.6	1.43	20.94
1.30	408.80	.105E+05	8.5	1.45	20.61
1.49	408.99	.247E+05	14.8	1.07	27.91

1.68	409.18	.601E+05	30.4	0.91	32.97
1.87	409.37	.109E+06	58.5	0.96	31.05
2.06	409.56	.166E+06	98.3	1.06	28.11
2.25	409.75	.231E+06	159.3	1.17	25.57
2.44	409.94	.303E+06	215.4	1.28	23.46
2.64	410.14	.383E+06	293.8	1.38	21.74
2.83	410.33	.470E+06	390.1	1.49	20.10
3.02	410.52	.563E+06	502.4	1.60	18.66
3.21	410.71	.660E+06	628.8	1.71	17.48
3.40	410.90	.762E+06	769.5	1.81	16.49
3.59	411.09	.868E+06	924.9	1.91	15.65

	AREA	<--- hydrograph --->			<-pipe / channel->	
	(ha)	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2400)	264.84	11.17	1.83	36.15	1.38	1.26
OUTFLOW : ID= 1 (4400)	264.84	9.54	2.42	36.15	1.33	1.37

CALIB			
NASHYD (0510)	Area (ha)=	90.75	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. To(hrs)=	1.70	

Unit Hyd Opeak (cms)= 2.039

PEAK FLOW	(cms)=	2.382 (i)
TIME TO PEAK	(hrs)=	3.500
RUNOFF VOLUME	(mm)=	34.443
TOTAL RAINFALL	(mm)=	84.430
RUNOFF COEFFICIENT	=	0.408

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

```
| ROUTE CHN( 4510)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
```

[illegible]

[illegible]

Unit Hyd Qpeak (cms)= 4.014

PEAK FLOW (cms)= 3.411 (i)

		<---- hydrograph <---->			<-pipe / channel->		
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW: ID= 2 (	0516)	11.47	0.68	2.08	34.44	0.51	0.92
OUTFLOW: ID= 1 (	4516)	11.47	0.64	2.25	34.42	0.49	0.90

```

-----
| ADD HYD ( 2510) |
| 1 + 2 = 3 |
-----
      AREA   QPEAK   TPEAK   R.V.
      (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 4516): 11.47  0.641  2.25  34.42
+ ID2= 2 ( 0511): 54.65  3.411  2.00  34.44
=====
ID = 3 ( 2510): 66.12  3.993  2.08  34.44

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| NASHYD ( 0517) |
| ID= 1 DT= 5.0 min |
-----
      Area   (ha)= 1.75  Curve Number (CN)= 71.0
      Ia     (mm)= 5.00  # of Linear Res.(N)= 3.00
      U.H. Tp(hrs)= 0.32

```

Unit Hyd Qpeak (cms)= 0.209

```

PEAK FLOW      (cms)= 0.147 (i)
TIME TO PEAK   (hrs)= 1.750
RUNOFF VOLUME  (mm)= 34.432
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.408

```

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

```

-----
| ADD HYD ( 2511) |
| 1 + 2 = 3 |
-----
      AREA   QPEAK   TPEAK   R.V.
      (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2510): 66.12  3.993  2.08  34.44
+ ID2= 2 ( 4510): 90.75  2.382  3.50  34.44
=====
ID = 3 ( 2511): 156.87  5.126  2.25  34.44

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2511) |
| 3 + 2 = 1 |
-----
      AREA   QPEAK   TPEAK   R.V.
      (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2511): 156.87  5.126  2.25  34.44
+ ID2= 2 ( 0517): 1.75  0.147  1.75  34.43
=====
ID = 1 ( 2511): 158.62  5.211  2.17  34.44

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| NASHYD ( 0512) |
| ID= 1 DT= 5.0 min |
-----
      Area   (ha)= 31.10  Curve Number (CN)= 71.0
      Ia     (mm)= 5.00  # of Linear Res.(N)= 3.00
      U.H. Tp(hrs)= 0.71

```

Unit Hyd Qpeak (cms)= 1.673

```

PEAK FLOW      (cms)= 1.573 (i)
TIME TO PEAK   (hrs)= 2.250
RUNOFF VOLUME  (mm)= 34.443
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.408

```

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

```

-----
| CALIB
| NASHYD ( 0514) |
| ID= 1 DT= 5.0 min |
-----
      Area   (ha)= 2.65  Curve Number (CN)= 65.0
      Ia     (mm)= 5.00  # of Linear Res.(N)= 3.00
      U.H. Tp(hrs)= 0.60

```

Unit Hyd Qpeak (cms)= 0.169

```

PEAK FLOW      (cms)= 0.126 (i)
TIME TO PEAK   (hrs)= 2.167
RUNOFF VOLUME  (mm)= 29.181
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.346

```

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

```

-----
| CALIB
| NASHYD ( 0515) |
| ID= 1 DT= 5.0 min |
-----
      Area   (ha)= 5.41  Curve Number (CN)= 65.0
      Ia     (mm)= 5.00  # of Linear Res.(N)= 3.00
      U.H. Tp(hrs)= 0.41

```

Unit Hyd Qpeak (cms)= 0.504

```

PEAK FLOW      (cms)= 0.327 (i)
TIME TO PEAK   (hrs)= 1.917
RUNOFF VOLUME  (mm)= 29.179
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.346

```

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

```

-----
| CALIB
| NASHYD ( 0513) |
| ID= 1 DT= 5.0 min |
-----
      Area   (ha)= 6.68  Curve Number (CN)= 71.0
      Ia     (mm)= 5.00  # of Linear Res.(N)= 3.00
      U.H. Tp(hrs)= 0.20

```

Unit Hyd Qpeak (cms)= 1.276

```

PEAK FLOW      (cms)= 0.718 (i)
TIME TO PEAK   (hrs)= 1.583
RUNOFF VOLUME  (mm)= 34.377
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.407

```

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


```

-----
| ADD HYD ( 2512)|
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 2511):  158.62  5.211  2.17  34.44
+ ID2= 2 ( 0512):   31.10  1.573  2.25  34.44
=====
ID = 3 ( 2512):  189.72  6.783  2.25  34.44

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2512)|
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 2512):  189.72  6.783  2.25  34.44
+ ID2= 2 ( 0513):    6.68  0.718  1.58  34.38
=====
ID = 1 ( 2512):  196.40  7.027  2.17  34.44

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2512)|
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 2512):  196.40  7.027  2.17  34.44
+ ID2= 2 ( 0514):    2.65  0.126  2.17  29.18
=====
ID = 3 ( 2512):  199.05  7.153  2.17  34.37

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2512)|
| 3 + 2 = 1 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 2512):  199.05  7.153  2.17  34.37
+ ID2= 2 ( 0515):    5.41  0.327  1.92  29.18
=====
ID = 1 ( 2512):  204.46  7.433  2.17  34.23

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2513)|
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 2512):  204.46  7.433  2.17  34.23
+ ID2= 2 ( 4400):  264.84  9.539  2.42  36.15
=====
ID = 3 ( 2513):  469.30  16.815  2.25  35.31

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| NASHYD ( 0520)|
ID= 1 DT= 5.0 min|
-----
Area      (ha)= 108.36  Curve Number (CN)= 71.0
Ia        (mm)= 5.00   # of Linear Res.(N)= 3.00

```

U.H. Tp(hrs)= 1.20

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 3.730 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 34.443
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.408

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

```

-----
| ADD HYD ( 2520)|
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 2513):  469.30  16.815  2.25  35.31
+ ID2= 2 ( 0520):  108.36  3.730  2.83  34.44
=====
ID = 3 ( 2520):  577.66  19.970  2.42  35.15

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 4500)|
| IN= 2--> OUT= 1 |
-----
Routing time step (min)'= 5.00

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          409.70      0.0550
19.70         408.80      0.0550
41.70         407.20      0.0550
60.50         405.30      0.0550
80.00         404.50      0.0550
95.70         404.60      0.0550 /0.0350 Main Channel
98.60         403.40      0.0350 Main Channel
100.40        403.40      0.0350 Main Channel
100.80        402.90      0.0350 Main Channel
101.50        402.70      0.0350 Main Channel
102.30        402.80      0.0350 Main Channel
103.30        403.20      0.0350 Main Channel
104.00        403.20      0.0350 Main Channel
105.60        404.40      0.0350 /0.0550 Main Channel
109.70        404.30      0.0550
128.60        404.20      0.0550
154.10        405.40      0.0550
179.10        406.70      0.0550
201.90        408.60      0.0550
224.20        410.60      0.0550

```

```

<----- TRAVEL TIME TABLE ----->
DEPTH      ELEV      VOLUME      FLOW RATE      VELOCITY      TRAV.TIME
(m)         (m)         (cu.m.)      (cms)          (m/s)         (min)
0.34        403.04      .954E+03      0.3            0.70          47.40
0.68        403.38      .304E+04      1.6            1.03          32.27
1.02        403.72      .718E+04      4.5            1.25          26.57
1.36        404.06      .122E+05      9.7            1.58          20.96
1.70        404.40      .251E+05      18.1           1.44          23.04
2.08        404.78      .650E+05      42.3           1.29          25.62
2.46        405.16      .122E+06      86.3           1.40          23.62
2.84        405.54      .192E+06      151.6          1.57          21.10

```

3.21	405.91	.270E+06	238.3	1.75	18.90
3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	2520)	577.66	19.97	2.42	35.15	1.73	1.43
OUTFLOW: ID= 1 (	4500)	577.66	18.27	2.92	35.15	1.70	1.44

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

CALIB				
NASHYD (0625)	Area (ha)=	6.72	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.39		

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW	(cms)=	0.488 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	33.503
TOTAL RAINFALL	(mm)=	84.430
RUNOFF COEFFICIENT	=	0.397

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

CALIB				
NASHYD (0610)	Area (ha)=	78.05	Curve Number (CN)=	71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	1.00		

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW	(cms)=	3.080 (i)
TIME TO PEAK	(hrs)=	2.583
RUNOFF VOLUME	(mm)=	34.443
TOTAL RAINFALL	(mm)=	84.430
RUNOFF COEFFICIENT	=	0.408

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.108E+02	0.0	0.24	42.13
0.16	412.86	.434E+02	0.0	0.38	26.54
0.24	412.94	.976E+02	0.1	0.50	20.26
0.32	413.02	.174E+03	0.2	0.61	16.72
0.39	413.09	.271E+03	0.3	0.70	14.41
0.47	413.17	.390E+03	0.5	0.79	12.76
0.55	413.25	.532E+03	0.8	0.88	11.51
0.63	413.33	.694E+03	1.1	0.96	10.53
0.71	413.41	.879E+03	1.5	1.04	9.74
0.79	413.49	.108E+04	2.0	1.11	9.08
0.87	413.57	.131E+04	2.6	1.19	8.52
0.95	413.65	.156E+04	3.2	1.26	8.04
1.03	413.73	.183E+04	4.0	1.33	7.62
1.11	413.81	.213E+04	4.9	1.39	7.25
1.18	413.88	.244E+04	5.9	1.46	6.93
1.26	413.96	.278E+04	7.0	1.52	6.64
1.34	414.04	.313E+04	8.2	1.59	6.37
1.42	414.12	.351E+04	9.5	1.65	6.13
1.50	414.20	.392E+04	11.0	1.71	5.92

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	0625)	6.72	0.49	1.83	33.50	0.46
OUTFLOW: ID= 1 (	4625)	6.72	0.44	2.08	33.47	0.76

CALIB			
NASHYD (0622)	Area (ha)=	9.69	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
-----	U.H. Tp(hrs)=	0.36	

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW (cms)= 0.737 (i)
 TIME TO PEAK (hrs)= 1.833
 RUNOFF VOLUME (mm)= 33.502
 TOTAL RAINFALL (mm)= 84.430
 RUNOFF COEFFICIENT = 0.397

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

CALIB			
NASHYD (0621)	Area (ha)=	6.56	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
-----	U.H. Tp(hrs)=	0.37	

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.492 (i)
 TIME TO PEAK (hrs)= 1.833
 RUNOFF VOLUME (mm)= 33.502
 TOTAL RAINFALL (mm)= 84.430
 RUNOFF COEFFICIENT = 0.397

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

CALIB			
NASHYD (0624)	Area (ha)=	11.84	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
-----	U.H. Tp(hrs)=	0.51	

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 0.727 (i)
 TIME TO PEAK (hrs)= 2.000
 RUNOFF VOLUME (mm)= 33.507
 TOTAL RAINFALL (mm)= 84.430
 RUNOFF COEFFICIENT = 0.397

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

CALIB			
STANDHYD (0626)	Area (ha)=	1.06	
ID= 1 DT= 5.0 min	Total Imp(%)=	60.00	Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.64	0.42
Dep. Storage (mm)=	1.00	10.00
Average Slope (%)=	1.00	2.00
Length (m)=	84.06	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	189.90	80.43
over (min)	5.00	10.00
Storage Coeff. (min)=	1.78 (ii)	6.78 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.32	0.14

TOTALS

PEAK FLOW (cms)=	0.27	0.07	0.306 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	83.43	35.72	59.57
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.99	0.42	0.71

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 70.0 Ia = Dep. 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 (2621)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4625):	6.72	0.436	2.08	33.47
+ ID2= 2 (0621):	6.56	0.492	1.83	33.50
=====				
ID = 3 (2621):	13.28	0.896	1.92	33.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2621):	13.28	0.896	1.92	33.49
+ ID2= 2 (0622):	9.69	0.737	1.83	33.50
=====				
ID = 1 (2621):	22.97	1.610	1.92	33.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2621):	22.97	1.610	1.92	33.49
+ ID2= 2 (0623):	19.37	1.288	1.92	33.51
=====				
ID = 3 (2621):	42.34	2.898	1.92	33.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2621):	42.34	2.898	1.92	33.50

+ ID2= 2 (0624): 11.84 0.727 2.00 33.51
=====

ID = 1 (2621): 54.18 3.612 1.92 33.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2621):	54.18	3.612	1.92	33.50
+ ID2= 2 (0626):	1.06	0.306	1.33	59.57
=====				
ID = 3 (2621):	55.24	3.673	1.92	34.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0627)
ID= 1 DT= 5.0 min

Area (ha)=	9.39	Curve Number (CN)=	70.0
Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.20		

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.978 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 33.444
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.396

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

CALIB
NASHYD (6200)
ID= 1 DT= 5.0 min

Area (ha)=	6.66	Curve Number (CN)=	74.0
Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.28		

Unit Hyd Qpeak (cms)= 0.908

PEAK FLOW (cms)= 0.659 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 37.386
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.443

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

CALIB
NASHYD (6201)
ID= 1 DT= 5.0 min

Area (ha)=	0.82	Curve Number (CN)=	74.0
Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.15		

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.110 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 37.188

TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.440

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

ADD HYD (0113)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (6200):	6.66	0.659	1.67	37.39
+ ID2= 2 (6201):	0.82	0.110	1.50	37.19
=====				
ID = 3 (0113):	7.48	0.747	1.67	37.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4620)
IN= 2---> OUT= 1

Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.456E+01	0.0	0.55	7.70
0.16	412.86	.182E+02	0.1	0.88	4.85
0.24	412.94	.410E+02	0.2	1.15	3.70
0.32	413.02	.729E+02	0.4	1.39	3.05
0.39	413.09	.114E+03	0.7	1.61	2.63
0.47	413.17	.164E+03	1.2	1.82	2.33
0.55	413.25	.223E+03	1.8	2.02	2.10
0.63	413.33	.292E+03	2.5	2.21	1.92
0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0113)	7.48	0.75	1.67	37.36	0.40	1.63
OUTFLOW: ID= 1 (4620)	7.48	0.74	1.67	37.36	0.40	1.62

ADD HYD (2620)

1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4620):	7.48	0.745	1.67	37.36
+ ID2= 2 (0627):	9.39	0.978	1.58	33.44
=====				
ID = 3 (2620):	16.87	1.679	1.67	35.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2622)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2620):	16.87	1.679	1.67	35.18
+ ID2= 2 (2621):	55.24	3.673	1.92	34.00
=====				
ID = 3 (2622):	72.11	5.023	1.83	34.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2623)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2610):	655.71	21.260	2.83	35.07
+ ID2= 2 (2622):	72.11	5.023	1.83	34.28
=====				
ID = 3 (2623):	727.82	23.171	2.67	34.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area	(ha)=	8.36	Curve Number	(CN)= 70.0
NASHYD (0637)	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.47			

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 0.539 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 33.506
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

CALIB	Area	(ha)=	33.04	Curve Number	(CN)= 70.0
NASHYD (0630)	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.38			

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 2.438 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 33.503
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

ROUTE CHN(4630)	Routing time step (min)=' 5.00
IN= 2---> OUT= 1	

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

<---- hydrograph ---->				<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
	(ha)	(cms)	(hrs)	(mm)	(m)
INFLOW : ID= 2 (0630)	33.04	2.44	1.83	33.50	0.96
OUTFLOW: ID= 1 (4630)	33.04	2.28	2.00	33.49	0.93

ADD HYD (2637)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2623):	727.82	23.171	2.67	34.99
+ ID2= 2 (4630):	33.04	2.282	2.00	33.49
=====				
ID = 3 (2637):	760.86	24.391	2.58	34.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)

ID1= 3 (2637): 760.86 24.391 2.58 34.92
+ ID2= 2 (0637): 8.36 0.539 1.92 33.51
=====

ID = 1 (2637): 769.22 24.719 2.58 34.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0636) | Area (ha)= 3.32 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.48

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.212 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 33.506
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

ADD HYD (2636) |
1 + 2 = 3 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (2637): 769.22 24.719 2.58 34.91
+ ID2= 2 (0636): 3.32 0.212 2.00 33.51
=====

ID = 3 (2636): 772.54 24.852 2.58 34.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0638) | Area (ha)= 4.60 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.43

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.315 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 33.505
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

CALIB
NASHYD (0638) | Area (ha)= 20.63 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.46

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 1.351 (i)
TIME TO PEAK (hrs)= 1.917

RUNOFF VOLUME (mm)= 33.506
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

ADD HYD (2630) |
1 + 2 = 3 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (2636): 772.54 24.852 2.58 34.90
+ ID2= 2 (0638): 20.63 1.351 1.92 33.51
=====

ID = 3 (2630): 793.17 25.716 2.50 34.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2630) |
3 + 2 = 1 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 3 (2630): 793.17 25.716 2.50 34.86
+ ID2= 2 (0639): 4.60 0.315 1.92 33.50
=====

ID = 1 (2630): 797.77 25.904 2.50 34.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

** SIMULATION : 100 year Fergus Shand Dam Chi **

CHICAGO STORM | IDF curve parameters: A=4382.000
Ptotal= 94.08 mm | B= 21.000
C= 0.939
used in: INTENSITY = A / (t + B)^C
Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	3.55	1.00	33.31	2.00	18.02	3.00	5.69
0.08	3.91	1.08	54.51	2.08	15.69	3.08	5.34
0.17	4.34	1.17	109.99	2.17	13.83	3.17	5.02
0.25	4.86	1.25	205.33	2.25	12.30	3.25	4.73
0.33	5.50	1.33	132.84	2.33	11.04	3.33	4.47
0.42	6.30	1.42	87.25	2.42	9.97	3.42	4.24
0.50	7.33	1.50	62.23	2.50	9.07	3.50	4.02
0.58	8.67	1.58	46.93	2.58	8.30	3.58	3.82
0.67	10.48	1.67	36.86	2.67	7.63	3.67	3.64
0.75	13.04	1.75	29.86	2.75	7.05	3.75	3.48
0.83	16.82	1.83	24.77	2.83	6.54	3.83	3.32
0.92	22.83	1.92	20.96	2.92	6.09	3.92	3.18

CALIB
NASHYD (0100)
ID= 1 DT= 5.0 min
Area (ha)= 136.98
Ia (mm)= 5.00
U.H. Tp(hrs)= 1.17
Curve Number (CN)= 69.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 4.464
PEAK FLOW (cms)= 5.477 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 39.053
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.415

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

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min
Area (ha)= 14.60
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.97
Curve Number (CN)= 74.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 0.575
PEAK FLOW (cms)= 0.820 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 47.141
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.501

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

CALIB
STANDHYD (0203)
ID= 1 DT= 5.0 min
Area (ha)= 8.20
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.69 4.51
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 205.33 122.38
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.79 (ii) 6.51 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

PEAK FLOW (cms)= 1.17 1.18 1.912 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 92.08 49.10 59.84
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.52 0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200)
1 + 2 = 3
ID1= 1 (0201): AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
+ ID2= 2 (0203): 14.60 0.820 2.58 47.14
8.20 1.912 1.42 59.84
ID = 3 (2200): 22.80 1.993 1.42 51.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)
IN= 2---> OUT= 1
DT= 5.0 min
OVERFLOW IS OFF
OUTFLOW (cms) STORAGE (ha.m.) OUTFLOW (cms) STORAGE (ha.m.)
0.0000 0.0000 0.1980 0.2314
0.0040 0.0218 0.2920 0.2621
0.0060 0.0446 0.3980 0.2937
0.0070 0.0683 0.5150 0.3261
0.0080 0.0930 0.8290 0.3592
0.0090 0.1187 1.3520 0.3930
0.0230 0.1453 2.0570 0.4275
0.0610 0.1730 2.9590 0.4629
0.1200 0.2017 0.0000 0.0000

INFLOW : ID= 2 (2200) AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
22.800 1.993 1.42 51.71
OUTFLOW: ID= 1 (5200) 22.800 1.037 2.50 51.65

PEAK FLOW REDUCTION [Qout/Qin](%)= 52.04
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.3727

CALIB
NASHYD (0205)
ID= 1 DT= 5.0 min
Area (ha)= 4.80
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.41
Curve Number (CN)= 90.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.768 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 70.945
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.754

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

CALIB

| STANDHYD (0206) | Area (ha)= 0.20
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 122.38
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.79 (ii) 6.51 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

TOTALS
PEAK FLOW (cms)= 0.03 0.03 0.047 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 92.08 49.10 59.82
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.52 0.64

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201) |
| 1 + 2 = 3 |
ID1= 1 (0205): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0206): 4.80 0.768 1.83 70.94
===== 0.20 0.047 1.42 59.82
ID = 3 (2201): 5.00 0.785 1.83 70.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2201) |
| 3 + 2 = 1 |
ID1= 3 (2201): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (5200): 5.00 0.785 1.83 70.50
===== 22.80 1.037 2.50 51.65
ID = 1 (2201): 27.80 1.567 2.17 55.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| STANDHYD (0209) | Area (ha)= 2.70
| ID= 1 DT= 5.0 min | Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.43 2.27
Dep. Storage (mm)= 2.00 5.00

Average Slope (%)= 1.20 1.20
Length (m)= 35.00 35.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 85.24
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.97 (ii) 9.06 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

TOTALS
PEAK FLOW (cms)= 0.12 0.38 0.432 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.50
RUNOFF VOLUME (mm)= 92.08 43.49 47.38
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.46 0.50

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (0207) | Area (ha)= 1.30
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.58 0.72
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 122.38
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.79 (ii) 6.51 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

TOTALS
PEAK FLOW (cms)= 0.19 0.19 0.303 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 92.08 49.10 59.84
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.52 0.64

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202) |

1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
-----	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0207):	1.30	0.303	1.42	59.84
+ ID2= 2 (0209):	2.70	0.432	1.50	47.38
=====				
ID = 3 (2202):	4.00	0.725	1.42	51.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2202):	4.00	0.725	1.42	51.43
+ ID2= 2 (2201):	27.80	1.567	2.17	55.04
=====				
ID = 1 (2202):	31.80	1.765	2.08	54.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2100)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0100):	136.98	5.477	2.83	39.05
+ ID2= 2 (2202):	31.80	1.765	2.08	54.59
=====				
ID = 3 (2100):	168.78	6.786	2.67	41.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area	(ha)=	2.90	Curve Number	(CN)= 74.0
NASHYD (0302)	Ia	(mm)=	1.50	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.45			

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.277 (i)
 TIME TO PEAK (hrs)= 1.917
 RUNOFF VOLUME (mm)= 47.137
 TOTAL RAINFALL (mm)= 94.082
 RUNOFF COEFFICIENT = 0.501

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

CALIB	Area	(ha)=	4.40	Dir. Conn.(%)=	25.00
STANDHYD (0304)	Total Imp(%)=	45.00			
ID= 1 DT= 5.0 min					

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.98	2.42
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	205.33	122.38

over (min)	5.00	10.00	
Storage Coeff. (min)=	0.83 (ii)	6.88 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.14	
			TOTALS
PEAK FLOW (cms)=	0.63	0.63	1.012 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.42
RUNOFF VOLUME (mm)=	92.08	49.10	59.84
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.98	0.52	0.64

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. 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 (2300)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0302):	2.90	0.277	1.92	47.14
+ ID2= 2 (0304):	4.40	1.012	1.42	59.84
=====				
ID = 3 (2300):	7.30	1.100	1.42	54.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area	(ha)=	0.20	Dir. Conn.(%)=	25.00
STANDHYD (0308)	Total Imp(%)=	45.00			
ID= 1 DT= 5.0 min					

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	205.33	122.38
over (min)	5.00	10.00
Storage Coeff. (min)=	0.83 (ii)	6.88 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.14

			TOTALS
PEAK FLOW (cms)=	0.03	0.03	0.046 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.42
RUNOFF VOLUME (mm)=	92.08	49.10	59.82
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.98	0.52	0.64

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0310)
ID= 1 DT= 5.0 min

Area (ha)= 5.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 85.24
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.79 (ii) 7.40 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.13

PEAK FLOW (cms)= 0.26 0.85 0.965 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 92.08 43.49 47.38
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.46 0.50

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)
1 + 2 = 3
ID1= 1 (2300): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0308): 7.30 1.100 1.42 54.80
0.20 0.046 1.42 59.82
ID = 3 (2301): 7.50 1.146 1.42 54.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)
3 + 2 = 1
ID1= 3 (2301): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0310): 7.50 1.146 1.42 54.93
5.70 0.965 1.42 47.38
ID = 1 (2301): 13.20 2.111 1.42 51.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2302)
1 + 2 = 3
ID1= 1 (2100): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (2301): 168.78 6.786 2.67 41.98
13.20 2.111 1.42 51.67
ID = 3 (2302): 181.98 7.131 2.67 42.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0400)
ID= 1 DT= 5.0 min

Area (ha)= 82.86
Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 169.08 80.49
over (min)= 10.00 20.00
Storage Coeff. (min)= 11.40 (ii) 19.10 (ii)
Unit Hyd. Tpeak (min)= 10.00 20.00
Unit Hyd. peak (cms)= 0.10 0.06

PEAK FLOW (cms)= 0.80 8.26 8.850 (iii)
TIME TO PEAK (hrs)= 1.42 1.67 1.67
RUNOFF VOLUME (mm)= 92.08 42.01 43.51
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.45 0.46

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2400)
1 + 2 = 3
ID1= 1 (2302): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0400): 181.98 7.131 2.67 42.68
82.86 8.850 1.67 43.51
ID = 3 (2400): 264.84 13.550 1.75 42.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4400)
IN= 2---> OUT= 1 Routing time step (min)'= 5.00

----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550

TRAVEL TIME TABLE					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN

4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

TRAVEL TIME TABLE					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.125E+02	0.0	0.27	43.74
0.16	412.86	.500E+02	0.0	0.42	27.55
0.24	412.94	.113E+03	0.1	0.55	21.03
0.32	413.02	.200E+03	0.2	0.67	17.36
0.39	413.09	.313E+03	0.3	0.78	14.96
0.47	413.17	.450E+03	0.6	0.88	13.25
0.55	413.25	.613E+03	0.9	0.98	11.95
0.63	413.33	.801E+03	1.2	1.07	10.93
0.71	413.41	.101E+04	1.7	1.15	10.11
0.79	413.49	.125E+04	2.2	1.24	9.42
0.87	413.57	.151E+04	2.9	1.32	8.84
0.95	413.65	.180E+04	3.6	1.40	8.34
1.03	413.73	.211E+04	4.5	1.47	7.91
1.11	413.81	.245E+04	5.4	1.55	7.53
1.18	413.88	.281E+04	6.5	1.62	7.19
1.26	413.96	.320E+04	7.7	1.69	6.89
1.34	414.04	.362E+04	9.1	1.76	6.62
1.42	414.12	.405E+04	10.6	1.83	6.37
1.50	414.20	.452E+04	12.3	1.90	6.14

	<---- hydrograph <---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW: ID= 2 (0516)	11.47	0.82	2.08	41.15	0.54	0.96
OUTFLOW: ID= 1 (4516)	11.47	0.78	2.25	41.13	0.53	0.95

ADD HYD (2510)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4516):	11.47	0.777	2.25	41.13
+ ID2= 2 (0511):	54.65	4.110	2.00	41.15
=====	=====	=====	=====	=====
ID = 3 (2510):	66.12	4.820	2.08	41.15

PEAK FLOW	(cms)=	0.177	(i)
TIME TO PEAK	(hrs)=	1.750	
RUNOFF VOLUME	(mm)=	41.141	
TOTAL RAINFALL	(mm)=	94.082	
RUNOFF COEFFICIENT	=	0.437	

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
      0.00      414.20      0.0350      Main Channel

```

```

-----
| ADD HYD ( 2511)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2510):  66.12  4.820   2.08  41.15
+ ID2= 2 ( 4510):  90.75  2.861   3.42  41.15
=====
ID = 3 ( 2511):  156.87  6.184   2.25  41.15
-----
NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

```

-----
| ADD HYD ( 2511)|
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2511):  156.87  6.184   2.25  41.15
+ ID2= 2 ( 0517):   1.75  0.177   1.75  41.14
=====
ID = 1 ( 2511):  158.62  6.291   2.17  41.15
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| NASHYD ( 0512)|
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)= 31.10  Curve Number (CN)= 71.0
          Ia     (mm)=  5.00  # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)=  0.71

```

Unit Hyd Qpeak (cms)= 1.673

```

PEAK FLOW      (cms)= 1.896 (i)
TIME TO PEAK   (hrs)= 2.250
RUNOFF VOLUME  (mm)= 41.153
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.437

```

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

```

-----
| CALIB
| NASHYD ( 0514)|
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)= 2.65  Curve Number (CN)= 65.0
          Ia     (mm)=  5.00  # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)=  0.60

```

Unit Hyd Qpeak (cms)= 0.169

```

PEAK FLOW      (cms)= 0.153 (i)
TIME TO PEAK   (hrs)= 2.167
RUNOFF VOLUME  (mm)= 35.135
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.373

```

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

```

-----
| CALIB
| NASHYD ( 0515)|
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)= 5.41  Curve Number (CN)= 65.0
          Ia     (mm)=  5.00  # of Linear Res.(N)= 3.00

```

U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.504

```

PEAK FLOW      (cms)= 0.397 (i)
TIME TO PEAK   (hrs)= 1.917
RUNOFF VOLUME  (mm)= 35.132
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.373

```

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

```

-----
| CALIB
| NASHYD ( 0513)|
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)= 6.68  Curve Number (CN)= 71.0
          Ia     (mm)=  5.00  # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)=  0.20

```

Unit Hyd Qpeak (cms)= 1.276

```

PEAK FLOW      (cms)= 0.861 (i)
TIME TO PEAK   (hrs)= 1.583
RUNOFF VOLUME  (mm)= 41.075
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.437

```

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

```

-----
| ADD HYD ( 2512)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2511):  158.62  6.291   2.17  41.15
+ ID2= 2 ( 0512):  31.10  1.896   2.25  41.15
=====
ID = 3 ( 2512):  189.72  8.182   2.25  41.15
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2512)|
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2512):  189.72  8.182   2.25  41.15
+ ID2= 2 ( 0513):   6.68  0.861   1.58  41.08
=====
ID = 1 ( 2512):  196.40  8.479   2.17  41.15
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2512)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2512):  196.40  8.479   2.17  41.15
+ ID2= 2 ( 0514):   2.65  0.153   2.17  35.13
=====
ID = 3 ( 2512):  199.05  8.632   2.17  41.07
-----

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2512) |
| 3 + 2 = 1 |
-----
ID1= 3 ( 2512): 199.05 8.632 2.17 41.07
+ ID2= 2 ( 0515): 5.41 0.397 1.92 35.13
=====
ID = 1 ( 2512): 204.46 8.972 2.17 40.91
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2513) |
| 1 + 2 = 3 |
-----
ID1= 1 ( 2512): 204.46 8.972 2.17 40.91
+ ID2= 2 ( 4400): 264.84 11.197 2.42 42.94
=====
ID = 3 ( 2513): 469.30 19.977 2.25 42.06
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0520) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 108.36 Curve Number (CN)= 71.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.20
-----
```

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 4.491 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 41.154
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.437

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

```
-----
| ADD HYD ( 2520) |
| 1 + 2 = 3 |
-----
ID1= 1 ( 2513): 469.30 19.977 2.25 42.06
+ ID2= 2 ( 0520): 108.36 4.491 2.83 41.15
=====
ID = 3 ( 2520): 577.66 23.768 2.42 41.89
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTE CHN( 4500) |
| IN= 2---> OUT= 1 |
-----
Routing time step (min)'= 5.00
-----
```

<----- DATA FOR SECTION (1.1) ----->
Distance 0.00 Elevation 409.70 Manning 0.0550

19.70	408.80	0.0550	
41.70	407.20	0.0550	
60.50	405.30	0.0550	
80.00	404.50	0.0550	
95.70	404.60	0.0550 / 0.0350	Main Channel
98.60	403.40	0.0350	Main Channel
100.40	403.40	0.0350	Main Channel
100.80	402.90	0.0350	Main Channel
101.50	402.70	0.0350	Main Channel
102.30	402.80	0.0350	Main Channel
103.30	403.20	0.0350	Main Channel
104.00	403.20	0.0350	Main Channel
105.60	404.40	0.0350 / 0.0550	Main Channel
109.70	404.30	0.0550	
128.60	404.20	0.0550	
154.10	405.40	0.0550	
179.10	406.70	0.0550	
201.90	408.60	0.0550	
224.20	410.60	0.0550	

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.34	403.04	.954E+03	0.3	0.70	47.40
0.68	403.38	.304E+04	1.6	1.03	32.27
1.02	403.72	.718E+04	4.5	1.25	26.57
1.36	404.06	.122E+05	9.7	1.58	20.96
1.70	404.40	.251E+05	18.1	1.44	23.04
2.08	404.78	.650E+05	42.3	1.29	25.62
2.46	405.16	.122E+06	86.3	1.40	23.62
2.84	405.54	.192E+06	151.6	1.57	21.10
3.21	405.91	.270E+06	238.3	1.75	18.90
3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

<---- hydrograph ---->					<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2520)	577.66	23.77	2.42	41.89	1.79	1.40
OUTFLOW: ID= 1 (4500)	577.66	21.82	2.92	41.89	1.75	1.41

```
-----
| CALIB |
| NASHYD ( 0610) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 78.05 Curve Number (CN)= 71.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.00
-----
```

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 3.712 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 41.153

TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.437

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

ADD HYD (2610)					
1 + 2 = 3					
	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (4500):	577.66	21.821	2.92	41.89	
+ ID2= 2 (0610):	78.05	3.712	2.58	41.15	
=====					
ID = 3 (2610):	655.71	25.393	2.83	41.80	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0623)	Area (ha)=	19.37	Curve Number (CN)=	70.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.45			

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW (cms)= 1.554 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 40.088
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

CALIB					
NASHYD (0625)	Area (ha)=	6.72	Curve Number (CN)=	70.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.39			

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW (cms)= 0.588 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.085
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

ROUTE CHN(4625)					
IN= 2---> OUT= 1	Routing time step (min)'=	5.00			

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	414.20	0.0360	Main Channel
4.30	412.70	0.0360	Main Channel
8.60	414.20	0.0360	Main Channel

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

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.108E+02	0.0	0.24	42.13
0.16	412.86	.434E+02	0.0	0.38	26.54
0.24	412.94	.976E+02	0.1	0.50	20.26
0.32	413.02	.174E+03	0.2	0.61	16.72
0.39	413.09	.271E+03	0.3	0.70	14.41
0.47	413.17	.390E+03	0.5	0.79	12.76
0.55	413.25	.532E+03	0.8	0.88	11.51
0.63	413.33	.694E+03	1.1	0.96	10.53
0.71	413.41	.879E+03	1.5	1.04	9.74
0.79	413.49	.108E+04	2.0	1.11	9.08
0.87	413.57	.131E+04	2.6	1.19	8.52
0.95	413.65	.156E+04	3.2	1.26	8.04
1.03	413.73	.183E+04	4.0	1.33	7.62
1.11	413.81	.213E+04	4.9	1.39	7.25
1.18	413.88	.244E+04	5.9	1.46	6.93
1.26	413.96	.278E+04	7.0	1.52	6.64
1.34	414.04	.313E+04	8.2	1.59	6.37
1.42	414.12	.351E+04	9.5	1.65	6.13
1.50	414.20	.392E+04	11.0	1.71	5.92

<--- hydrograph --->					
	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
INFLOW : ID= 2 (0625)	6.72	0.59	1.83	40.09	0.50
OUTFLOW: ID= 1 (4625)	6.72	0.53	2.00	40.05	0.48
					0.80

CALIB					
NASHYD (0622)	Area (ha)=	9.69	Curve Number (CN)=	70.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.36			

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW (cms)= 0.888 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.083
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

CALIB					
NASHYD (0621)	Area (ha)=	6.56	Curve Number (CN)=	70.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.37			

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.593 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.084
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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


```

-----
| CALIB |
| NASHYD ( 0624) | Area (ha)= 11.84 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----|
| U.H. Tp(hrs)= 0.51

```

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 0.877 (i)
 TIME TO PEAK (hrs)= 2.000
 RUNOFF VOLUME (mm)= 40.089
 TOTAL RAINFALL (mm)= 94.082
 RUNOFF COEFFICIENT = 0.426

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

```

-----
| CALIB |
| STANDHYD ( 0626) | Area (ha)= 1.06
| ID= 1 DT= 5.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00
|-----|

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.64	0.42
Dep. Storage (mm)=	1.00	10.00
Average Slope (%)=	1.00	2.00
Length (m)=	84.06	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	95.83
over (min)=	5.00	10.00
Storage Coeff. (min)=	1.73 (ii)	6.57 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.32	0.14

TOTALS

PEAK FLOW (cms)=	0.29	0.09	0.338 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	93.08	42.79	67.93
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.99	0.45	0.72

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 ( 2621) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 4625): | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
| + ID2= 2 ( 0621): | 6.72 0.532 2.00 40.05
|=====|
| ID = 3 ( 2621): | 13.28 1.089 1.92 40.07

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2621) |
| 3 + 2 = 1 |
|-----|
| ID1= 3 ( 2621): | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
| + ID2= 2 ( 0622): | 13.28 1.089 1.92 40.07
|=====|
| ID = 1 ( 2621): | 9.69 0.888 1.83 40.08
|=====|
| ID = 1 ( 2621): | 22.97 1.949 1.92 40.07

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2621) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2621): | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
| + ID2= 2 ( 0623): | 22.97 1.949 1.92 40.07
|=====|
| ID = 3 ( 2621): | 19.37 1.554 1.92 40.09
|=====|
| ID = 3 ( 2621): | 42.34 3.503 1.92 40.08

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2621) |
| 3 + 2 = 1 |
|-----|
| ID1= 3 ( 2621): | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
| + ID2= 2 ( 0624): | 42.34 3.503 1.92 40.08
|=====|
| ID = 1 ( 2621): | 11.84 0.877 2.00 40.09
|=====|
| ID = 1 ( 2621): | 54.18 4.365 1.92 40.08

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2621) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2621): | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
| + ID2= 2 ( 0626): | 54.18 4.365 1.92 40.08
|=====|
| ID = 3 ( 2621): | 1.06 0.338 1.33 67.93
|=====|
| ID = 3 ( 2621): | 55.24 4.436 1.92 40.62

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0627) | Area (ha)= 9.39 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----|
| U.H. Tp(hrs)= 0.20

```

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 1.174 (i)
 TIME TO PEAK (hrs)= 1.583
 RUNOFF VOLUME (mm)= 40.015
 TOTAL RAINFALL (mm)= 94.082
 RUNOFF COEFFICIENT = 0.425

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

```
-----
| CALIB                                     |
| NASHYD ( 6200) | Area (ha)= 6.66 Curve Number (CN)= 74.0 |
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
|-----| U.H. Tp(hrs)= 0.28 |
```

Unit Hyd Qpeak (cms)= 0.908

PEAK FLOW (cms)= 0.788 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 44.478
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.473

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

```
-----
| CALIB                                     |
| NASHYD ( 6201) | Area (ha)= 0.82 Curve Number (CN)= 74.0 |
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
|-----| U.H. Tp(hrs)= 0.15 |
```

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.131 (i)
TIME TO PEAK (hrs)= 1.500
RUNOFF VOLUME (mm)= 44.243
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.470

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

```
-----
| ADD HYD ( 0113) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 6200): 6.66 0.788 1.67 44.48 |
| + ID2= 2 ( 6201): 0.82 0.131 1.50 44.24 |
|=====|
| ID = 3 ( 0113): 7.48 0.894 1.67 44.45 |
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTE CHN( 4620) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning Main Channel
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
```

0.16	412.86	.182E+02	0.1	0.88	4.85
0.24	412.94	.410E+02	0.2	1.15	3.70
0.32	413.02	.729E+02	0.4	1.39	3.05
0.39	413.09	.114E+03	0.7	1.61	2.63
0.47	413.17	.164E+03	1.2	1.82	2.33
0.55	413.25	.223E+03	1.8	2.02	2.10
0.63	413.33	.292E+03	2.5	2.21	1.92
0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

```
<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 0113) 7.48 0.89 1.67 44.45 0.42 1.69
OUTFLOW: ID= 1 ( 4620) 7.48 0.89 1.67 44.45 0.42 1.69
```

```
-----
| ADD HYD ( 2620) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 4620): 7.48 0.888 1.67 44.45 |
| + ID2= 2 ( 0627): 9.39 1.174 1.58 40.01 |
|=====|
| ID = 3 ( 2620): 16.87 2.011 1.67 41.98 |
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2622) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2620): 16.87 2.011 1.67 41.98 |
| + ID2= 2 ( 2621): 55.24 4.436 1.92 40.62 |
|=====|
| ID = 3 ( 2622): 72.11 6.058 1.83 40.94 |
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2623) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2610): 655.71 25.393 2.83 41.80 |
| + ID2= 2 ( 2622): 72.11 6.058 1.83 40.94 |
|=====|
| ID = 3 ( 2623): 727.82 27.644 2.67 41.71 |
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0637) |
| ID= 1 DT= 5.0 min |
|-----|
Area (ha)= 8.36 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.47

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 0.650 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 40.088
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426
```

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

```
-----
| CALIB |
| NASHYD ( 0630) |
| ID= 1 DT= 5.0 min |
|-----|
Area (ha)= 33.04 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.38
```

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 2.939 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.085
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

```
-----
| ROUTE CHN( 4630) |
| IN= 2---> OUT= 1 |
|-----|
Routing time step (min)'= 5.00
```

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

```
<----- TRAVEL TIME TABLE ----->
DEPTH   ELEV   VOLUME   FLOW RATE   VELOCITY   TRAV.TIME
(m)      (m)      (cu.m.)   (cms)        (m/s)      (min)
0.08  412.78  .893E+01   0.0          0.17       47.72
0.16  412.86  .357E+02   0.0          0.28       30.06
0.24  412.94  .804E+02   0.1          0.36       22.94
0.32  413.02  .143E+03   0.1          0.44       18.94
0.39  413.09  .223E+03   0.2          0.51       16.32
0.47  413.17  .322E+03   0.4          0.58       14.45
0.55  413.25  .438E+03   0.6          0.64       13.04
0.63  413.33  .572E+03   0.8          0.70       11.93
0.71  413.41  .724E+03   1.1          0.76       11.03
0.79  413.49  .893E+03   1.4          0.81       10.28
0.87  413.57  .108E+04   1.9          0.86        9.65
0.95  413.65  .129E+04   2.4          0.92        9.10
1.03  413.73  .151E+04   2.9          0.97        8.63
1.11  413.81  .175E+04   3.6          1.01        8.22
1.18  413.88  .201E+04   4.3          1.06        7.85
```

1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

```
<---- hydrograph ----> <-pipe / channel->
                          AREA   QPEAK   TPEAK   R.V.   MAX DEPTH   MAX VEL
                          (ha)   (cms)   (hrs)   (mm)   (m)         (m/s)
INFLOW : ID= 2 ( 0630)  33.04   2.94    1.83   40.08   1.03        0.97
OUTFLOW: ID= 1 ( 4630)  33.04   2.76    2.00   40.08   1.00        0.95
```

```
-----
| ADD HYD ( 2637) |
| 1 + 2 = 3 |
|-----|
ID1= 1 ( 2623): 727.82 27.644 2.67 41.71
+ ID2= 2 ( 4630): 33.04 2.762 2.00 40.08
=====
ID = 3 ( 2637): 760.86 29.086 2.58 41.64
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2637) |
| 3 + 2 = 1 |
|-----|
ID1= 3 ( 2637): 760.86 29.086 2.58 41.64
+ ID2= 2 ( 0637): 8.36 0.650 1.92 40.09
=====
ID = 1 ( 2637): 769.22 29.480 2.58 41.63
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0636) |
| ID= 1 DT= 5.0 min |
|-----|
Area (ha)= 3.32 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.48
```

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.255 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 40.088
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

```
-----
| ADD HYD ( 2636) |
| 1 + 2 = 3 |
|-----|
ID1= 1 ( 2637): 769.22 29.480 2.58 41.63
+ ID2= 2 ( 0636): 3.32 0.255 2.00 40.09
=====
```

ID = 3 (2636): 772.54 29.639 2.58 41.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0639)	Area (ha)=	4.60	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.43		

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.379 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 40.087
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

CALIB				
NASHYD (0638)	Area (ha)=	20.63	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.46		

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 1.630 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 40.088
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

ADD HYD (2630)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2636):	772.54	29.639	2.58	41.62
+ ID2= 2 (0638):	20.63	1.630	1.92	40.09
=====				
ID = 3 (2630):	793.17	30.663	2.50	41.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2630)				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2630):	793.17	30.663	2.50	41.58
+ ID2= 2 (0639):	4.60	0.379	1.92	40.09
=====				
ID = 1 (2630):	797.77	30.888	2.50	41.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

** SIMULATION : Hazel

READ STORM	Filename: C:\Users\TNuman\AppData\Local\Temp\1105c3bc-ce2c-45a5-ba64-de66a0889104\098df982
Ptotal=212.00 mm	Comments: Hazel

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	6.00	3.00	13.00	6.00	23.00	9.00	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00

CALIB				
NASHYD (0100)	Area (ha)=	136.98	Curve Number (CN)=	85.0
ID= 1 DT= 2.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	1.17		

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

--- TRANSFORMED HYETOGRAPH ---							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00
0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00

1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00
1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00
1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00
1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00
2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00
2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 13.246 (i)
 TIME TO PEAK (hrs)= 11.300
 RUNOFF VOLUME (mm)= 170.153
 TOTAL RAINFALL (mm)= 211.999
 RUNOFF COEFFICIENT = 0.803

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

 | CALIB |
 | NASHYD (0205) | Area (ha)= 4.80 Curve Number (CN)= 96.0
 | ID= 1 DT= 2.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
 |-----| U.H. Tp(hrs)= 0.41

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00
0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00
1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00

1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00
1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00
2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00
2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.652 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 200.421
TOTAL RAINFALL (mm)= 211.999
RUNOFF COEFFICIENT = 0.945

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

| STANDHYD (0206) | Area (ha)= 0.20
| ID= 1 DT= 2.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)= 0.09	0.11
Dep. Storage	(mm)= 2.00	5.00
Average Slope	(%)= 1.20	1.20
Length	(m)= 25.00	25.00
Mannings n	= 0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00
0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00
1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00
1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00

| CALIB |

1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00
2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00
2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Max.Eff.Inten.(mm/hr)= 53.00 70.29
over (min) 5.00 10.00
Storage Coeff. (min)= 1.36 (ii) 8.50 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.47 0.13

TOTALS
PEAK FLOW (cms)= 0.01 0.02 0.029 (iii)
TIME TO PEAK (hrs)= 9.33 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 181.86 188.87
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.86 0.89

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

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| NASHYD (0201) | Area (ha)= 14.60 Curve Number (CN)= 88.0
| ID= 1 DT= 2.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.97

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00
0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00
1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00
1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00
1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00

1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00
2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00
2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 1.537 (i)
TIME TO PEAK (hrs)= 11.133
RUNOFF VOLUME (mm)= 180.756
TOTAL RAINFALL (mm)= 211.999
RUNOFF COEFFICIENT = 0.853

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

CALIB			
STANDHYD (0203)			
ID= 1 DT= 2.0 min			

		Area (ha)=	8.20
		Total Imp(%)=	45.00
		Dir. Conn.(%)=	25.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.69	4.51
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.20	1.20
Length	(m)=	25.00	25.00

Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00
0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00
1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00
1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00
1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00

1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00
2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00
2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Max.Eff.Inten.(mm/hr)= 53.00 70.29
over (min) 5.00 10.00
Storage Coeff. (min)= 1.36 (ii) 8.50 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.47 0.13

TOTALS

PEAK FLOW (cms)= 0.30 0.88 1.179 (iii)
TIME TO PEAK (hrs)= 9.40 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 181.86 188.90
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.86 0.89

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2200)				
1 + 2 = 3				

ID1= 1 (0201):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
	14.60	1.537	11.13	180.76

+ ID2= 2 (0203):	8.20	1.179	10.00	188.90
=====				
ID = 3 (2200):	22.80	2.381	11.00	183.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201)				
1 + 2 = 3				

ID1= 1 (0205):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
	4.80	0.652	10.17	200.42
+ ID2= 2 (0206):	0.20	0.029	10.00	188.87
=====				
ID = 3 (2201):	5.00	0.677	10.13	199.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201)				
3 + 2 = 1				

ID1= 3 (2201):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
	5.00	0.677	10.13	199.96
+ ID2= 2 (2200):	22.80	2.381	11.00	183.68
=====				
ID = 1 (2201):	27.80	2.930	11.00	186.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0209)				
ID= 1 DT= 2.0 min				

Area	(ha)=	2.70		
Total Imp(%)=	16.00	Dir. Conn.(%)=	8.00	

			IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.43	2.27	
Dep. Storage	(mm)=	2.00	5.00	
Average Slope	(%)=	1.20	1.20	
Length	(m)=	35.00	35.00	
Mannings n	=	0.013	0.250	

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00

0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00
0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00
1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00
1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00
1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00
2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00

2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Max.Eff.Inten.(mm/hr)=	53.00	55.75	
over (min)	5.00	12.00	
Storage Coeff. (min)=	1.66 (ii)	11.25 (ii)	
Unit Hyd. Tpeak (min)=	4.00	12.00	
Unit Hyd. peak (cms)=	0.44	0.10	
PEAK FLOW (cms)=	0.03	0.35	*TOTALS* 0.379 (iii)
TIME TO PEAK (hrs)=	9.43	10.00	10.00
RUNOFF VOLUME (mm)=	210.00	175.49	178.25
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	0.99	0.83	0.84

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)=	1.30	
STANDHYD (0207)	Total Imp(%)=	45.00	Dir. Conn.(%)= 25.00
ID= 1 DT= 2.0 min			
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.58	0.72	
Dep. Storage (mm)=	2.00	5.00	
Average Slope (%)=	1.20	1.20	
Length (m)=	25.00	25.00	
Mannings n =	0.013	0.250	

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00

0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00
0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00
1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00
1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00
1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00

2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00
2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Max.Eff.Inten.(mm/hr)=	53.00	70.29
over (min)	5.00	10.00
Storage Coeff. (min)=	1.36 (ii)	8.50 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.47	0.13

PEAK FLOW (cms)=	0.05	0.14	*TOTALS* (iii)
TIME TO PEAK (hrs)=	9.37	10.00	10.00
RUNOFF VOLUME (mm)=	210.00	181.86	188.89
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	0.99	0.86	0.89

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2202)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0207):	1.30	0.187	10.00	188.89
+ ID2= 2 (0209):	2.70	0.379	10.00	178.25
=====				
ID = 3 (2202):	4.00	0.566	10.00	181.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2202):	4.00	0.566	10.00	181.71
+ ID2= 2 (2201):	27.80	2.930	11.00	186.61
=====				
ID = 1 (2202):	31.80	3.457	10.00	185.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2100)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0100):	136.98	13.246	11.30	170.15
+ ID2= 2 (2202):	31.80	3.457	10.00	185.99
=====				
ID = 3 (2100):	168.78	16.204	11.03	173.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0302)|
ID= 1 DT= 2.0 min

Area (ha)=	2.90	Curve Number (CN)=	88.0
Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.45		

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00
0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00

1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00
1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00
1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00
2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00
2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.372 (i)
TIME TO PEAK (hrs)= 10.200
RUNOFF VOLUME (mm)= 180.755
TOTAL RAINFALL (mm)= 211.999
RUNOFF COEFFICIENT = 0.853

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

CALIB
STANDHYD (0304)
ID= 1 DT= 2.0 min

Area (ha)= 4.40
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.98 2.42
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00
0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00
1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00
1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00

1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00
1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00
2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00
2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Max.Eff.Inten.(mm/hr)= 53.00 70.29
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.43 (ii) 8.98 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.46 0.12

TOTALS
PEAK FLOW (cms)= 0.16 0.47 0.632 (iii)
TIME TO PEAK (hrs)= 9.40 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 181.86 188.89
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.86 0.89

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2300)				
1	2	3		
AREA	QPEAK	TPEAK	R.V.	
(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0302):	2.90	0.372	10.20	180.76
+ ID2= 2 (0304):	4.40	0.632	10.00	188.89
=====				
ID = 3 (2300):	7.30	0.987	10.00	185.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0308)			
ID= 1 DT= 2.0 min	Area (ha)=	0.20	
	Total Imp(%)=	45.00	Dir. Conn.(%)= 25.00
IMPERVIOUS			
PERVIOUS (i)			
Surface Area	(ha)=	0.09	0.11
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	25.00	25.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00

0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00
1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00
1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00
1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00
2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00
2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Max.Eff.Inten.(mm/hr)= 53.00 70.29
over (min) 5.00 10.00
Storage Coeff. (min)= 1.43 (ii) 8.98 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.46 0.12

TOTALS
PEAK FLOW (cms)= 0.01 0.02 0.029 (iii)
TIME TO PEAK (hrs)= 9.33 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 181.86 188.87
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.86 0.89

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0310) |
ID= 1 DT= 2.0 min
Area (ha)= 5.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----
TIME RAIN TIME RAIN TIME RAIN TIME RAIN
hrs mm/hr hrs mm/hr ' hrs mm/hr hrs mm/hr
0.033 6.00 3.033 13.00 6.033 23.00 9.03 53.00
0.067 6.00 3.067 13.00 6.067 23.00 9.07 53.00
0.100 6.00 3.100 13.00 6.100 23.00 9.10 53.00
0.133 6.00 3.133 13.00 6.133 23.00 9.13 53.00
0.167 6.00 3.167 13.00 6.167 23.00 9.17 53.00
0.200 6.00 3.200 13.00 6.200 23.00 9.20 53.00
0.233 6.00 3.233 13.00 6.233 23.00 9.23 53.00
0.267 6.00 3.267 13.00 6.267 23.00 9.27 53.00
0.300 6.00 3.300 13.00 6.300 23.00 9.30 53.00
0.333 6.00 3.333 13.00 6.333 23.00 9.33 53.00
0.367 6.00 3.367 13.00 6.367 23.00 9.37 53.00
0.400 6.00 3.400 13.00 6.400 23.00 9.40 53.00
0.433 6.00 3.433 13.00 6.433 23.00 9.43 53.00
0.467 6.00 3.467 13.00 6.467 23.00 9.47 53.00
0.500 6.00 3.500 13.00 6.500 23.00 9.50 53.00
0.533 6.00 3.533 13.00 6.533 23.00 9.53 53.00
0.567 6.00 3.567 13.00 6.567 23.00 9.57 53.00
0.600 6.00 3.600 13.00 6.600 23.00 9.60 53.00
0.633 6.00 3.633 13.00 6.633 23.00 9.63 53.00
0.667 6.00 3.667 13.00 6.667 23.00 9.67 53.00
0.700 6.00 3.700 13.00 6.700 23.00 9.70 53.00
0.733 6.00 3.733 13.00 6.733 23.00 9.73 53.00
0.767 6.00 3.767 13.00 6.767 23.00 9.77 53.00
0.800 6.00 3.800 13.00 6.800 23.00 9.80 53.00

0.833 6.00 3.833 13.00 6.833 23.00 9.83 53.00
0.867 6.00 3.867 13.00 6.867 23.00 9.87 53.00
0.900 6.00 3.900 13.00 6.900 23.00 9.90 53.00
0.933 6.00 3.933 13.00 6.933 23.00 9.93 53.00
0.967 6.00 3.967 13.00 6.967 23.00 9.97 53.00
1.000 6.00 4.000 13.00 7.000 23.00 10.00 52.99
1.033 4.00 4.033 17.00 7.033 13.00 10.03 38.00
1.067 4.00 4.067 17.00 7.067 13.00 10.07 38.00
1.100 4.00 4.100 17.00 7.100 13.00 10.10 38.00
1.133 4.00 4.133 17.00 7.133 13.00 10.13 38.00
1.167 4.00 4.167 17.00 7.167 13.00 10.17 38.00
1.200 4.00 4.200 17.00 7.200 13.00 10.20 38.00
1.233 4.00 4.233 17.00 7.233 13.00 10.23 38.00
1.267 4.00 4.267 17.00 7.267 13.00 10.27 38.00
1.300 4.00 4.300 17.00 7.300 13.00 10.30 38.00
1.333 4.00 4.333 17.00 7.333 13.00 10.33 38.00
1.367 4.00 4.367 17.00 7.367 13.00 10.37 38.00
1.400 4.00 4.400 17.00 7.400 13.00 10.40 38.00
1.433 4.00 4.433 17.00 7.433 13.00 10.43 38.00
1.467 4.00 4.467 17.00 7.467 13.00 10.47 38.00
1.500 4.00 4.500 17.00 7.500 13.00 10.50 38.00
1.533 4.00 4.533 17.00 7.533 13.00 10.53 38.00
1.567 4.00 4.567 17.00 7.567 13.00 10.57 38.00
1.600 4.00 4.600 17.00 7.600 13.00 10.60 38.00
1.633 4.00 4.633 17.00 7.633 13.00 10.63 38.00
1.667 4.00 4.667 17.00 7.667 13.00 10.67 38.00
1.700 4.00 4.700 17.00 7.700 13.00 10.70 38.00
1.733 4.00 4.733 17.00 7.733 13.00 10.73 38.00
1.767 4.00 4.767 17.00 7.767 13.00 10.77 38.00
1.800 4.00 4.800 17.00 7.800 13.00 10.80 38.00
1.833 4.00 4.833 17.00 7.833 13.00 10.83 38.00
1.867 4.00 4.867 17.00 7.867 13.00 10.87 38.00
1.900 4.00 4.900 17.00 7.900 13.00 10.90 38.00
1.933 4.00 4.933 17.00 7.933 13.00 10.93 38.00
1.967 4.00 4.967 17.00 7.967 13.00 10.97 38.00
2.000 4.00 5.000 17.00 8.000 13.00 11.00 37.98
2.033 6.00 5.033 13.00 8.033 13.00 11.03 13.00
2.067 6.00 5.067 13.00 8.067 13.00 11.07 13.00
2.100 6.00 5.100 13.00 8.100 13.00 11.10 13.00
2.133 6.00 5.133 13.00 8.133 13.00 11.13 13.00
2.167 6.00 5.167 13.00 8.167 13.00 11.17 13.00
2.200 6.00 5.200 13.00 8.200 13.00 11.20 13.00
2.233 6.00 5.233 13.00 8.233 13.00 11.23 13.00
2.267 6.00 5.267 13.00 8.267 13.00 11.27 13.00
2.300 6.00 5.300 13.00 8.300 13.00 11.30 13.00
2.333 6.00 5.333 13.00 8.333 13.00 11.33 13.00
2.367 6.00 5.367 13.00 8.367 13.00 11.37 13.00
2.400 6.00 5.400 13.00 8.400 13.00 11.40 13.00
2.433 6.00 5.433 13.00 8.433 13.00 11.43 13.00
2.467 6.00 5.467 13.00 8.467 13.00 11.47 13.00
2.500 6.00 5.500 13.00 8.500 13.00 11.50 13.00
2.533 6.00 5.533 13.00 8.533 13.00 11.53 13.00
2.567 6.00 5.567 13.00 8.567 13.00 11.57 13.00
2.600 6.00 5.600 13.00 8.600 13.00 11.60 13.00
2.633 6.00 5.633 13.00 8.633 13.00 11.63 13.00
2.667 6.00 5.667 13.00 8.667 13.00 11.67 13.00
2.700 6.00 5.700 13.00 8.700 13.00 11.70 13.00
2.733 6.00 5.733 13.00 8.733 13.00 11.73 13.00
2.767 6.00 5.767 13.00 8.767 13.00 11.77 13.00
2.800 6.00 5.800 13.00 8.800 13.00 11.80 13.00
2.833 6.00 5.833 13.00 8.833 13.00 11.83 13.00
2.867 6.00 5.867 13.00 8.867 13.00 11.87 13.00
2.900 6.00 5.900 13.00 8.900 13.00 11.90 13.00

2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Max.Eff.Inten.(mm/hr)=	53.00	55.75	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.36 (ii)	9.20 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.47	0.12	
PEAK FLOW (cms)=	0.07	0.74	0.804 (iii)
TIME TO PEAK (hrs)=	9.37	10.00	10.00
RUNOFF VOLUME (mm)=	210.00	175.49	178.25
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	0.99	0.83	0.84

TOTALS

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2301)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2300):	7.30	0.987	10.00	185.66
+ ID2= 2 (0308):	0.20	0.029	10.00	188.87
=====				
ID = 3 (2301):	7.50	1.016	10.00	185.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)				
3 + 2 = 1				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2301):	7.50	1.016	10.00	185.75
+ ID2= 2 (0310):	5.70	0.804	10.00	178.25
=====				
ID = 1 (2301):	13.20	1.821	10.00	182.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2302)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2100):	168.78	16.204	11.03	173.14
+ ID2= 2 (2301):	13.20	1.821	10.00	182.51
=====				
ID = 3 (2302):	181.98	17.576	11.00	173.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB		Area (ha)=	82.86
STANDHYD (0400)		Total Imp(%)=	10.00
ID= 1 DT= 2.0 min		Dir. Conn.(%)=	3.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.29	74.57
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	0.70	2.00
Length	(m)=	1437.00	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.033	6.00	3.033	13.00	6.033	23.00	9.03	53.00
0.067	6.00	3.067	13.00	6.067	23.00	9.07	53.00
0.100	6.00	3.100	13.00	6.100	23.00	9.10	53.00
0.133	6.00	3.133	13.00	6.133	23.00	9.13	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.200	6.00	3.200	13.00	6.200	23.00	9.20	53.00
0.233	6.00	3.233	13.00	6.233	23.00	9.23	53.00
0.267	6.00	3.267	13.00	6.267	23.00	9.27	53.00
0.300	6.00	3.300	13.00	6.300	23.00	9.30	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.367	6.00	3.367	13.00	6.367	23.00	9.37	53.00
0.400	6.00	3.400	13.00	6.400	23.00	9.40	53.00
0.433	6.00	3.433	13.00	6.433	23.00	9.43	53.00
0.467	6.00	3.467	13.00	6.467	23.00	9.47	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.533	6.00	3.533	13.00	6.533	23.00	9.53	53.00
0.567	6.00	3.567	13.00	6.567	23.00	9.57	53.00
0.600	6.00	3.600	13.00	6.600	23.00	9.60	53.00
0.633	6.00	3.633	13.00	6.633	23.00	9.63	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.700	6.00	3.700	13.00	6.700	23.00	9.70	53.00
0.733	6.00	3.733	13.00	6.733	23.00	9.73	53.00
0.767	6.00	3.767	13.00	6.767	23.00	9.77	53.00
0.800	6.00	3.800	13.00	6.800	23.00	9.80	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.867	6.00	3.867	13.00	6.867	23.00	9.87	53.00
0.900	6.00	3.900	13.00	6.900	23.00	9.90	53.00
0.933	6.00	3.933	13.00	6.933	23.00	9.93	53.00
0.967	6.00	3.967	13.00	6.967	23.00	9.97	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	52.99
1.033	4.00	4.033	17.00	7.033	13.00	10.03	38.00
1.067	4.00	4.067	17.00	7.067	13.00	10.07	38.00
1.100	4.00	4.100	17.00	7.100	13.00	10.10	38.00
1.133	4.00	4.133	17.00	7.133	13.00	10.13	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.200	4.00	4.200	17.00	7.200	13.00	10.20	38.00
1.233	4.00	4.233	17.00	7.233	13.00	10.23	38.00
1.267	4.00	4.267	17.00	7.267	13.00	10.27	38.00
1.300	4.00	4.300	17.00	7.300	13.00	10.30	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.367	4.00	4.367	17.00	7.367	13.00	10.37	38.00
1.400	4.00	4.400	17.00	7.400	13.00	10.40	38.00
1.433	4.00	4.433	17.00	7.433	13.00	10.43	38.00
1.467	4.00	4.467	17.00	7.467	13.00	10.47	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00

1.533	4.00	4.533	17.00	7.533	13.00	10.53	38.00
1.567	4.00	4.567	17.00	7.567	13.00	10.57	38.00
1.600	4.00	4.600	17.00	7.600	13.00	10.60	38.00
1.633	4.00	4.633	17.00	7.633	13.00	10.63	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.700	4.00	4.700	17.00	7.700	13.00	10.70	38.00
1.733	4.00	4.733	17.00	7.733	13.00	10.73	38.00
1.767	4.00	4.767	17.00	7.767	13.00	10.77	38.00
1.800	4.00	4.800	17.00	7.800	13.00	10.80	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.867	4.00	4.867	17.00	7.867	13.00	10.87	38.00
1.900	4.00	4.900	17.00	7.900	13.00	10.90	38.00
1.933	4.00	4.933	17.00	7.933	13.00	10.93	38.00
1.967	4.00	4.967	17.00	7.967	13.00	10.97	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	37.98
2.033	6.00	5.033	13.00	8.033	13.00	11.03	13.00
2.067	6.00	5.067	13.00	8.067	13.00	11.07	13.00
2.100	6.00	5.100	13.00	8.100	13.00	11.10	13.00
2.133	6.00	5.133	13.00	8.133	13.00	11.13	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.200	6.00	5.200	13.00	8.200	13.00	11.20	13.00
2.233	6.00	5.233	13.00	8.233	13.00	11.23	13.00
2.267	6.00	5.267	13.00	8.267	13.00	11.27	13.00
2.300	6.00	5.300	13.00	8.300	13.00	11.30	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.367	6.00	5.367	13.00	8.367	13.00	11.37	13.00
2.400	6.00	5.400	13.00	8.400	13.00	11.40	13.00
2.433	6.00	5.433	13.00	8.433	13.00	11.43	13.00
2.467	6.00	5.467	13.00	8.467	13.00	11.47	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.533	6.00	5.533	13.00	8.533	13.00	11.53	13.00
2.567	6.00	5.567	13.00	8.567	13.00	11.57	13.00
2.600	6.00	5.600	13.00	8.600	13.00	11.60	13.00
2.633	6.00	5.633	13.00	8.633	13.00	11.63	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.700	6.00	5.700	13.00	8.700	13.00	11.70	13.00
2.733	6.00	5.733	13.00	8.733	13.00	11.73	13.00
2.767	6.00	5.767	13.00	8.767	13.00	11.77	13.00
2.800	6.00	5.800	13.00	8.800	13.00	11.80	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.867	6.00	5.867	13.00	8.867	13.00	11.87	13.00
2.900	6.00	5.900	13.00	8.900	13.00	11.90	13.00
2.933	6.00	5.933	13.00	8.933	13.00	11.93	13.00
2.967	6.00	5.967	13.00	8.967	13.00	11.97	13.00
3.000	6.00	6.000	13.00	9.000	13.01	12.00	12.98

Max.Eff.Inten.(mm/hr)= 53.00 54.48
over (min) 18.00 28.00
Storage Coeff. (min)= 18.14 (ii) 27.14 (ii)
Unit Hyd. Tpeak (min)= 18.00 28.00
Unit Hyd. peak (cms)= 0.06 0.04

TOTALS
PEAK FLOW (cms)= 0.35 9.88 10.218 (iii)
TIME TO PEAK (hrs)= 10.03 10.23 10.23
RUNOFF VOLUME (mm)= 209.99 172.71 173.84
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.81 0.82

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)

- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-----
| ADD HYD ( 2400)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 2302): 181.98 17.576 11.00 173.82
+ ID2= 2 ( 0400): 82.86 10.218 10.23 173.84
=====
ID = 3 ( 2400): 264.84 26.422 11.00 173.82

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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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-----
| ROUTE CHN( 4400)|
| IN= 2--> OUT= 1 |
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<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          411.10          0.0550
27.30         410.20          0.0550
77.50         409.10          0.0550
96.60         409.10          0.0550
115.80        408.90          0.0550
124.80        409.10          0.0550
131.00        408.90          0.0550 /0.0350 Main Channel
133.60        408.00          0.0350 Main Channel
134.40        407.60          0.0350 Main Channel
135.00        407.50          0.0350 Main Channel
135.80        407.60          0.0350 Main Channel
136.50        408.00          0.0350 Main Channel
139.40        408.80          0.0350 /0.0550 Main Channel
143.50        408.90          0.0550
148.50        408.70          0.0550
163.80        408.90          0.0550
183.20        408.90          0.0550
243.70        409.70          0.0550
278.70        410.20          0.0550
330.50        411.40          0.0550

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<----- TRAVEL TIME TABLE ----->
DEPTH    ELEV    VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
(m)      (m)      (cu.m.)   (cms)        (m/s)      (min)
0.19    407.69    .366E+03    0.1          0.51       58.83
0.37    407.87    .106E+04    0.5          0.81       37.08
0.56    408.06    .199E+04    1.1          1.00       29.93
0.74    408.24    .328E+04    2.1          1.14       26.32
0.93    408.43    .498E+04    3.6          1.28       23.32
1.11    408.61    .708E+04    5.6          1.43       20.94
1.30    408.80    .105E+05    8.5          1.45       20.61
1.49    408.99    .247E+05    14.8         1.07       27.91
1.68    409.18    .601E+05    30.4         0.91       32.97
1.87    409.37    .109E+06    58.5         0.96       31.05
2.06    409.56    .166E+06    98.3         1.06       28.11
2.25    409.75    .231E+06    150.3        1.17       25.57
2.44    409.94    .303E+06    215.4        1.28       23.46
2.64    410.14    .383E+06    293.8        1.38       21.74
2.83    410.33    .470E+06    390.1        1.49       20.10
3.02    410.52    .563E+06    502.4        1.60       18.66

```

		AREA	----- hydrograph -----		<-pipe / channel->		
		(ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (2400)	264.84	26.42	11.00	173.82	1.63	0.94
OUTFLOW :	ID= 1 (4400)	264.84	24.70	11.33	173.82	1.61	0.90

PEAK FLOW (cms)= 7.570 (i)
TIME TO PEAK (hrs)= 11.750
RUNOFF VOLUME (mm)= 172.536
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.814

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

CALIB	Area	(ha)= 90.75	Curve Number (CN)= 86.0
NASHYD (0510)	Ia	(mm)= 5.00	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	1.70	

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

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

Unit Hyd Qpeak (cms)= 2.039

```
| ROUTE CHN( 4510)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
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[illegible]

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

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN
-Inf	-Inf	.000E+00	0.0	NaN	NaN

**** WARNING: INFLOW HYDROGRAPH IS DRY!!

CALIB			
NASHYD (0511)	Area (ha)= 54.65	Curve Number (CN)= 86.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.52		

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00

2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 4.014

PEAK FLOW (cms)= 6.638 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 172.528
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.814

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

CALIB			
NASHYD (0516)	Area (ha)= 11.47	Curve Number (CN)= 86.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.56		

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00

2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.782

PEAK FLOW (cms)= 1.367 (i)
TIME TO PEAK (hrs)= 10.333
RUNOFF VOLUME (mm)= 172.530
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.814

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

ADD HYD (2510)			
1 + 2 = 3			
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)
ID1= 1 (4516):	11.47	1.348	10.50
+ ID2= 2 (0511):	54.65	6.638	10.25
=====			
ID = 3 (2510):	66.12	7.960	10.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0517)	Area (ha)=	1.75	Curve Number (CN)= 86.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.32	

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

ROUTE CHN(4516)
IN= 2--> OUT= 1

Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.125E+02	0.0	0.27	43.74
0.16	412.86	.500E+02	0.0	0.42	27.55
0.24	412.94	.113E+03	0.1	0.55	21.03
0.32	413.02	.200E+03	0.2	0.67	17.36
0.39	413.09	.313E+03	0.3	0.78	14.96
0.47	413.17	.450E+03	0.6	0.88	13.25
0.55	413.25	.613E+03	0.9	0.98	11.95
0.63	413.33	.801E+03	1.2	1.07	10.93
0.71	413.41	.101E+04	1.7	1.15	10.11
0.79	413.49	.125E+04	2.2	1.24	9.42
0.87	413.57	.151E+04	2.9	1.32	8.84
0.95	413.65	.180E+04	3.6	1.40	8.34
1.03	413.73	.211E+04	4.5	1.47	7.91
1.11	413.81	.245E+04	5.4	1.55	7.53
1.18	413.88	.281E+04	6.5	1.62	7.19
1.26	413.96	.320E+04	7.7	1.69	6.89
1.34	414.04	.362E+04	9.1	1.76	6.62
1.42	414.12	.405E+04	10.6	1.83	6.37
1.50	414.20	.452E+04	12.3	1.90	6.14

<---- hydrograph ---->

<-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0516)	11.47	1.37	10.33	172.53	0.66	1.09
OUTFLOW: ID= 1 (4516)	11.47	1.35	10.50	172.51	0.65	1.09

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

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.235 (i)

TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 172.484
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.814

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

```
-----
| ADD HYD ( 2511) |
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
| ID1= 1 ( 2510): 66.12 7.960 10.33 172.52 |
| + ID2= 2 ( 4510): 90.75 7.570 11.75 172.54 |
|=====|
| ID = 3 ( 2511): 156.87 14.070 11.08 172.53 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2511) |
| 3 + 2 = 1 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
| ID1= 3 ( 2511): 156.87 14.070 11.08 172.53 |
| + ID2= 2 ( 0517): 1.75 0.235 10.08 172.48 |
|=====|
| ID = 1 ( 2511): 158.62 14.245 11.08 172.53 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0512) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 31.10 Curve Number (CN)= 86.0 |
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
| U.H. Tp(hrs)= 0.71 |
|-----|
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NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

```
-----
| TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN |
| hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr |
|-----|-----|-----|-----|
| 0.083 6.00 | 3.083 13.00 | 6.083 23.00 | 9.08 53.00 |
| 0.167 6.00 | 3.167 13.00 | 6.167 23.00 | 9.17 53.00 |
| 0.250 6.00 | 3.250 13.00 | 6.250 23.00 | 9.25 53.00 |
| 0.333 6.00 | 3.333 13.00 | 6.333 23.00 | 9.33 53.00 |
| 0.417 6.00 | 3.417 13.00 | 6.417 23.00 | 9.42 53.00 |
| 0.500 6.00 | 3.500 13.00 | 6.500 23.00 | 9.50 53.00 |
| 0.583 6.00 | 3.583 13.00 | 6.583 23.00 | 9.58 53.00 |
| 0.667 6.00 | 3.667 13.00 | 6.667 23.00 | 9.67 53.00 |
| 0.750 6.00 | 3.750 13.00 | 6.750 23.00 | 9.75 53.00 |
| 0.833 6.00 | 3.833 13.00 | 6.833 23.00 | 9.83 53.00 |
| 0.917 6.00 | 3.917 13.00 | 6.917 23.00 | 9.92 53.00 |
| 1.000 6.00 | 4.000 13.00 | 7.000 23.00 | 10.00 53.00 |
| 1.083 4.00 | 4.083 17.00 | 7.083 13.00 | 10.08 38.00 |
| 1.167 4.00 | 4.167 17.00 | 7.167 13.00 | 10.17 38.00 |
| 1.250 4.00 | 4.250 17.00 | 7.250 13.00 | 10.25 38.00 |
| 1.333 4.00 | 4.333 17.00 | 7.333 13.00 | 10.33 38.00 |
| 1.417 4.00 | 4.417 17.00 | 7.417 13.00 | 10.42 38.00 |
| 1.500 4.00 | 4.500 17.00 | 7.500 13.00 | 10.50 38.00 |
| 1.583 4.00 | 4.583 17.00 | 7.583 13.00 | 10.58 38.00 |
|-----|-----|-----|-----|
```

1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.673

PEAK FLOW (cms)= 3.478 (i)
TIME TO PEAK (hrs)= 10.667
RUNOFF VOLUME (mm)= 172.533
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.814

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

```
-----
| CALIB |
| NASHYD ( 0514) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 2.65 Curve Number (CN)= 80.0 |
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
| U.H. Tp(hrs)= 0.60 |
|-----|
```

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

```
-----
| TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN |
| hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr |
|-----|-----|-----|-----|
| 0.083 6.00 | 3.083 13.00 | 6.083 23.00 | 9.08 53.00 |
| 0.167 6.00 | 3.167 13.00 | 6.167 23.00 | 9.17 53.00 |
| 0.250 6.00 | 3.250 13.00 | 6.250 23.00 | 9.25 53.00 |
| 0.333 6.00 | 3.333 13.00 | 6.333 23.00 | 9.33 53.00 |
| 0.417 6.00 | 3.417 13.00 | 6.417 23.00 | 9.42 53.00 |
| 0.500 6.00 | 3.500 13.00 | 6.500 23.00 | 9.50 53.00 |
| 0.583 6.00 | 3.583 13.00 | 6.583 23.00 | 9.58 53.00 |
| 0.667 6.00 | 3.667 13.00 | 6.667 23.00 | 9.67 53.00 |
| 0.750 6.00 | 3.750 13.00 | 6.750 23.00 | 9.75 53.00 |
| 0.833 6.00 | 3.833 13.00 | 6.833 23.00 | 9.83 53.00 |
| 0.917 6.00 | 3.917 13.00 | 6.917 23.00 | 9.92 53.00 |
| 1.000 6.00 | 4.000 13.00 | 7.000 23.00 | 10.00 53.00 |
| 1.083 4.00 | 4.083 17.00 | 7.083 13.00 | 10.08 38.00 |
| 1.167 4.00 | 4.167 17.00 | 7.167 13.00 | 10.17 38.00 |
| 1.250 4.00 | 4.250 17.00 | 7.250 13.00 | 10.25 38.00 |
| 1.333 4.00 | 4.333 17.00 | 7.333 13.00 | 10.33 38.00 |
| 1.417 4.00 | 4.417 17.00 | 7.417 13.00 | 10.42 38.00 |
| 1.500 4.00 | 4.500 17.00 | 7.500 13.00 | 10.50 38.00 |
| 1.583 4.00 | 4.583 17.00 | 7.583 13.00 | 10.58 38.00 |
|-----|-----|-----|-----|
```

1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.169

PEAK FLOW (cms)= 0.294 (i)
 TIME TO PEAK (hrs)= 10.417
 RUNOFF VOLUME (mm)= 158.402
 TOTAL RAINFALL (mm)= 212.000
 RUNOFF COEFFICIENT = 0.747

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

CALIB			
NASHYD (0515)	Area (ha)= 5.41	Curve Number (CN)= 80.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.41		

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00

2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.504

PEAK FLOW (cms)= 0.662 (i)
 TIME TO PEAK (hrs)= 10.167
 RUNOFF VOLUME (mm)= 158.389
 TOTAL RAINFALL (mm)= 212.000
 RUNOFF COEFFICIENT = 0.747

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

CALIB			
NASHYD (0513)	Area (ha)= 6.68	Curve Number (CN)= 86.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.20		

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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00

2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.930 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 172.207
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.812

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

ADD HYD (2512)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2511):	158.62	14.245	11.08	172.53
+ ID2= 2 (0512):	31.10	3.478	10.67	172.53
=====				
ID = 3 (2512):	189.72	17.641	11.00	172.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2512):	189.72	17.641	11.00	172.53
+ ID2= 2 (0513):	6.68	0.930	10.00	172.21
=====				
ID = 1 (2512):	196.40	18.321	11.00	172.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2512):	196.40	18.321	11.00	172.52
+ ID2= 2 (0514):	2.65	0.294	10.42	158.40
=====				
ID = 3 (2512):	199.05	18.601	11.00	172.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2512):	199.05	18.601	11.00	172.33
+ ID2= 2 (0515):	5.41	0.662	10.17	158.39

=====

ID = 1 (2512):	204.46	19.152	11.00	171.96
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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2513)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2512):	204.46	19.152	11.00	171.96
+ ID2= 2 (4400):	264.84	24.698	11.33	173.82
=====				
ID = 3 (2513):	469.30	43.368	11.10	173.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0520)		Area (ha)= 108.36	Curve Number (CN)= 86.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# 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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00

2.917 6.00 | 5.917 13.00 | 8.917 13.00 | 11.92 13.00
3.000 6.00 | 6.000 13.00 | 9.000 13.00 | 12.00 13.00

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 10.462 (i)
TIME TO PEAK (hrs)= 11.333
RUNOFF VOLUME (mm)= 172.535
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.814

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

| ADD HYD (2520) |
1 + 2 = 3
ID1= 1 (2513): 469.30 43.368 11.10 173.01
+ ID2= 2 (0520): 108.36 10.462 11.33 172.54
=====

ID = 3 (2520): 577.66 53.758 11.17 172.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4500) |
| IN= 2--> OUT= 1 | Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning
0.00	409.70	0.0550
19.70	408.80	0.0550
41.70	407.20	0.0550
60.50	405.30	0.0550
80.00	404.50	0.0550
95.70	404.60	0.0550 / 0.0350
98.60	403.40	0.0350
100.40	403.40	0.0350
100.80	402.90	0.0350
101.50	402.70	0.0350
102.30	402.80	0.0350
103.30	403.20	0.0350
104.00	403.20	0.0350
105.60	404.40	0.0350 / 0.0550
109.70	404.30	0.0550
128.60	404.20	0.0550
154.10	405.40	0.0550
179.10	406.70	0.0550
201.90	408.60	0.0550
224.20	410.60	0.0550

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.34	403.04	.954E+03	0.3	0.70	47.40
0.68	403.38	.304E+04	1.6	1.03	32.27
1.02	403.72	.718E+04	4.5	1.25	26.57
1.36	404.06	.122E+05	9.7	1.58	20.96
1.70	404.40	.251E+05	18.1	1.44	23.04
2.08	404.78	.650E+05	42.3	1.29	25.62
2.46	405.16	.122E+06	86.3	1.40	23.62

2.84	405.54	.192E+06	151.6	1.57	21.10
3.21	405.91	.270E+06	238.3	1.75	18.90
3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (2520) 577.66 53.76 11.17 172.92 2.18 1.32
OUTFLOW: ID= 1 (4500) 577.66 51.55 11.47 172.92 2.15 1.31

| CALIB |
| NASHYD (0610) | Area (ha)= 78.05 Curve Number (CN)= 86.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.00

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

TIME		RAIN		TIME		RAIN		TIME		RAIN	
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00				
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00				
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00				
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00				
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00				
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00				
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00				
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00				
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00				
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00				
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00				
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00				
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00				
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00				
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00				
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00				
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00				
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00				
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00				
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00				
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00				
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00				
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00				
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00				
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00				
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00				
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00				
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00				
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00				

2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 8.022 (i)
TIME TO PEAK (hrs)= 11.167
RUNOFF VOLUME (mm)= 172.535
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.814

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

ADD HYD (2610)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4500):	577.66	51.549	11.47	172.92
+ ID2= 2 (0610):	78.05	8.022	11.17	172.54
=====				
ID = 3 (2610):	655.71	59.288	11.43	172.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0623)			
ID= 1 DT= 5.0 min	Area (ha)= 19.37	Curve Number (CN)= 85.0	
	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.45		

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00

1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW (cms)= 2.425 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 170.142
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

CALIB			
NASHYD (0625)			
ID= 1 DT= 5.0 min	Area (ha)= 6.72	Curve Number (CN)= 85.0	
	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.39		

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00

2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW (cms)= 0.868 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 170.132
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

ROUTE CHN(4625)
IN= 2---> OUT= 1 Routing time step (min)'= 5.00

----- DATA FOR SECTION (1.1) -----
Distance Elevation Manning
0.00 414.20 0.0360 Main Channel
4.30 412.70 0.0360 Main Channel
8.60 414.20 0.0360 Main Channel

----- TRAVEL TIME TABLE -----
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .108E+02 0.0 0.24 42.13
0.16 412.86 .434E+02 0.0 0.38 26.54
0.24 412.94 .976E+02 0.1 0.50 20.26
0.32 413.02 .174E+03 0.2 0.61 16.72
0.39 413.09 .271E+03 0.3 0.70 14.41
0.47 413.17 .390E+03 0.5 0.79 12.76
0.55 413.25 .532E+03 0.8 0.88 11.51
0.63 413.33 .694E+03 1.1 0.96 10.53
0.71 413.41 .879E+03 1.5 1.04 9.74
0.79 413.49 .108E+04 2.0 1.11 9.08
0.87 413.57 .131E+04 2.6 1.19 8.52
0.95 413.65 .156E+04 3.2 1.26 8.04
1.03 413.73 .183E+04 4.0 1.33 7.62
1.11 413.81 .213E+04 4.9 1.39 7.25
1.18 413.88 .244E+04 5.9 1.46 6.93
1.26 413.96 .278E+04 7.0 1.52 6.64
1.34 414.04 .313E+04 8.2 1.59 6.37
1.42 414.12 .351E+04 9.5 1.65 6.13
1.50 414.20 .392E+04 11.0 1.71 5.92

----- hydrograph -----<- pipe / channel ->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0625) 6.72 0.87 10.08 170.13 0.58 0.90
OUTFLOW : ID= 1 (4625) 6.72 0.85 10.25 170.10 0.57 0.89

CALIB
NASHYD (0622) Area (ha)= 9.69 Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.36

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

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

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW (cms)= 1.273 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 170.123
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.802

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

| CALIB |
| NASHYD (0621) |
ID= 1 DT= 5.0 min
Area (ha)= 6.56 Curve Number (CN)= 85.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.37

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

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

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.857 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 170.126
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.802

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

| NASHYD (0624) |
ID= 1 DT= 5.0 min
Area (ha)= 11.84 Curve Number (CN)= 85.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.51

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

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

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 1.435 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 170.147
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

| CALIB |
| STANDHYD (0626) |
ID= 1 DT= 5.0 min
Area (ha)= 1.06
Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.64	0.42
Dep. Storage (mm)=	1.00	10.00
Average Slope (%)=	1.00	2.00
Length (m)=	84.06	40.00
Mannings n =	0.013	0.250

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

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

Max.Eff.Inten.(mm/hr)=	53.00	63.74
over (min)	5.00	15.00
Storage Coeff. (min)=	2.97 (ii)	11.42 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.28	0.09

PEAK FLOW (cms)=	0.08	0.07	0.152 (iii)
TIME TO PEAK (hrs)=	9.75	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	173.50	192.25
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.82	0.91

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

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

ADD HYD (2621)				
1	2	3	AREA	QPEAK
			(ha)	(cms)
ID1= 1 (4625):			6.72	0.847
+ ID2= 2 (0621):			6.56	0.857
ID = 3 (2621):			13.28	1.692

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
3	2	1	AREA	QPEAK
			(ha)	(cms)
ID1= 3 (2621):			13.28	1.692
+ ID2= 2 (0622):			9.69	1.273
ID = 1 (2621):			22.97	2.953

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
1	2	3	AREA	QPEAK
			(ha)	(cms)
ID1= 1 (2621):			22.97	2.953
+ ID2= 2 (0623):			19.37	2.425
ID = 3 (2621):			42.34	5.378

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
3	2	1	AREA	QPEAK
			(ha)	(cms)
ID1= 3 (2621):			42.34	5.378
+ ID2= 2 (0624):			11.84	1.435
ID = 1 (2621):			54.18	6.802

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
1	2	3	AREA	QPEAK
			(ha)	(cms)
ID1= 1 (2621):			54.18	6.802
+ ID2= 2 (0626):			1.06	0.152

=====

ID = 3 (2621): 55.24 6.928 10.17 170.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0627)	Area (ha)=	9.39	Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.20	

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

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 1.298 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 169.831
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.801

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

CALIB			
NASHYD (6200)	Area (ha)=	6.66	Curve Number (CN)= 86.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.28	

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

----- TRANSFORMED HYETOGRAPH -----

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

Unit Hyd Qpeak (cms)= 0.908

PEAK FLOW (cms)= 0.912 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 172.448
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.813

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

CALIB
NASHYD (6201) | Area (ha)= 0.82 Curve Number (CN)= 86.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.15

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

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

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.114 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 171.540
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.809

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

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (6200):	6.66	0.912	10.00	172.45
+ ID2= 2 (6201):	0.82	0.114	10.00	171.54
=====				
ID = 3 (0113):	7.48	1.026	10.00	172.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4620) |
IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.456E+01	0.0	0.55	7.70
0.16	412.86	.182E+02	0.1	0.88	4.85
0.24	412.94	.410E+02	0.2	1.15	3.70
0.32	413.02	.729E+02	0.4	1.39	3.05
0.39	413.09	.114E+03	0.7	1.61	2.63
0.47	413.17	.164E+03	1.2	1.82	2.33
0.55	413.25	.223E+03	1.8	2.02	2.10
0.63	413.33	.292E+03	2.5	2.21	1.92
0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

	AREA	QPEAK	TPEAK	R.V.	<-pipe / channel->	
	(ha)	(cms)	(hrs)	(mm)	MAX DEPTH	MAX VEL
					(m)	(m/s)
INFLOW : ID= 2 (0113)	7.48	1.03	10.00	172.35	0.45	1.75
OUTFLOW: ID= 1 (4620)	7.48	1.02	10.00	172.35	0.45	1.75

ADD HYD (2620)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4620):	7.48	1.022	10.00	172.35
+ ID2= 2 (0627):	9.39	1.298	10.00	169.83
=====				
ID = 3 (2620):	16.87	2.321	10.00	170.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0113)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.

ADD HYD (2622)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2620):	16.87	2.321	10.00	170.95
+ ID2= 2 (2621):	55.24	6.928	10.17	170.56
=====				
ID = 3 (2622):	72.11	9.152	10.08	170.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2623)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2610):	655.71	59.288	11.43	172.88
+ ID2= 2 (2622):	72.11	9.152	10.08	170.65
=====				
ID = 3 (2623):	727.82	65.164	11.23	172.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0637)				
ID= 1 DT= 5.0 min				
	Area (ha)=	8.36	Curve Number (CN)=	85.0
	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.47		

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

---- TRANSFORMED HYETOGRAPH ----							
TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00

2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 1.035 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 170.144
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

CALIB			
NASHYD (0630)			
ID= 1 DT= 5.0 min			
Area (ha)=	33.04	Curve Number (CN)=	85.0
Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.38		

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

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

2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 4.294 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 170.129
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.802

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

ROUTE CHN(4630)
IN= 2--> OUT= 1 Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .893E+01 0.0 0.17 47.72
0.16 412.86 .357E+02 0.0 0.28 30.06
0.24 412.94 .804E+02 0.1 0.36 22.94
0.32 413.02 .143E+03 0.1 0.44 18.94
0.39 413.09 .223E+03 0.2 0.51 16.32
0.47 413.17 .322E+03 0.4 0.58 14.45
0.55 413.25 .438E+03 0.6 0.64 13.04
0.63 413.33 .572E+03 0.8 0.70 11.93
0.71 413.41 .724E+03 1.1 0.76 11.03
0.79 413.49 .893E+03 1.4 0.81 10.28
0.87 413.57 .108E+04 1.9 0.86 9.65
0.95 413.65 .129E+04 2.4 0.92 9.10
1.03 413.73 .151E+04 2.9 0.97 8.63
1.11 413.81 .175E+04 3.6 1.01 8.22
1.18 413.88 .201E+04 4.3 1.06 7.85
1.26 413.96 .229E+04 5.1 1.11 7.52
1.34 414.04 .258E+04 6.0 1.15 7.22
1.42 414.12 .289E+04 6.9 1.20 6.95
1.50 414.20 .323E+04 8.0 1.24 6.70

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0630) 33.04 4.29 10.08 170.13 1.19 1.06
OUTFLOW: ID= 1 (4630) 33.04 4.23 10.17 170.12 1.18 1.06

(ha) (cms) (hrs) (mm)
ID1= 1 (2623): 727.82 65.164 11.23 172.65
+ ID2= 2 (4630): 33.04 4.228 10.17 170.12
=====

ID = 3 (2637): 760.86 68.454 11.17 172.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2637): 760.86 68.454 11.17 172.54
+ ID2= 2 (0637): 8.36 1.035 10.25 170.14
=====

ID = 1 (2637): 769.22 69.299 11.17 172.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0636)
ID= 1 DT= 5.0 min
Area (ha)= 3.32 Curve Number (CN)= 85.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.48

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

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

2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.409 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 170.145
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

ADD HYD (2636)				
1	2	3		

ID1= 1 (2637):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (0636):	769.22	69.299	11.17	172.52
	3.32	0.409	10.25	170.14
=====				
ID = 3 (2636):	772.54	69.635	11.17	172.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0639)	Area (ha)=	4.60	Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.43	

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00

1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.582 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 170.139
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

CALIB			
NASHYD (0638)	Area (ha)=	20.63	Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.46	

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00

2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 2.567 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 170.143
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

ADD HYD (2630)					
1 + 2 = 3					

		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1=	1 (2636):	772.54	69.635	11.17	172.51
+	ID2= 2 (0638):	20.63	2.567	10.17	170.14
=====					
ID =	3 (2630):	793.17	71.711	11.17	172.45

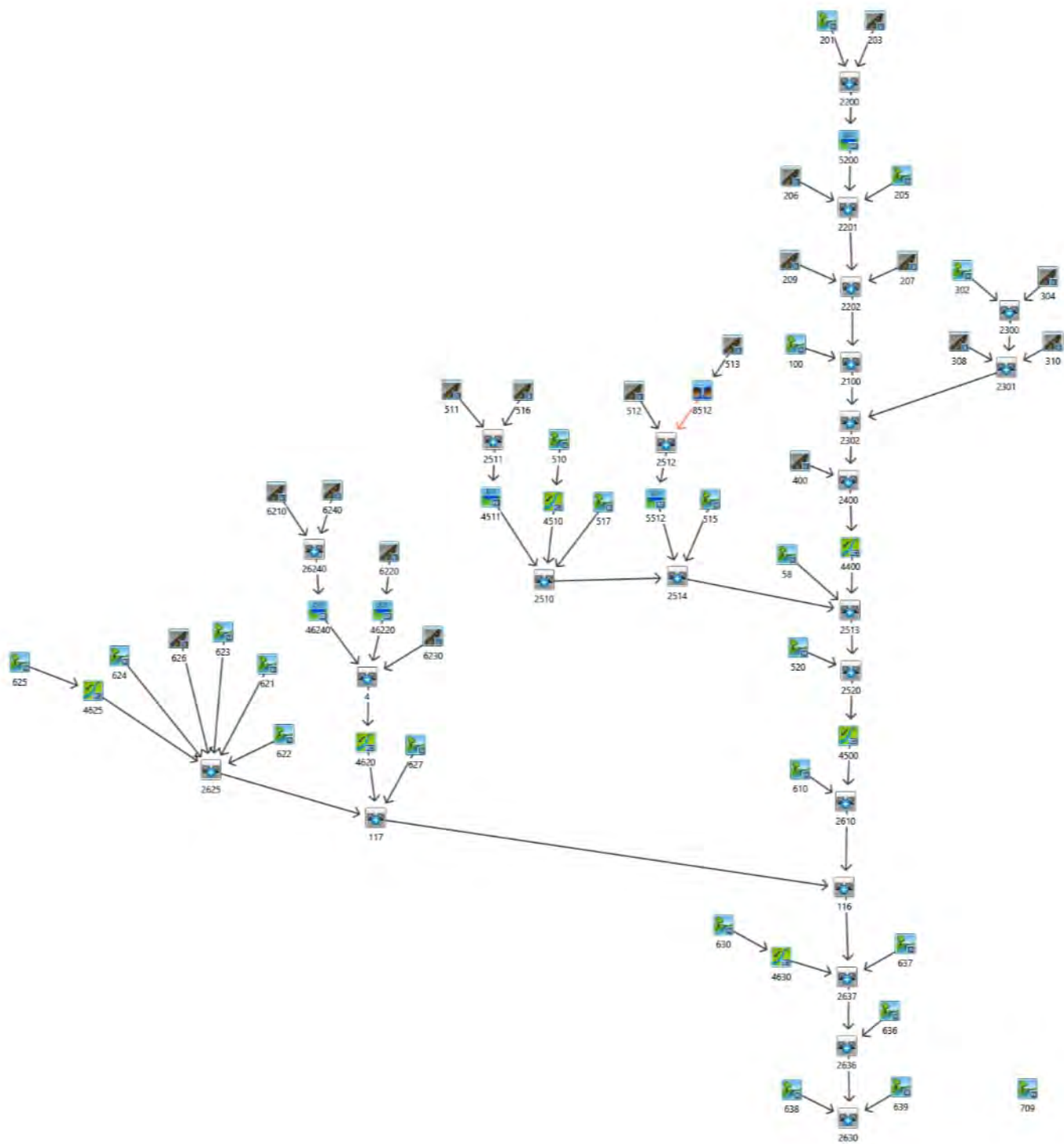
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2630)					
3 + 2 = 1					

		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1=	3 (2630):	793.17	71.711	11.17	172.45
+	ID2= 2 (0639):	4.60	0.582	10.17	170.14
=====					
ID =	1 (2630):	797.77	72.167	11.17	172.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH
=====



** SIMULATION : 2 year Fergus Shand Dam Chica **

CHICAGO STORM
Ptotal= 36.04 mm

IDF curve parameters: A= 721.000
B= 6.000
C= 0.796

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

Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.15	1.00	10.02	2.00	6.24	3.00	2.89
0.08	2.28	1.08	15.64	2.08	5.65	3.08	2.77
0.17	2.44	1.17	36.22	2.17	5.18	3.17	2.67
0.25	2.62	1.25	106.90	2.25	4.78	3.25	2.57
0.33	2.83	1.33	46.53	2.33	4.44	3.33	2.48
0.42	3.08	1.42	25.96	2.42	4.15	3.42	2.40
0.50	3.39	1.50	17.80	2.50	3.90	3.50	2.32
0.58	3.79	1.58	13.52	2.58	3.68	3.58	2.25
0.67	4.29	1.67	10.91	2.67	3.49	3.67	2.18
0.75	4.97	1.75	9.16	2.75	3.31	3.75	2.12
0.83	5.94	1.83	7.91	2.83	3.16	3.83	2.06
0.92	7.43	1.92	6.97	2.92	3.02	3.92	2.01

CALIB
NASHYD (0100)
ID= 1 DT= 5.0 min

Area (ha)= 136.98 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.17

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 0.840 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 6.637
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.184

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

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

Area (ha)= 14.60 Curve Number (CN)= 74.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.97

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.153 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 9.637
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.267

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

CALIB
STANDHYD (0203)
ID= 1 DT= 5.0 min

Area (ha)= 8.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PVIOUS (i)
Surface Area (ha)= 3.69 4.51
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 106.90 21.28
over (min)= 5.00 15.00
Storage Coeff. (min)= 1.03 (ii) 12.55 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.34 0.08

TOTALS

PEAK FLOW (cms)= 0.61 0.17 0.650 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 34.04 9.66 15.76
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.27 0.44

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

(i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:

CN* = 71.0 Ia = Dep. 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 (2200)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	14.60	0.153	2.58	9.64
+ ID2= 2 (0203):	8.20	0.650	1.33	15.76
=====				
ID = 3 (2200):	22.80	0.655	1.33	11.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1980	0.2314
0.0040	0.0218	0.2920	0.2621
0.0060	0.0446	0.3980	0.2937
0.0070	0.0683	0.5150	0.3261
0.0080	0.0930	0.8290	0.3592
0.0090	0.1187	1.3520	0.3930
0.0230	0.1453	2.0570	0.4275
0.0610	0.1730	2.9590	0.4629
0.1200	0.2017	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2200)	22.800	0.655	1.33	11.84
OUTFLOW: ID= 1 (5200)	22.800	0.102	4.08	11.78

PEAK FLOW REDUCTION [Qout/Qin](%)= 15.58
TIME SHIFT OF PEAK FLOW (min)=165.00
MAXIMUM STORAGE USED (ha.m.)= 0.1930

CALIB NASHYD (0205)	Area (ha)=	4.80	Curve Number (CN)=	90.0
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.41		

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.190 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.006
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.527

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

CALIB STANDHYD (0206)	Area (ha)=	0.20	Dir. Conn.(%)=	25.00
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	106.90	21.28
over (min)	5.00	15.00
Storage Coeff. (min)=	1.03 (ii)	12.55 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.08

PEAK FLOW (cms)=	0.01	0.00	*TOTALS* 0.016 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	34.04	9.66	15.73
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.27	0.44

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0205):	4.80	0.190	1.83	19.01
+ ID2= 2 (0206):	0.20	0.016	1.33	15.73
ID = 3 (2201):	5.00	0.195	1.83	18.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (2201):	5.00	0.195	1.83	18.87
+ ID2= 2 (5200):	22.80	0.102	4.08	11.78
ID = 1 (2201):	27.80	0.202	1.83	13.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0209)	Area (ha)=	2.70	Dir. Conn.(%)=	8.00
ID= 1 DT= 5.0 min	Total Imp(%)=	16.00		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.43	2.27
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	35.00	35.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	106.90	11.67
over (min)	5.00	20.00
Storage Coeff. (min)=	1.25 (ii)	19.19 (ii)
Unit Hyd. Tpeak (min)=	5.00	20.00
Unit Hyd. peak (cms)=	0.33	0.06

PEAK FLOW (cms)=	0.06	0.04	*TOTALS* 0.070 (iii)
TIME TO PEAK (hrs)=	1.33	1.67	1.33
RUNOFF VOLUME (mm)=	34.04	7.85	9.94
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.22	0.28

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (0207)	Area (ha)=	1.30	Dir. Conn.(%)=	25.00
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00		

IMPERVIOUS PERVIOUS (i)

Surface Area	(ha)=	0.58	0.72
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.20	1.20
Length	(m)=	25.00	25.00
Mannings n	=	0.013	0.250

Max.Eff.Inten.(mm/hr)=	106.90	21.28
over (min)	5.00	15.00
Storage Coeff. (min)=	1.03 (ii)	12.55 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.08

PEAK FLOW	(cms)=	0.10	0.03	*TOTALS*
TIME TO PEAK	(hrs)=	1.33	1.58	0.103 (iii)
RUNOFF VOLUME	(mm)=	34.04	9.66	1.33
TOTAL RAINFALL	(mm)=	36.04	36.04	15.75
RUNOFF COEFFICIENT	=	0.94	0.27	36.04
				0.44

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)				
1 + 2 = 3				

ID1= 1 (0207):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
+ ID2= 2 (0209):	1.30	0.103	1.33	15.75
	2.70	0.070	1.33	9.94
=====				
ID = 3 (2202):	4.00	0.173	1.33	11.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)				
3 + 2 = 1				

ID1= 3 (2202):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
+ ID2= 2 (2201):	4.00	0.173	1.33	11.83
	27.80	0.202	1.83	13.05
=====				
ID = 1 (2202):	31.80	0.281	1.75	12.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2100)				
1 + 2 = 3				

ID1= 1 (0100):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
+ ID2= 2 (2202):	136.98	0.840	3.00	6.64
	31.80	0.281	1.75	12.90
=====				
ID = 3 (2100):	168.78	0.969	2.92	7.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0302)			
ID= 1 DT= 5.0 min			

Area	(ha)=	2.90	Curve Number (CN)= 74.0
Ia	(mm)=	1.50	# of Linear Res.(N)= 3.00
U.H. Tp(hrs)=	0.45		

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW	(cms)=	0.051 (i)
TIME TO PEAK	(hrs)=	1.917
RUNOFF VOLUME	(mm)=	9.636
TOTAL RAINFALL	(mm)=	36.039
RUNOFF COEFFICIENT	=	0.267

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

CALIB			
STANDHYD (0304)			
ID= 1 DT= 5.0 min			

Area	(ha)=	4.40	
Total Imp(%)=	45.00	Dir. Conn.(%)=	25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.98
Dep. Storage	(mm)=	2.42
Average Slope	(%)=	2.00
Length	(m)=	1.00
Mannings n	=	25.00
		0.013
		0.250

Max.Eff.Inten.(mm/hr)=	106.90	21.28
over (min)	5.00	15.00
Storage Coeff. (min)=	1.08 (ii)	13.25 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.08

PEAK FLOW	(cms)=	0.32	0.09	*TOTALS*
TIME TO PEAK	(hrs)=	1.33	1.58	0.347 (iii)
RUNOFF VOLUME	(mm)=	34.04	9.66	1.33
TOTAL RAINFALL	(mm)=	36.04	36.04	15.76
RUNOFF COEFFICIENT	=	0.94	0.27	36.04
				0.44

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)				
1 + 2 = 3				

ID1= 1 (0302):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
+ ID2= 2 (0304):	2.90	0.051	1.92	9.64
	4.40	0.347	1.33	15.76
=====				
ID = 3 (2300):	7.30	0.354	1.33	13.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0308)	Area (ha)=	0.20	
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00	Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	106.90	21.28
over (min)	5.00	15.00
Storage Coeff. (min)=	1.08 (ii)	13.25 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.08

			TOTALS
PEAK FLOW (cms)=	0.01	0.00	0.016 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	34.04	9.66	15.72
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.27	0.44

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0310)	Area (ha)=	5.70	
ID= 1 DT= 5.0 min	Total Imp(%)=	16.00	Dir. Conn.(%)= 8.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.91	4.79
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	106.90	13.48
over (min)	5.00	15.00
Storage Coeff. (min)=	1.03 (ii)	14.86 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.08

			TOTALS
PEAK FLOW (cms)=	0.13	0.11	0.159 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	34.04	7.85	9.94
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.22	0.28

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2300):	7.30	0.354	1.33	13.32
+ ID2= 2 (0308):	0.20	0.016	1.33	15.72
ID = 3 (2301):	7.50	0.370	1.33	13.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2301):	7.50	0.370	1.33	13.39
+ ID2= 2 (0310):	5.70	0.159	1.33	9.94
ID = 1 (2301):	13.20	0.529	1.33	11.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2302)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2100):	168.78	0.969	2.92	7.82
+ ID2= 2 (2301):	13.20	0.529	1.33	11.90
ID = 3 (2302):	181.98	1.046	2.83	8.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0400)	Area (ha)=	82.86	
ID= 1 DT= 5.0 min	Total Imp(%)=	10.00	Dir. Conn.(%)= 3.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	8.29	74.57
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	0.70	2.00
Length (m)=	1437.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	53.90	10.84
over (min)	20.00	40.00
Storage Coeff. (min)=	18.02 (ii)	35.18 (ii)
Unit Hyd. Tpeak (min)=	20.00	40.00
Unit Hyd. peak (cms)=	0.06	0.03

			TOTALS
PEAK FLOW (cms)=	0.25	0.90	1.023 (iii)
TIME TO PEAK (hrs)=	1.58	2.08	2.00
RUNOFF VOLUME (mm)=	34.04	7.45	8.24
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.21	0.23

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 ( 2400)|  
| 1 + 2 = 3 |  
-----  
ID1= 1 ( 2302): 181.98 1.046 2.83 8.11  
+ ID2= 2 ( 0400): 82.86 1.023 2.00 8.24  
=====
```

ID = 3 (2400): 264.84 1.942 2.08 8.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----  
| ROUTE CHN( 4400)|  
| IN= 2--> OUT= 1 |  
-----  
Routing time step (min)'= 2.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->  
Distance Elevation Manning  
0.00 411.10 0.0550  
27.30 410.20 0.0550  
77.50 409.10 0.0550  
96.60 409.10 0.0550  
115.80 408.90 0.0550  
124.80 409.10 0.0550  
131.00 408.90 0.0550 /0.0350 Main Channel  
133.60 408.00 0.0350 Main Channel  
134.40 407.60 0.0350 Main Channel  
135.00 407.50 0.0350 Main Channel  
135.80 407.60 0.0350 Main Channel  
136.50 408.00 0.0350 Main Channel  
139.40 408.80 0.0350 /0.0550 Main Channel  
143.50 408.90 0.0550  
148.50 408.70 0.0550  
163.80 408.90 0.0550  
183.20 408.90 0.0550  
243.70 409.70 0.0550  
278.70 410.20 0.0550  
330.50 411.40 0.0550
```

```
<----- TRAVEL TIME TABLE ----->  
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME  
(m) (m) (cu.m.) (cms) (m/s) (min)  
0.19 407.69 .366E+03 0.1 0.51 58.83  
0.37 407.87 .106E+04 0.5 0.81 37.08  
0.56 408.06 .199E+04 1.1 1.00 29.93  
0.74 408.24 .328E+04 2.1 1.14 26.32  
0.93 408.43 .498E+04 3.6 1.28 23.32  
1.11 408.61 .708E+04 5.6 1.43 20.94  
1.30 408.80 .105E+05 8.5 1.45 20.61  
1.49 408.99 .247E+05 14.8 1.07 27.91  
1.68 409.18 .601E+05 30.4 0.91 32.97  
1.87 409.37 .109E+06 58.5 0.96 31.05
```

2.06	409.56	.166E+06	98.3	1.06	28.11
2.25	409.75	.231E+06	150.3	1.17	25.57
2.44	409.94	.303E+06	215.4	1.28	23.46
2.64	410.14	.383E+06	293.8	1.38	21.74
2.83	410.33	.470E+06	390.1	1.49	20.10
3.02	410.52	.563E+06	502.4	1.60	18.66
3.21	410.71	.660E+06	628.8	1.71	17.48
3.40	410.90	.762E+06	769.5	1.81	16.49
3.59	411.09	.868E+06	924.9	1.91	15.65

```
<--- hydrograph ---> <-pipe / channel->  
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL  
(ha) (cms) (hrs) (mm) (m) (m/s)  
INFLOW : ID= 2 ( 2400) 264.84 1.94 2.08 8.15 0.72 1.12  
OUTFLOW: ID= 1 ( 4400) 264.84 1.71 2.69 8.08 0.67 1.08
```

***** WARNING : THE HYD WAS CUT TO 2000 POINTS

```
-----  
| CALIB  
| NASHYD ( 0515)|  
| ID= 1 DT= 5.0 min |  
-----  
Area (ha)= 5.01 Curve Number (CN)= 65.0  
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00  
U.H. Tp(hrs)= 0.41
```

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW (cms)= 0.067 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 6.963
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.193

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

```
-----  
| CALIB  
| NASHYD ( 0510)|  
| ID= 1 DT= 5.0 min |  
-----  
Area (ha)= 91.44 Curve Number (CN)= 71.0  
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00  
U.H. Tp(hrs)= 1.09
```

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)= 0.784 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 8.627
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.239

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

```
-----  
| ROUTE CHN( 4510)|  
| IN= 2--> OUT= 1 |  
-----  
Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->  
Distance Elevation Manning  
0.00 414.20 0.0350 Main Channel  
4.30 412.70 0.0350 Main Channel  
8.60 414.20 0.0350 Main Channel
```

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.206E+02	0.0	0.19	101.61
0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

<---- hydrograph ---->

<-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0510)	91.44	0.78	2.75	8.63	0.61	0.73
OUTFLOW: ID= 1 (4510)	91.44	0.72	3.17	8.62	0.59	0.72

Storage Coeff. (min)=	10.00	25.00	
Unit Hyd. Tpeak (min)=	8.27 (ii)	23.20 (ii)	
Unit Hyd. peak (cms)=	10.00	25.00	
	0.13	0.05	
PEAK FLOW (cms)=	2.57	0.87	*TOTALS*
TIME TO PEAK (hrs)=	1.42	1.75	2.863 (iii)
RUNOFF VOLUME (mm)=	35.24	11.21	1.42
TOTAL RAINFALL (mm)=	36.04	36.04	18.42
RUNOFF COEFFICIENT =	0.98	0.31	36.04
			0.51

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)=	10.78	
STANDHYD (0516)	Total Imp(%)=	45.00	Dir. Conn.(%)= 45.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	4.85	5.93	
Dep. Storage (mm)=	0.80	1.50	
Average Slope (%)=	1.00	1.00	
Length (m)=	268.08	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	106.90	10.45	
Storage Coeff. (min)=	5.00	30.00	
Unit Hyd. Tpeak (min)=	4.49 (ii)	25.94 (ii)	
Unit Hyd. peak (cms)=	5.00	30.00	
	0.23	0.04	
PEAK FLOW (cms)=	1.09	0.10	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.83	1.106 (iii)
RUNOFF VOLUME (mm)=	35.24	8.63	1.33
TOTAL RAINFALL (mm)=	36.04	36.04	20.60
RUNOFF COEFFICIENT =	0.98	0.24	36.04
			0.57

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2511)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0511):	52.87	2.863	1.42	18.42
+ ID2= 2 (0516):	10.78	1.106	1.33	20.60
ID = 3 (2511):	63.65	3.669	1.42	18.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	2.14	Curve Number (CN)= 71.0
NASHYD (0517)	Ia (mm)=	1.50	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.32	

Unit Hyd Qpeak (cms)= 0.255

PEAK FLOW (cms)= 0.042 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 8.624
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.239

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

CALIB	Area (ha)=	52.87	
STANDHYD (0511)	Total Imp(%)=	50.00	Dir. Conn.(%)= 30.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	26.43	26.43	
Dep. Storage (mm)=	0.80	1.50	
Average Slope (%)=	1.00	1.00	
Length (m)=	593.69	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	76.72	25.83	

```

-----
| RESERVOIR( 4511) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
      **** WARNING : FIRST OUTFLOW IS NOT ZERO.
      OUTFLOW    STORAGE    | OUTFLOW    STORAGE
      (cms)      (ha.m.)    | (cms)      (ha.m.)
      0.7700     0.9000     | 3.2130     1.6220
      1.6000     1.1400     | 3.9540     1.8810
      2.2900     1.2810     | 4.9000     2.3000

      AREA    QPEAK    TPEAK    R.V.
      (ha)    (cms)    (hrs)    (mm)
INFLOW : ID= 2 ( 2511) 63.650  3.669  1.42  18.79
OUTFLOW: ID= 1 ( 4511) 63.650  0.614  2.67  18.78

      PEAK FLOW REDUCTION [Qout/Qin](%)= 16.74
      TIME SHIFT OF PEAK FLOW (min)= 75.00
      MAXIMUM STORAGE USED (ha.m.)= 0.7179

```

```

-----
| ADD HYD ( 2510) |
| 1 + 2 = 3 |
-----
      ID1= 1 ( 4510): 91.44 0.725 3.17 8.62
      + ID2= 2 ( 4511): 63.65 0.614 2.67 18.78
      =====
      ID = 3 ( 2510): 155.09 1.326 3.08 12.79

      NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

```

-----
| ADD HYD ( 2510) |
| 3 + 2 = 1 |
-----
      ID1= 3 ( 2510): 155.09 1.326 3.08 12.79
      + ID2= 2 ( 0517): 2.14 0.042 1.75 8.62
      =====
      ID = 1 ( 2510): 157.23 1.335 3.08 12.73

      NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

```

-----
| CALIB
| STANDHYD ( 0512) |
| ID= 1 DT= 5.0 min |
-----
      Area (ha)= 27.13
      Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00

      IMPERVIOUS    PERVIOUS (i)
      Surface Area (ha)= 13.56 13.56
      Dep. Storage (mm)= 0.80 1.50
      Average Slope (%)= 1.00 2.00
      Length (m)= 425.28 40.00
      Mannings n = 0.013 0.250

      Max.Eff.Inten.(mm/hr)= 106.90 25.83
      over (min)= 5.00 20.00
      Storage Coeff. (min)= 5.93 (ii) 18.06 (ii)
      Unit Hyd. Tpeak (min)= 5.00 20.00
      Unit Hyd. peak (cms)= 0.19 0.06

      *TOTALS*

```

```

PEAK FLOW (cms)= 1.63 0.52 1.747 (iii)
TIME TO PEAK (hrs)= 1.33 1.67 1.33
RUNOFF VOLUME (mm)= 35.24 11.21 18.42
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.98 0.31 0.51

```

```

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
    CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
    THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

```

-----
| CALIB
| STANDHYD ( 0513) |
| ID= 1 DT= 5.0 min |
-----
      Area (ha)= 6.44
      Total Imp(%)= 65.00 Dir. Conn.(%)= 35.00

```

```

      IMPERVIOUS    PERVIOUS (i)
      Surface Area (ha)= 4.19 2.25
      Dep. Storage (mm)= 0.80 1.50
      Average Slope (%)= 1.00 1.00
      Length (m)= 207.20 40.00
      Mannings n = 0.013 0.250

```

```

      Max.Eff.Inten.(mm/hr)= 106.90 42.42
      over (min)= 5.00 20.00
      Storage Coeff. (min)= 3.85 (ii) 16.10 (ii)
      Unit Hyd. Tpeak (min)= 5.00 20.00
      Unit Hyd. peak (cms)= 0.25 0.06

```

```

      *TOTALS*
      PEAK FLOW (cms)= 0.54 0.15 0.574 (iii)
      TIME TO PEAK (hrs)= 1.33 1.67 1.33
      RUNOFF VOLUME (mm)= 35.24 13.63 21.19
      TOTAL RAINFALL (mm)= 36.04 36.04 36.04
      RUNOFF COEFFICIENT = 0.98 0.38 0.59

```

```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
    CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
    THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

```

-----
| DUHYD ( 8512) |
| Inlet Cap.= 0.732 |
| #of Inlets= 1 |
| Total(cms)= 0.7 |
-----
      AREA    QPEAK    TPEAK    R.V.
      (ha)    (cms)    (hrs)    (mm)
TOTAL HYD.(ID= 1): 6.44 0.57 1.33 21.19
=====
MAJOR SYS.(ID= 2): 0.00 0.00 0.00 0.00
MINOR SYS.(ID= 3): 6.44 0.57 1.33 21.19

```

```

      NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

```

| ADD HYD ( 2512)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0512): 27.13 1.747 1.33 18.42
+ ID2= 2 ( 8512): 6.44 0.574 1.33 21.19
=====
ID = 3 ( 2512): 33.57 2.321 1.33 18.95

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| RESERVOIR( 5512)|
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
OVERFLOW IS OFF
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.6640 0.9151
0.0210 0.1601 | 0.8570 1.0220
0.0360 0.3317 | 1.0660 1.1320
0.0410 0.4218 | 1.2900 1.2450
0.1000 0.5147 | 1.5290 1.3610
0.2030 0.6105 | 1.7810 1.4800
0.3340 0.7092 | 2.0460 1.6020
0.4890 0.8107 | 2.3220 1.7260

```

```

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 2512) 33.570 2.321 1.33 18.95
OUTFLOW: ID= 1 ( 5512) 33.570 0.129 4.00 18.89

```

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.54
TIME SHIFT OF PEAK FLOW (min)=160.00
MAXIMUM STORAGE USED (ha.m.)= 0.5414

```

```

| ADD HYD ( 2514)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 2510): 157.23 1.335 3.08 12.73
+ ID2= 2 ( 0515): 5.01 0.067 1.83 6.96
=====
ID = 3 ( 2514): 162.24 1.356 3.08 12.56

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 2514)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2514): 162.24 1.356 3.08 12.56
+ ID2= 2 ( 5512): 33.57 0.129 4.00 18.89
=====
ID = 1 ( 2514): 195.81 1.466 3.08 13.64

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| CALIB
| NASHYD ( 0058)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 6.68 Curve Number (CN)= 71.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

```

Unit Hyd Qpeak (cms)= 1.276

```

PEAK FLOW (cms)= 0.134 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 7.134
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.198

```

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

```

| ADD HYD ( 2513)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 2514): 195.81 1.466 3.08 13.64
+ ID2= 2 ( 4400): 264.84 1.706 2.69 8.08
=====
ID = 3 ( 2513): 460.65 3.134 2.92 10.33

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| ADD HYD ( 2513)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2513): 460.65 3.134 2.92 10.33
+ ID2= 2 ( 0058): 6.68 0.134 1.58 7.13
=====
ID = 1 ( 2513): 467.33 3.160 2.89 10.29

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

| CALIB
| NASHYD ( 0520)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 108.36 Curve Number (CN)= 71.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.20

```

Unit Hyd Qpeak (cms)= 3.449

```

PEAK FLOW (cms)= 0.706 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 7.148
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.198

```

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

```

| ADD HYD ( 2520)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 2513): 467.33 3.160 2.89 10.29
+ ID2= 2 ( 0520): 108.36 0.706 3.00 7.15
=====
ID = 3 ( 2520): 575.69 3.864 2.92 9.70

```


NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4500)
IN= 2--> OUT= 1 | Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 /0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 /0.0550 Main Channel
109.70 404.30 0.0550
128.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
0.68 403.38 .304E+04 1.6 1.03 32.27
1.02 403.72 .718E+04 4.5 1.25 26.57
1.36 404.06 .122E+05 9.7 1.58 20.96
1.70 404.40 .251E+05 18.1 1.44 23.04
2.08 404.78 .650E+05 42.3 1.29 25.62
2.46 405.16 .122E+06 86.3 1.40 23.62
2.84 405.54 .192E+06 151.6 1.57 21.10
3.21 405.91 .270E+06 238.3 1.75 18.90
3.59 406.29 .357E+06 345.8 1.93 17.20
3.97 406.67 .452E+06 474.9 2.09 15.85
4.35 407.05 .554E+06 631.1 2.26 14.63
4.73 407.43 .663E+06 807.8 2.42 13.67
5.11 407.81 .779E+06 1006.4 2.57 12.89
5.49 408.19 .902E+06 1229.0 2.71 12.23
5.86 408.56 .103E+07 1476.4 2.84 11.66
6.24 408.94 .117E+07 1745.6 2.96 11.18
6.62 409.32 .132E+07 2034.5 3.07 10.79
7.00 409.70 .147E+07 2353.2 3.17 10.44

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (2520) 575.69 3.86 2.92 9.70 0.95 1.19
OUTFLOW: ID= 1 (4500) 575.69 3.64 3.39 9.69 0.92 1.17

NASHYD (0610) | Area (ha)= 78.05 Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.00

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 0.575 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 7.148
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.198

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

ADD HYD (2610) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (4500): 575.69 3.640 3.39 9.69
+ ID2= 2 (0610): 78.05 0.575 2.75 7.15
=====

ID = 3 (2610): 653.74 4.137 3.28 9.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0621) | Area (ha)= 6.56 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.37

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.089 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 6.885
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

CALIB
NASHYD (0622) | Area (ha)= 9.69 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.36

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW (cms)= 0.133 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 6.885
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

CALIB

CALIB

NASHYD (0623) | Area (ha)= 19.37 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.45

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW (cms)= 0.231 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

CALIB
NASHYD (0624) | Area (ha)= 11.84 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.51

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 0.131 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

CALIB
NASHYD (0625) | Area (ha)= 6.72 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.39

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW (cms)= 0.088 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

ROUTE CHN(4625) |
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0360 Main Channel
4.30 412.70 0.0360 Main Channel
8.60 414.20 0.0360 Main Channel

----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .108E+02 0.0 0.24 42.13

0.16	412.86	.434E+02	0.0	0.38	26.54
0.24	412.94	.976E+02	0.1	0.50	20.26
0.32	413.02	.174E+03	0.2	0.61	16.72
0.39	413.09	.271E+03	0.3	0.70	14.41
0.47	413.17	.390E+03	0.5	0.79	12.76
0.55	413.25	.532E+03	0.8	0.88	11.51
0.63	413.33	.694E+03	1.1	0.96	10.53
0.71	413.41	.879E+03	1.5	1.04	9.74
0.79	413.49	.108E+04	2.0	1.11	9.08
0.87	413.57	.131E+04	2.6	1.19	8.52
0.95	413.65	.156E+04	3.2	1.26	8.04
1.03	413.73	.183E+04	4.0	1.33	7.62
1.11	413.81	.213E+04	4.9	1.39	7.25
1.18	413.88	.244E+04	5.9	1.46	6.93
1.26	413.96	.278E+04	7.0	1.52	6.64
1.34	414.04	.313E+04	8.2	1.59	6.37
1.42	414.12	.351E+04	9.5	1.65	6.13
1.50	414.20	.392E+04	11.0	1.71	5.92

-----> hydrograph -----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0625) 6.72 0.09 1.83 6.89 0.24 0.51
OUTFLOW: ID= 1 (4625) 6.72 0.07 2.17 6.85 0.22 0.47

CALIB
STANDHYD (0626) | Area (ha)= 1.06
ID= 1 DT= 5.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.64 0.42
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 84.06 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 106.90 20.27
over (min) 5.00 20.00
Storage Coeff. (min)= 2.24 (ii) 15.60 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.30 0.07

TOTALS
PEAK FLOW (cms)= 0.15 0.01 0.149 (iii)
TIME TO PEAK (hrs)= 1.33 1.67 1.33
RUNOFF VOLUME (mm)= 35.04 9.96 22.49
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.97 0.28 0.62

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2625)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4625):	6.72	0.071	2.17	6.85
+ ID2= 2 (0621):	6.56	0.089	1.83	6.89
ID = 3 (2625):	13.28	0.149	2.00	6.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2625):	13.28	0.149	2.00	6.87
+ ID2= 2 (0622):	9.69	0.133	1.83	6.89
ID = 1 (2625):	22.97	0.276	1.92	6.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2625):	22.97	0.276	1.92	6.88
+ ID2= 2 (0623):	19.37	0.231	1.92	6.89
ID = 3 (2625):	42.34	0.507	1.92	6.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2625):	42.34	0.507	1.92	6.88
+ ID2= 2 (0624):	11.84	0.131	2.00	6.89
ID = 1 (2625):	54.18	0.635	1.92	6.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2625):	54.18	0.635	1.92	6.88
+ ID2= 2 (0626):	1.06	0.149	1.33	22.49
ID = 3 (2625):	55.24	0.657	1.92	7.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area	(ha)=	9.39	Curve Number (CN)=	70.0
NASHYD (0627)	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=		0.20		

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.181 (i)
 TIME TO PEAK (hrs)= 1.583
 RUNOFF VOLUME (mm)= 6.874
 TOTAL RAINFALL (mm)= 36.039
 RUNOFF COEFFICIENT = 0.191

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

CALIB	Area	(ha)=	0.79	Dir. Conn.(%)=	70.00
STANDHYD (6240)	Total Imp(%)=	90.00			
ID= 1 DT= 5.0 min					
	IMPERVIOUS	PERVIOUS (i)			
Surface Area	(ha)=	0.71	0.08		
Dep. Storage	(mm)=	0.52	7.16		
Average Slope	(%)=	2.00	2.00		
Length	(m)=	20.00	20.00		
Mannings n	=	0.013	0.250		
Max.Eff.Inten.(mm/hr)=	106.90	115.77			
over (min)	5.00	5.00			
Storage Coeff. (min)=	0.77 (ii)	2.85 (ii)			
Unit Hyd. Tpeak (min)=	5.00	5.00			
Unit Hyd. peak (cms)=	0.34	0.28			
PEAK FLOW (cms)=	0.16	0.03			*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.33			0.192 (iii)
RUNOFF VOLUME (mm)=	35.52	17.86			1.33
TOTAL RAINFALL (mm)=	36.04	36.04			30.22
RUNOFF COEFFICIENT =	0.99	0.50			36.04
					0.84

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 74.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area	(ha)=	1.96	Dir. Conn.(%)=	40.00
STANDHYD (6210)	Total Imp(%)=	60.00			
ID= 1 DT= 5.0 min					
	IMPERVIOUS	PERVIOUS (i)			
Surface Area	(ha)=	1.18	0.78		
Dep. Storage	(mm)=	0.52	7.16		
Average Slope	(%)=	2.00	2.00		
Length	(m)=	40.00	40.00		
Mannings n	=	0.013	0.250		
Max.Eff.Inten.(mm/hr)=	106.90	26.23			
over (min)	5.00	15.00			
Storage Coeff. (min)=	1.17 (ii)	13.22 (ii)			
Unit Hyd. Tpeak (min)=	5.00	15.00			
Unit Hyd. peak (cms)=	0.34	0.08			
					TOTALS

PEAK FLOW	(cms)=	0.23	0.04	0.239 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.33
RUNOFF VOLUME	(mm)=	35.52	10.77	20.67
TOTAL RAINFALL	(mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT	=	0.99	0.30	0.57

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26240)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (6210):	1.96	0.239	1.33	20.67
+ ID2= 2 (6240):	0.79	0.192	1.33	30.22
=====				
ID = 3 (26240):	2.75	0.431	1.33	23.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(46240)	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	0.1390	0.0686
	0.0060	0.0042	0.1510	0.0822
	0.0130	0.0130	0.1630	0.0967
	0.0200	0.0250	0.1730	0.1121
	0.0250	0.0328	0.1780	0.1202
	0.0290	0.0439	2.5750	0.1742
	0.1260	0.0558	0.0000	0.0000
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (26240)	2.750	0.431	1.33	23.41
OUTFLOW: ID= 1 (46240)	2.750	0.028	2.50	23.35

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.55
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 0.0417

CALIB			
STANDHYD (6220)	Area (ha)=	0.92	
ID= 1 DT= 5.0 min	Total Imp(%)=	40.00	Dir. Conn.(%)= 20.00
	IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.37	0.55
Dep. Storage	(mm)=	0.52	7.16
Average Slope	(%)=	2.00	2.00
Length	(m)=	40.00	40.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=		106.90	20.42

over (min)	5.00	15.00	
Storage Coeff. (min)=	1.17 (ii)	14.49 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.34	0.08	
			TOTALS
PEAK FLOW (cms)=	0.05	0.02	0.058 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	35.52	9.64	14.80
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.99	0.27	0.41

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(46220)	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	0.2590	0.0708
	0.0050	0.0089	0.2910	0.0871
	0.0100	0.0187	0.3210	0.1045
	0.0130	0.0298	0.3720	0.1438
	0.0150	0.0422	2.8080	0.2087
	0.2220	0.0559	0.0000	0.0000

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (6220)	0.920	0.058	1.33	14.80
OUTFLOW: ID= 1 (46220)	0.920	0.005	3.08	14.32

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.86
TIME SHIFT OF PEAK FLOW (min)=105.00
MAXIMUM STORAGE USED (ha.m.)= 0.0092

CALIB			
STANDHYD (6230)	Area (ha)=	0.48	
ID= 1 DT= 5.0 min	Total Imp(%)=	10.00	Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	0.05	0.43
Dep. Storage	(mm)=	0.52	7.16
Average Slope	(%)=	2.00	2.00
Length	(m)=	20.00	20.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=		106.90	11.91
over (min)	5.00	15.00	
Storage Coeff. (min)=	0.77 (ii)	11.68 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.34	0.09	
			TOTALS
PEAK FLOW (cms)=	0.01	0.01	0.010 (iii)

TIME TO PEAK (hrs)= 1.33 1.58 1.58
RUNOFF VOLUME (mm)= 35.52 7.52 8.91
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.99 0.21 0.25

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 ( 0004)|  
| 1 + 2 = 3 |  
-----  
ID1= 1 ( 46220): AREA QPEAK TPEAK R.V.  
                (ha) (cms) (hrs) (mm)  
+ ID2= 2 ( 46240): 0.92 0.005 3.08 14.32  
===== 23.35  
ID = 3 ( 0004): 3.67 0.033 2.58 21.09
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 0004)|  
| 3 + 2 = 1 |  
-----  
ID1= 3 ( 0004): AREA QPEAK TPEAK R.V.  
                (ha) (cms) (hrs) (mm)  
+ ID2= 2 ( 6230): 0.48 0.010 1.58 8.91  
===== 19.68  
ID = 1 ( 0004): 4.15 0.039 1.67 19.68
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN( 4620)|  
| IN= 2--> OUT= 1 | Routing time step (min)'= 2.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->  
Distance Elevation Manning  
0.00 414.20 0.0350 Main Channel  
4.30 412.70 0.0350 Main Channel  
8.60 414.20 0.0350 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->  
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME  
(m) (m) (cu.m.) (cms) (m/s) (min)  
0.08 412.78 .456E+01 0.0 0.55 7.70  
0.16 412.86 .182E+02 0.1 0.88 4.85  
0.24 412.94 .410E+02 0.2 1.15 3.70  
0.32 413.02 .729E+02 0.4 1.39 3.05  
0.39 413.09 .114E+03 0.7 1.61 2.63  
0.47 413.17 .164E+03 1.2 1.82 2.33  
0.55 413.25 .223E+03 1.8 2.02 2.10  
0.63 413.33 .292E+03 2.5 2.21 1.92  
0.71 413.41 .369E+03 3.5 2.39 1.78  
0.79 413.49 .456E+03 4.6 2.56 1.66
```

0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

```
<--- hydrograph ---> <-pipe / channel->  
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL  
(ha) (cms) (hrs) (mm) (m) (m/s)  
INFLOW : ID= 2 ( 0004) 4.15 0.04 1.67 19.68 0.12 0.69  
OUTFLOW: ID= 1 ( 4620) 4.15 0.04 1.83 19.52 0.12 0.69
```

```
| ADD HYD ( 0117)|  
| 1 + 2 = 3 |  
-----  
ID1= 1 ( 2625): AREA QPEAK TPEAK R.V.  
                (ha) (cms) (hrs) (mm)  
+ ID2= 2 ( 4620): 55.24 0.657 1.92 7.18  
===== 19.52  
ID = 3 ( 0117): 59.39 0.695 1.92 8.04
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 0117)|  
| 3 + 2 = 1 |  
-----  
ID1= 3 ( 0117): AREA QPEAK TPEAK R.V.  
                (ha) (cms) (hrs) (mm)  
+ ID2= 2 ( 0627): 59.39 0.695 1.92 8.04  
===== 6.87  
ID = 1 ( 0117): 9.39 0.181 1.58 6.87  
===== 7.88
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 0116)|  
| 1 + 2 = 3 |  
-----  
ID1= 1 ( 0117): AREA QPEAK TPEAK R.V.  
                (ha) (cms) (hrs) (mm)  
+ ID2= 2 ( 2610): 68.78 0.812 1.83 7.88  
===== 9.39  
ID = 3 ( 0116): 653.74 4.137 3.28 9.39  
===== 9.24
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB  
| NASHYD ( 0637)| Area (ha)= 8.36 Curve Number (CN)= 70.0  
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00  
| U.H. Tp(hrs)= 0.47
```

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 0.097 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

CALIB (0630) | Area (ha)= 33.04 Curve Number (CN)= 70.0
NASHYD (0630) | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min | U.H. Tp(hrs)= 0.38

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 0.439 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

ROUTE CHN(4630) |
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0630)	33.04	0.44	1.83	6.89	0.50	0.60

OUTFLOW: ID= 1 (4630) 33.04 0.38 2.08 6.88 0.48 0.58

ADD HYD (2637) |
1 + 2 = 3 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (0116): 722.52 4.437 3.22 9.24
+ ID2= 2 (4630): 33.04 0.384 2.08 6.88
=====

ID = 3 (2637): 755.56 4.595 3.14 9.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637) |
3 + 2 = 1 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 3 (2637): 755.56 4.595 3.14 9.14
+ ID2= 2 (0637): 8.36 0.097 2.00 6.89
=====

ID = 1 (2637): 763.92 4.634 3.14 9.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0636) | Area (ha)= 3.32 Curve Number (CN)= 70.0
NASHYD (0636) | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min | U.H. Tp(hrs)= 0.48

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.038 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

ADD HYD (2636) |
1 + 2 = 3 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (2637): 763.92 4.634 3.14 9.12
+ ID2= 2 (0636): 3.32 0.038 2.00 6.89
=====

ID = 3 (2636): 767.24 4.650 3.14 9.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0638) | Area (ha)= 20.63 Curve Number (CN)= 70.0
NASHYD (0638) | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min | U.H. Tp(hrs)= 0.46

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 0.243 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

```
-----
| CALIB
| NASHYD ( 0639) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 4.60 Curve Number (CN)= 70.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.43
```

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.057 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

```
-----
| ADD HYD ( 2630) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2636): 767.24 4.650 3.14 9.11
| + ID2= 2 ( 0638): 20.63 0.243 1.92 6.89
|=====|
| ID = 3 ( 2630): 787.87 4.746 3.11 9.05
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2630) |
| 3 + 2 = 1 |
|-----|
| ID1= 3 ( 2630): 787.87 4.746 3.11 9.05
| + ID2= 2 ( 0639): 4.60 0.057 1.92 6.89
|=====|
| ID = 1 ( 2630): 792.47 4.767 3.08 9.04
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0709) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 21.19 Curve Number (CN)= 70.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.65
```

Unit Hyd Qpeak (cms)= 1.245

PEAK FLOW (cms)= 0.200 (i)
TIME TO PEAK (hrs)= 2.250

RUNOFF VOLUME (mm)= 6.887
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

FINISH

```
-----
*****
** SIMULATION : 5 year Fergus Shand Dam Chica **
*****
```

```
-----
| CHICAGO STORM
| Ptotal= 51.35 mm |
|-----|
IDF curve parameters: A=1436.000
B= 11.000
C= 0.854
used in: INTENSITY = A / (t + B)^C
```

Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.55	1.00	15.63	2.00	9.04	3.00	3.62
0.08	2.73	1.08	25.44	2.08	8.05	3.08	3.45
0.17	2.95	1.17	57.17	2.17	7.25	3.17	3.29
0.25	3.21	1.25	134.65	2.25	6.59	3.25	3.15
0.33	3.53	1.33	71.87	2.33	6.04	3.33	3.02
0.42	3.91	1.42	42.53	2.42	5.57	3.42	2.90
0.50	4.38	1.50	29.16	2.50	5.17	3.50	2.79
0.58	4.99	1.58	21.78	2.58	4.83	3.58	2.69
0.67	5.80	1.67	17.20	2.67	4.52	3.67	2.59
0.75	6.91	1.75	14.12	2.75	4.26	3.75	2.51
0.83	8.53	1.83	11.92	2.83	4.02	3.83	2.42
0.92	11.09	1.92	10.29	2.92	3.81	3.92	2.35

```
-----
| CALIB
| NASHYD ( 0100) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 136.98 Curve Number (CN)= 69.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 1.17
```

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 1.783 (i)
TIME TO PEAK (hrs)= 2.917
RUNOFF VOLUME (mm)= 13.390
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.261

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

CALIB

NASHYD (0201) | Area (ha)= 14.60 Curve Number (CN)= 74.0
ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.97

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.296 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 17.868
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.348

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

CALIB
STANDHYD (0203) | Area (ha)= 8.20
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.69 4.51
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 48.29
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.93 (ii) 9.24 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

TOTALS
PEAK FLOW (cms)= 0.76 0.40 0.950 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 49.35 18.37 26.12
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.96 0.36 0.51

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 (0201): 14.60 0.296 2.58 17.87
+ ID2= 2 (0203): 8.20 0.950 1.33 26.12
=====

ID = 3 (2200): 22.80 0.962 1.33 20.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200) | 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 | 0.1980 0.2314
0.0040 0.0218 | 0.2920 0.2621
0.0060 0.0446 | 0.3980 0.2937
0.0070 0.0683 | 0.5150 0.3261
0.0080 0.0930 | 0.8290 0.3592
0.0090 0.1187 | 1.3520 0.3930
0.0230 0.1453 | 2.0570 0.4275
0.0610 0.1730 | 2.9590 0.4629
0.1200 0.2017 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2200) 22.800 0.962 1.33 20.84
OUTFLOW: ID= 1 (5200) 22.800 0.276 3.42 20.77

PEAK FLOW REDUCTION [Qout/Qin](%)= 28.67
TIME SHIFT OF PEAK FLOW (min)=125.00
MAXIMUM STORAGE USED (ha.m.)= 0.2568

CALIB
NASHYD (0205) | Area (ha)= 4.80 Curve Number (CN)= 90.0
ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.335 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 31.830
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.620

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

CALIB
STANDHYD (0206) | Area (ha)= 0.20
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 48.29
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.93 (ii) 9.24 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

TOTALS
PEAK FLOW (cms)= 0.02 0.01 0.023 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 49.35 18.37 26.10
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.96 0.36 0.51

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0205):	4.80	0.335	1.83	31.83
+ ID2= 2 (0206):	0.20	0.023	1.33	26.10
=====				
ID = 3 (2201):	5.00	0.342	1.83	31.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201)				
3 + 2 = 1				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2201):	5.00	0.342	1.83	31.60
+ ID2= 2 (5200):	22.80	0.276	3.42	20.77
=====				
ID = 1 (2201):	27.80	0.379	1.92	22.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0209)			
ID= 1 DT= 5.0 min	Area (ha)= 2.70	Total Imp(%)= 16.00	Dir. Conn.(%)= 8.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.43	2.27
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	35.00	35.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	134.65	27.37
over (min)=	5.00	15.00
Storage Coeff. (min)=	1.14 (ii)	13.89 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.08

PEAK FLOW (cms)=	0.08	0.11	0.126 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.58
RUNOFF VOLUME (mm)=	49.35	15.47	18.18
TOTAL RAINFALL (mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT =	0.96	0.30	0.35

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)

- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0207)			
ID= 1 DT= 5.0 min	Area (ha)= 1.30	Total Imp(%)= 45.00	Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.58	0.72
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	134.65	48.29
over (min)=	5.00	10.00
Storage Coeff. (min)=	0.93 (ii)	9.24 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.12

PEAK FLOW (cms)=	0.12	0.06	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	0.151 (iii)
RUNOFF VOLUME (mm)=	49.35	18.37	1.33
TOTAL RAINFALL (mm)=	51.35	51.35	26.11
RUNOFF COEFFICIENT =	0.96	0.36	51.35
			0.51

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0207):	1.30	0.151	1.33	26.11
+ ID2= 2 (0209):	2.70	0.126	1.58	18.18
=====				
ID = 3 (2202):	4.00	0.258	1.33	20.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)				
3 + 2 = 1				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2202):	4.00	0.258	1.33	20.76
+ ID2= 2 (2201):	27.80	0.379	1.92	22.72
=====				
ID = 1 (2202):	31.80	0.519	1.75	22.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2100) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0100): 136.98  1.783  2.92  13.39
+ ID2= 2 ( 2202): 31.80  0.519  1.75  22.47
=====
ID = 3 ( 2100): 168.78  2.159  2.83  15.10

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| NASHYD ( 0302) |
| ID= 1 DT= 5.0 min |
-----
          Area      (ha)= 2.90  Curve Number (CN)= 74.0
          Ia      (mm)= 1.50  # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)= 0.45

```

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.100 (i)
 TIME TO PEAK (hrs)= 1.917
 RUNOFF VOLUME (mm)= 17.867
 TOTAL RAINFALL (mm)= 51.355
 RUNOFF COEFFICIENT = 0.348

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

```

-----
| CALIB |
| STANDHYD ( 0304) |
| ID= 1 DT= 5.0 min |
-----
          Area      (ha)= 4.40
          Total Imp(%)= 45.00  Dir. Conn.(%)= 25.00

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.98	2.42
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	134.65	48.29
over (min)	5.00	10.00
Storage Coeff. (min)=	0.99 (ii)	9.76 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.11

TOTALS
 PEAK FLOW (cms)= 0.41 0.21 0.506 (iii)
 TIME TO PEAK (hrs)= 1.33 1.50 1.33
 RUNOFF VOLUME (mm)= 49.35 18.37 26.12
 TOTAL RAINFALL (mm)= 51.35 51.35 51.35
 RUNOFF COEFFICIENT = 0.96 0.36 0.51

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. 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 ( 2300) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0302): 2.90  0.100  1.92  17.87
+ ID2= 2 ( 0304): 4.40  0.506  1.33  26.12
=====
ID = 3 ( 2300): 7.30  0.520  1.33  22.84

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0308) |
| ID= 1 DT= 5.0 min |
-----
          Area      (ha)= 0.20
          Total Imp(%)= 45.00  Dir. Conn.(%)= 25.00

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	134.65	48.29
over (min)	5.00	10.00
Storage Coeff. (min)=	0.99 (ii)	9.76 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.11

TOTALS
 PEAK FLOW (cms)= 0.02 0.01 0.023 (iii)
 TIME TO PEAK (hrs)= 1.33 1.50 1.33
 RUNOFF VOLUME (mm)= 49.35 18.37 26.09
 TOTAL RAINFALL (mm)= 51.35 51.35 51.35
 RUNOFF COEFFICIENT = 0.96 0.36 0.51

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0310) |
| ID= 1 DT= 5.0 min |
-----
          Area      (ha)= 5.70
          Total Imp(%)= 16.00  Dir. Conn.(%)= 8.00

```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.91	4.79
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	134.65	31.72
over (min)	5.00	15.00
Storage Coeff. (min)=	0.93 (ii)	10.76 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.09

TOTALS
 PEAK FLOW (cms)= 0.17 0.25 0.292 (iii)
 TIME TO PEAK (hrs)= 1.33 1.58 1.50

RUNOFF VOLUME (mm)= 49.35 15.47 18.18
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.96 0.30 0.35

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)|
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2300): 7.30 0.520 1.33 22.84
+ ID2= 2 (0308): 0.20 0.023 1.33 26.09
=====

ID = 3 (2301): 7.50 0.543 1.33 22.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2301)|
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2301): 7.50 0.543 1.33 22.93
+ ID2= 2 (0310): 5.70 0.292 1.50 18.18
=====

ID = 1 (2301): 13.20 0.781 1.33 20.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2302)|
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2100): 168.78 2.159 2.83 15.10
+ ID2= 2 (2301): 13.20 0.781 1.33 20.88
=====

ID = 3 (2302): 181.98 2.289 2.75 15.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| STANDHYD (0400)|
ID= 1 DT= 5.0 min
Area (ha)= 82.86
Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 87.90 25.58
over (min) 15.00 30.00
Storage Coeff. (min)= 14.81 (ii) 26.99 (ii)
Unit Hyd. Tpeak (min)= 15.00 30.00
Unit Hyd. peak (cms)= 0.08 0.04

TOTALS

PEAK FLOW (cms)= 0.40 2.26 2.496 (iii)
TIME TO PEAK (hrs)= 1.50 1.92 1.83
RUNOFF VOLUME (mm)= 49.35 14.77 15.81
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.96 0.29 0.31

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2400)|
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2302): 181.98 2.289 2.75 15.52
+ ID2= 2 (0400): 82.86 2.496 1.83 15.81
=====

ID = 3 (2400): 264.84 4.237 1.92 15.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4400)|
IN= 2---> OUT= 1
Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550
96.60 409.10 0.0550
115.80 408.90 0.0550
124.80 409.10 0.0550
131.00 408.90 0.0550 /0.0350 Main Channel
133.60 408.00 0.0350 Main Channel
134.40 407.60 0.0350 Main Channel
135.00 407.50 0.0350 Main Channel
135.80 407.60 0.0350 Main Channel
136.50 408.00 0.0350 Main Channel
139.40 408.80 0.0350 /0.0550 Main Channel
143.50 408.90 0.0550
148.50 408.70 0.0550
163.80 408.90 0.0550
183.20 408.90 0.0550
243.70 409.70 0.0550
278.70 410.20 0.0550
330.50 411.40 0.0550

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME

(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.19	407.69	.366E+03	0.1	0.51	58.83
0.37	407.87	.106E+04	0.5	0.81	37.08
0.56	408.06	.199E+04	1.1	1.00	29.93
0.74	408.24	.328E+04	2.1	1.14	26.32
0.93	408.43	.498E+04	3.6	1.28	23.32
1.11	408.61	.708E+04	5.6	1.43	20.94
1.30	408.80	.105E+05	8.5	1.45	20.61
1.49	408.99	.247E+05	14.8	1.07	27.91
1.68	409.18	.601E+05	30.4	0.91	32.97
1.87	409.37	.109E+06	58.5	0.96	31.05
2.06	409.56	.166E+06	98.3	1.06	28.11
2.25	409.75	.231E+06	150.3	1.17	25.57
2.44	409.94	.303E+06	215.4	1.28	23.46
2.64	410.14	.383E+06	293.8	1.38	21.74
2.83	410.33	.470E+06	390.1	1.49	20.10
3.02	410.52	.563E+06	502.4	1.60	18.66
3.21	410.71	.660E+06	628.8	1.71	17.48
3.40	410.90	.762E+06	769.5	1.81	16.49
3.59	411.09	.868E+06	924.9	1.91	15.65

		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2400)		264.84	4.24	1.92	15.61	0.99	1.33
OUTFLOW: ID= 1 (4400)		264.84	3.71	2.44	15.54	0.94	1.29

**** WARNING : THE HYD WAS CUT TO 2000 POINTS

CALIB					
NASHYD (0515)	Area (ha)=	5.01	Curve Number (CN)=	65.0	
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.41			

Unit Hyd Qpeak	(cms)=	0.467
PEAK FLOW	(cms)=	0.135 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	13.316
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.259

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

CALIB					
NASHYD (0510)	Area (ha)=	91.44	Curve Number (CN)=	71.0	
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	1.09			

Unit Hyd Qpeak	(cms)=	3.204
PEAK FLOW	(cms)=	1.537 (i)
TIME TO PEAK	(hrs)=	2.750
RUNOFF VOLUME	(mm)=	16.181
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.315

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

ROUTE CHN(4510)	
IN= 2--> OUT= 1	Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.206E+02	0.0	0.19	101.61
0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0510)		91.44	1.54	2.75	16.18	0.78	0.87
OUTFLOW: ID= 1 (4510)		91.44	1.44	3.08	16.18	0.76	0.86

CALIB					
NASHYD (0517)	Area (ha)=	2.14	Curve Number (CN)=	71.0	
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.32			

Unit Hyd Qpeak	(cms)=	0.255
PEAK FLOW	(cms)=	0.082 (i)
TIME TO PEAK	(hrs)=	1.750
RUNOFF VOLUME	(mm)=	16.176
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.315

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

CALIB	
-------	--

| STANDHYD (0511) | Area (ha)= 52.87
| ID= 1 DT= 5.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 26.43 26.43
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 1.00
Length (m)= 593.69 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 47.10
over (min)= 5.00 20.00
Storage Coeff. (min)= 6.60 (ii) 18.35 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.18 0.06

TOTALS
PEAK FLOW (cms)= 3.97 1.90 4.399 (iii)
TIME TO PEAK (hrs)= 1.33 1.67 1.33
RUNOFF VOLUME (mm)= 50.55 20.33 29.39
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.98 0.40 0.57

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (0516) | Area (ha)= 10.78
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.85 5.93
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 1.00
Length (m)= 268.08 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 26.22
over (min)= 5.00 20.00
Storage Coeff. (min)= 4.10 (ii) 18.94 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.24 0.06

TOTALS
PEAK FLOW (cms)= 1.46 0.23 1.514 (iii)
TIME TO PEAK (hrs)= 1.33 1.67 1.33
RUNOFF VOLUME (mm)= 50.55 16.18 31.65
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.98 0.32 0.62

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2511)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0511): 52.87 4.399 1.33 29.39
+ ID2= 2 (0516): 10.78 1.514 1.33 31.65
ID = 3 (2511): 63.65 5.914 1.33 29.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(4511) OVERFLOW IS OFF
IN= 2---> OUT= 1
DT= 5.0 min
***** WARNING : FIRST OUTFLOW IS NOT ZERO.
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
0.7700 0.9000 | 3.2130 1.6220
1.6000 1.1400 | 3.9540 1.8810
2.2900 1.2810 | 4.9000 2.3000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2511) 63.650 5.914 1.33 29.78
OUTFLOW: ID= 1 (4511) 63.650 1.450 2.25 29.77

PEAK FLOW REDUCTION [Qout/Qin](%)= 24.52
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 1.0976

ADD HYD (2510)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (4510): 91.44 1.444 3.08 16.18
+ ID2= 2 (4511): 63.65 1.450 2.25 29.77
ID = 3 (2510): 155.09 2.645 2.75 21.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2510)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2510): 155.09 2.645 2.75 21.76
+ ID2= 2 (0517): 2.14 0.082 1.75 16.18
ID = 1 (2510): 157.23 2.667 2.75 21.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0512) | Area (ha)= 27.13
ID= 1 DT= 5.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 13.56 13.56

Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 425.28 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 55.63
over (min)= 5.00 15.00
Storage Coeff. (min)= 5.41 (ii) 14.33 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.21 0.08

PEAK FLOW (cms)= 2.22 1.12 2.578 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 50.55 20.33 29.39
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.98 0.40 0.57

TOTALS

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0513)
ID= 1 DT= 5.0 min
Area (ha)= 6.44
Total Imp(%)= 65.00 Dir. Conn.(%)= 35.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.19 2.25
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 1.00
Length (m)= 207.20 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 89.28
over (min)= 5.00 15.00
Storage Coeff. (min)= 3.51 (ii) 12.60 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.26 0.08

PEAK FLOW (cms)= 0.71 0.31 0.822 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 50.55 24.01 33.30
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.98 0.47 0.65

TOTALS

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

DUHYD (8512)
Inlet Cap.= 0.732
#of Inlets= 1
Total(cms)= 0.7
AREA QPEAK TPEAK R.V.

TOTAL HYD.(ID= 1): (ha) (cms) (hrs) (mm)
6.44 0.82 1.33 33.30
MAJOR SYS.(ID= 2): 0.08 0.09 1.33 33.30
MINOR SYS.(ID= 3): 6.36 0.73 1.33 33.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0512): 27.13 2.578 1.33 29.39
+ ID2= 2 (8512): 6.36 0.732 1.33 33.30
ID = 3 (2512): 33.49 3.310 1.33 30.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5512)
IN= 2---> OUT= 1
DT= 5.0 min
OVERFLOW IS OFF
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.6640 0.9151
0.0210 0.1601 | 0.8570 1.0220
0.0360 0.3317 | 1.0660 1.1320
0.0410 0.4218 | 1.2900 1.2450
0.1000 0.5147 | 1.5290 1.3610
0.2030 0.6105 | 1.7810 1.4800
0.3340 0.7092 | 2.0460 1.6020
0.4890 0.8107 | 2.3220 1.7260

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2512) 33.489 3.310 1.33 30.14
OUTFLOW: ID= 1 (5512) 33.489 0.395 2.75 30.08

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.92
TIME SHIFT OF PEAK FLOW (min)= 85.00
MAXIMUM STORAGE USED (ha.m.)= 0.7490

ADD HYD (2514)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2510): 157.23 2.667 2.75 21.68
+ ID2= 2 (0515): 5.01 0.135 1.83 13.32
ID = 3 (2514): 162.24 2.725 2.67 21.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2514)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2514): 162.24 2.725 2.67 21.42

+ ID2= 2 (5512): 33.49 0.395 2.75 30.08
=====

ID = 1 (2514): 195.73 3.119 2.67 22.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0058) Area (ha)= 6.68 Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.288 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 14.288
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.278

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

ADD HYD (2513)
1 + 2 = 3
ID1= 1 (2514): 195.73 3.119 2.67 22.90
+ ID2= 2 (4400): 264.84 3.709 2.44 15.54
=====

ID = 3 (2513): 460.57 6.789 2.58 18.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2513)
3 + 2 = 1
ID1= 3 (2513): 460.57 6.789 2.58 18.54
+ ID2= 2 (0058): 6.68 0.288 1.58 14.29
=====

ID = 1 (2513): 467.25 6.848 2.58 18.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0520) Area (ha)= 108.36 Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.20

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 1.486 (i)
TIME TO PEAK (hrs)= 2.917
RUNOFF VOLUME (mm)= 14.315
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.279

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

ADD HYD (2520)
1 + 2 = 3
ID1= 1 (2513): 467.25 6.848 2.58 18.48
+ ID2= 2 (0520): 108.36 1.486 2.92 14.32
=====

ID = 3 (2520): 575.61 8.267 2.67 17.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4500)
IN= 2--> OUT= 1 Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 /0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 /0.0550 Main Channel
109.70 404.30 0.0550
128.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
0.68 403.38 .304E+04 1.6 1.03 32.27
1.02 403.72 .718E+04 4.5 1.25 26.57
1.36 404.06 .122E+05 9.7 1.58 20.96
1.70 404.40 .251E+05 18.1 1.44 23.04
2.08 404.78 .650E+05 42.3 1.29 25.62
2.46 405.16 .122E+06 86.3 1.40 23.62
2.84 405.54 .192E+06 151.6 1.57 21.10
3.21 405.91 .270E+06 238.3 1.75 18.90
3.59 406.29 .357E+06 345.8 1.93 17.20
3.97 406.67 .452E+06 474.9 2.09 15.85
4.35 407.05 .554E+06 631.1 2.26 14.63
4.73 407.43 .663E+06 807.8 2.42 13.67
5.11 407.81 .779E+06 1006.4 2.57 12.89
5.49 408.19 .902E+06 1229.0 2.71 12.23
5.86 408.56 .103E+07 1476.4 2.84 11.66
6.24 408.94 .117E+07 1745.6 2.96 11.18
6.62 409.32 .132E+07 2034.5 3.07 10.79
7.00 409.70 .147E+07 2353.2 3.17 10.44

		<---- hydrograph ---->				<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2520)	575.61	8.27	2.67	17.70	1.26	1.47	
OUTFLOW: ID= 1 (4500)	575.61	7.81	3.00	17.69	1.23	1.44	

PEAK FLOW	(cms)=	0.289 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	13.841
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.270

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

CALIB				
NASHYD (0610)	Area (ha)=	78.05	Curve Number (CN)=	71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	1.00		

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW	(cms)=	1.221 (i)
TIME TO PEAK	(hrs)=	2.667
RUNOFF VOLUME	(mm)=	14.315
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.279

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

ADD HYD (2610)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4500):	575.61	7.806	3.00	17.69
+ ID2= 2 (0610):	78.05	1.221	2.67	14.32
=====				
ID = 3 (2610):	653.66	8.969	2.97	17.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0621)	Area (ha)=	6.56	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.37		

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW	(cms)=	0.193 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	13.842
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.270

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

CALIB				
NASHYD (0622)	Area (ha)=	9.69	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.36		

Unit Hyd Qpeak (cms)= 1.028

CALIB				
NASHYD (0623)	Area (ha)=	19.37	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.45		

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW	(cms)=	0.504 (i)
TIME TO PEAK	(hrs)=	1.917
RUNOFF VOLUME	(mm)=	13.843
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.270

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

CALIB				
NASHYD (0624)	Area (ha)=	11.84	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.51		

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW	(cms)=	0.284 (i)
TIME TO PEAK	(hrs)=	2.000
RUNOFF VOLUME	(mm)=	13.843
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.270

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

CALIB				
NASHYD (0625)	Area (ha)=	6.72	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.39		

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW	(cms)=	0.191 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	13.842
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.270

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

ROUTE CHN(4625)		
IN= 2---> OUT= 1	Routing time step (min)='=	5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0360	Main Channel
4.30	412.70	0.0360	Main Channel
8.60	414.20	0.0360	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.108E+02	0.0	0.24	42.13
0.16	412.86	.434E+02	0.0	0.38	26.54
0.24	412.94	.976E+02	0.1	0.50	20.26
0.32	413.02	.174E+03	0.2	0.61	16.72
0.39	413.09	.271E+03	0.3	0.70	14.41
0.47	413.17	.390E+03	0.5	0.79	12.76
0.55	413.25	.532E+03	0.8	0.88	11.51
0.63	413.33	.694E+03	1.1	0.96	10.53
0.71	413.41	.879E+03	1.5	1.04	9.74
0.79	413.49	.108E+04	2.0	1.11	9.08
0.87	413.57	.131E+04	2.6	1.19	8.52
0.95	413.65	.156E+04	3.2	1.26	8.04
1.03	413.73	.183E+04	4.0	1.33	7.62
1.11	413.81	.213E+04	4.9	1.39	7.25
1.18	413.88	.244E+04	5.9	1.46	6.93
1.26	413.96	.278E+04	7.0	1.52	6.64
1.34	414.04	.313E+04	8.2	1.59	6.37
1.42	414.12	.351E+04	9.5	1.65	6.13
1.50	414.20	.392E+04	11.0	1.71	5.92

<---- hydrograph ---->

<-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0625)	6.72	0.19	1.83	13.84	0.33	0.62
OUTFLOW: ID= 1 (4625)	6.72	0.16	2.08	13.81	0.31	0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2625)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (4625):	6.72	0.163	2.08	13.81
+ ID2= 2 (0621):	6.56	0.193	1.83	13.84
ID = 3 (2625):	13.28	0.336	2.00	13.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (2625):	13.28	0.336	2.00	13.83
+ ID2= 2 (0622):	9.69	0.289	1.83	13.84
ID = 1 (2625):	22.97	0.616	1.92	13.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2625):	22.97	0.616	1.92	13.83
+ ID2= 2 (0623):	19.37	0.504	1.92	13.84
ID = 3 (2625):	42.34	1.119	1.92	13.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (2625):	42.34	1.119	1.92	13.84
+ ID2= 2 (0624):	11.84	0.284	2.00	13.84
ID = 1 (2625):	54.18	1.398	1.92	13.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2625):	54.18	1.398	1.92	13.84

CALIB
STANDHYD (0626)
ID= 1 DT= 5.0 min

IMPERVIOUS PERVIOUS (i)

Surface Area	(ha)=	0.64	0.42
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	84.06	40.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=		134.65	44.18
over (min)		5.00	15.00
Storage Coeff. (min)=		2.04 (ii)	11.83 (ii)
Unit Hyd. Tpeak (min)=		5.00	15.00
Unit Hyd. peak (cms)=		0.31	0.09

TOTALS

PEAK FLOW	(cms)=	0.19	0.03	0.198 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.33
RUNOFF VOLUME	(mm)=	50.35	18.33	34.33
TOTAL RAINFALL	(mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT	=	0.98	0.36	0.67

+ ID2= 2 (0626): 1.06 0.198 1.33 34.33
=====

ID = 3 (2625): 55.24 1.433 1.92 14.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0627) | Area (ha)= 9.39 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.391 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 13.818
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.269

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

| CALIB
| STANDHYD (6240) | Area (ha)= 0.79
| ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 70.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.71 0.08
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 20.00 20.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 192.97
over (min)= 5.00 5.00
Storage Coeff. (min)= 0.70 (ii) 2.60 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.29

PEAK FLOW (cms)= 0.21 0.05 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.33 0.253 (iii)
RUNOFF VOLUME (mm)= 50.83 30.46 44.72
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.99 0.59 0.87

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (6210) | Area (ha)= 1.96
| ID= 1 DT= 5.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.18 0.78

Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 60.16
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.06 (ii) 9.71 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.11

PEAK FLOW (cms)= 0.29 0.08 0.329 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 50.83 20.46 32.60
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.99 0.40 0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26240) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (6210): 1.96 0.329 1.33 32.60
+ ID2= 2 (6240): 0.79 0.253 1.33 44.72
=====

ID = 3 (26240): 2.75 0.582 1.33 36.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(46240) | 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 | 0.1390 0.0686
0.0060 0.0042 | 0.1510 0.0822
0.0130 0.0130 | 0.1630 0.0967
0.0200 0.0250 | 0.1730 0.1121
0.0250 0.0328 | 0.1780 0.1202
0.0290 0.0439 | 2.5750 0.1742
0.1260 0.0558 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (26240) 2.750 0.582 1.33 36.09
OUTFLOW: ID= 1 (46240) 2.750 0.118 1.75 36.02

PEAK FLOW REDUCTION [Qout/Qin](%)= 20.32
TIME SHIFT OF PEAK FLOW (min)= 25.00
MAXIMUM STORAGE USED (ha.m.)= 0.0550

| CALIB |

| STANDHYD (6220) | Area (ha)= 0.92
| ID= 1 DT= 5.0 min | Total Imp(%)= 40.00 Dir. Conn.(%)= 20.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.37 0.55
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 48.06
over (min)= 5.00 15.00
Storage Coeff. (min)= 1.06 (ii) 10.52 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.34 0.09

TOTALS
PEAK FLOW (cms)= 0.07 0.04 0.080 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 50.83 18.73 25.14
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.99 0.36 0.49

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| RESERVOIR(46220) |
| IN= 2--> OUT= 1 |
| DT= 5.0 min |

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.2590	0.0708
0.0050	0.0089	0.2910	0.0871
0.0100	0.0187	0.3210	0.1045
0.0130	0.0298	0.3720	0.1438
0.0150	0.0422	2.0080	0.2087
0.2220	0.0559	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (6220)	0.920	0.080	1.33	25.14
OUTFLOW: ID= 1 (46220)	0.920	0.009	2.83	24.65

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.87
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.0162

| CALIB
| STANDHYD (6230) |
| ID= 1 DT= 5.0 min |

Area (ha)= 0.48
Total Imp(%)= 10.00 Dir. Conn.(%)= 5.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.05 0.43
Dep. Storage (mm)= 0.52 7.16

Average Slope (%)= 2.00 2.00
Length (m)= 20.00 20.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 29.87
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.70 (ii) 8.25 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.13

TOTALS
PEAK FLOW (cms)= 0.01 0.02 0.028 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.50
RUNOFF VOLUME (mm)= 50.83 15.39 17.15
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.99 0.30 0.33

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (0004) |
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (46220):	0.92	0.009	2.83	24.65
+ ID2= 2 (46240):	2.75	0.118	1.75	36.02
=====				
ID = 3 (0004):	3.67	0.125	1.83	33.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0004) |
| 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0004):	3.67	0.125	1.83	33.17
+ ID2= 2 (6230):	0.48	0.028	1.50	17.15
=====				
ID = 1 (0004):	4.15	0.142	1.75	31.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4620) |
| IN= 2--> OUT= 1 |

Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME

(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.456E+01	0.0	0.55	7.70
0.16	412.86	.182E+02	0.1	0.88	4.85
0.24	412.94	.410E+02	0.2	1.15	3.70
0.32	413.02	.729E+02	0.4	1.39	3.05
0.39	413.09	.114E+03	0.7	1.61	2.63
0.47	413.17	.164E+03	1.2	1.82	2.33
0.55	413.25	.223E+03	1.8	2.02	2.10
0.63	413.33	.292E+03	2.5	2.21	1.92
0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0004)	4.15	0.14	1.75	31.32	0.21	1.04
OUTFLOW: ID= 1 (4620)	4.15	0.14	1.81	31.12	0.21	1.03

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2625):	55.24	1.433	1.92	14.23
+ ID2= 2 (4620):	4.15	0.139	1.81	31.12
ID = 3 (0117):	59.39	1.569	1.92	15.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0117):	59.39	1.569	1.92	15.41
+ ID2= 2 (0627):	9.39	0.391	1.58	13.82
ID = 1 (0117):	68.78	1.827	1.83	15.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0117):	68.78	1.827	1.83	15.19
+ ID2= 2 (2610):	653.66	8.969	2.97	17.29
ID = 3 (0116):	722.44	9.671	2.86	17.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0637)	Area (ha)=	8.36	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.47		

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW	(cms)=	0.211 (i)
TIME TO PEAK	(hrs)=	2.000
RUNOFF VOLUME	(mm)=	13.843
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.270

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

CALIB				
NASHYD (0630)	Area (ha)=	33.04	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.38		

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW	(cms)=	0.956 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	13.842
TOTAL RAINFALL	(mm)=	51.355
RUNOFF COEFFICIENT	=	0.270

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

ROUTE CHN(4630)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63

1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0630)	33.04	0.96	1.83	13.84	0.67	0.73	
OUTFLOW: ID= 1 (4630)	33.04	0.87	2.00	13.83	0.65	0.71	

+ ID2= 2 (0636):	3.32	0.083	2.00	13.84
=====				
ID = 3 (2636):	767.16	10.235	2.78	16.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0638)	Area (ha)= 20.63	Curve Number (CN)= 70.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.46		

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW	(cms)= 0.528 (i)
TIME TO PEAK	(hrs)= 1.917
RUNOFF VOLUME	(mm)= 13.843
TOTAL RAINFALL	(mm)= 51.355
RUNOFF COEFFICIENT	= 0.270

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

CALIB			
NASHYD (0639)	Area (ha)= 4.60	Curve Number (CN)= 70.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.43		

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW	(cms)= 0.123 (i)
TIME TO PEAK	(hrs)= 1.917
RUNOFF VOLUME	(mm)= 13.843
TOTAL RAINFALL	(mm)= 51.355
RUNOFF COEFFICIENT	= 0.270

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

ADD HYD (2637)				
1 + 2 = 3				
ID1= 1 (0116):	722.44	9.671	2.86	17.09
+ ID2= 2 (4630):	33.04	0.866	2.00	13.83
=====				
ID = 3 (2637):	755.48	10.085	2.81	16.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637)				
3 + 2 = 1				
ID1= 3 (2637):	755.48	10.085	2.81	16.95
+ ID2= 2 (0637):	8.36	0.211	2.00	13.84
=====				
ID = 1 (2637):	763.84	10.191	2.78	16.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0636)	Area (ha)= 3.32	Curve Number (CN)= 70.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.48		

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW	(cms)= 0.083 (i)
TIME TO PEAK	(hrs)= 2.000
RUNOFF VOLUME	(mm)= 13.843
TOTAL RAINFALL	(mm)= 51.355
RUNOFF COEFFICIENT	= 0.270

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

ADD HYD (2636)				
1 + 2 = 3				
ID1= 1 (2637):	763.84	10.191	2.78	16.91

ADD HYD (2630)				
1 + 2 = 3				
ID1= 1 (2636):	767.16	10.235	2.78	16.90
+ ID2= 2 (0638):	20.63	0.528	1.92	13.84
=====				
ID = 3 (2630):	787.79	10.500	2.72	16.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2630)				
3 + 2 = 1				
ID1= 3 (2630):	787.79	10.500	2.72	16.82
+ ID2= 2 (0639):	4.60	0.123	1.92	13.84
=====				
ID = 1 (2630):	792.39	10.559	2.72	16.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0709)
ID= 1 DT= 5.0 min
Area (ha)= 21.19 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.65

Unit Hyd Qpeak (cms)= 1.245

PEAK FLOW (cms)= 0.432 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 13.844
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

FINISH

** SIMULATION : 10 year Fergus Shand Dam Chic **

CHICAGO STORM
Ptotal= 61.34 mm
IDF curve parameters: A=2126.000
B= 15.000
C= 0.890

used in: INTENSITY = $A / (t + B)^{1/C}$

Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	2.71	1.00	19.98	2.00	11.15	3.00	4.04
0.08	2.94	1.08	32.79	2.08	9.83	3.08	3.82
0.17	3.21	1.17	70.46	2.17	8.76	3.17	3.63
0.25	3.53	1.25	147.79	2.25	7.89	3.25	3.45
0.33	3.92	1.33	87.01	2.33	7.16	3.33	3.29
0.42	4.40	1.42	53.99	2.42	6.55	3.42	3.14
0.50	5.01	1.50	37.57	2.50	6.03	3.50	3.01
0.58	5.79	1.58	28.09	2.58	5.58	3.58	2.89
0.67	6.84	1.67	22.06	2.67	5.19	3.67	2.77
0.75	8.31	1.75	17.96	2.75	4.84	3.75	2.67
0.83	10.47	1.83	15.02	2.83	4.54	3.83	2.57
0.92	13.90	1.92	12.83	2.92	4.27	3.92	2.48

CALIB
NASHYD (0100)
ID= 1 DT= 5.0 min
Area (ha)= 136.98 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.17

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 2.536 (i)
TIME TO PEAK (hrs)= 2.833

RUNOFF VOLUME (mm)= 18.624
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.304

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

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min
Area (ha)= 14.60 Curve Number (CN)= 74.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.97

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.407 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 24.021
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.392

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

CALIB
STANDHYD (0203)
ID= 1 DT= 5.0 min
Area (ha)= 8.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	147.79	63.41
over (min)=	5.00	10.00
Storage Coeff. (min)=	0.90 (ii)	8.35 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.12

PEAK FLOW (cms)=	0.84	0.56	1.115 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	59.34	24.87	33.49
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.97	0.41	0.55

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200)
1 + 2 = 3
ID1= 1 (0201): AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
14.60 0.407 2.58 24.02

+ ID2= 2 (0203): 8.20 1.115 1.33 33.49
=====

ID = 3 (2200): 22.80 1.131 1.33 27.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(5200) |
| IN= 2--> OUT= 1 |
DT= 5.0 min
OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1980	0.2314
0.0040	0.0218	0.2920	0.2621
0.0060	0.0446	0.3980	0.2937
0.0070	0.0683	0.5150	0.3261
0.0080	0.0930	0.8290	0.3592
0.0090	0.1187	1.3520	0.3930
0.0230	0.1453	2.0570	0.4275
0.0610	0.1730	2.9590	0.4629
0.1200	0.2017	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2200)	22.800	1.131	1.33	27.43
OUTFLOW: ID= 1 (5200)	22.800	0.410	3.17	27.37

PEAK FLOW REDUCTION [Qout/Qin](%)= 36.23
TIME SHIFT OF PEAK FLOW (min)=110.00
MAXIMUM STORAGE USED (ha.m.)= 0.2970

| CALIB
| NASHYD (0205) |
ID= 1 DT= 5.0 min
Area (ha)= 4.80 Curve Number (CN)= 90.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.433 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.661
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.663

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

| CALIB
| STANDHYD (0206) |
ID= 1 DT= 5.0 min
Area (ha)= 0.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 147.79 63.41
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.90 (ii) 8.35 (ii)

Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

PEAK FLOW (cms)= 0.02 0.01
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 59.34 24.87
TOTAL RAINFALL (mm)= 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.41 0.55

TOTALS
0.027 (iii)
1.33
33.46
61.34
0.55

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201) |
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0205):	4.80	0.433	1.83	40.66
+ ID2= 2 (0206):	0.20	0.027	1.33	33.46

=====

ID = 3 (2201): 5.00 0.443 1.83 40.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2201) |
3 + 2 = 1

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2201):	5.00	0.443	1.83	40.37
+ ID2= 2 (5200):	22.80	0.410	3.17	27.37

=====

ID = 1 (2201): 27.80 0.579 2.00 29.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| STANDHYD (0209) |
ID= 1 DT= 5.0 min
Area (ha)= 2.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.43 2.27
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 35.00 35.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 147.79 37.22
over (min)= 5.00 15.00
Storage Coeff. (min)= 1.10 (ii) 12.38 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.34 0.08
PEAK FLOW (cms)= 0.09 0.16
TIME TO PEAK (hrs)= 1.33 1.58
RUNOFF VOLUME (mm)= 59.34 21.28 24.32

TOTALS
0.181 (iii)
1.58
24.32

TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.35 0.40

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0207)
ID= 1 DT= 5.0 min
Area (ha)= 1.30
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.58 0.72
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 63.41
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.90 (ii) 8.35 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

PEAK FLOW (cms)= 0.13 0.09
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 59.34 24.87
TOTAL RAINFALL (mm)= 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.41 0.55

TOTALS

0.177 (iii)

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)
1 + 2 = 3
ID1= 1 (0207): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0209): 1.30 0.177 1.33 33.49
2.70 0.181 1.58 24.32
ID = 3 (2202): 4.00 0.313 1.50 27.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)
3 + 2 = 1
AREA QPEAK TPEAK R.V.

(ha) (cms) (hrs) (mm)
ID1= 3 (2202): 4.00 0.313 1.50 27.30
+ ID2= 2 (2201): 27.80 0.579 2.00 29.70
ID = 1 (2202): 31.80 0.740 1.83 29.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2100)
1 + 2 = 3
ID1= 1 (0100): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (2202): 136.98 2.536 2.83 18.62
31.80 0.740 1.83 29.40
ID = 3 (2100): 168.78 3.097 2.83 20.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0302)
ID= 1 DT= 5.0 min
Area (ha)= 2.90 Curve Number (CN)= 74.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.45

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.138 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 24.019
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.392

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

CALIB
STANDHYD (0304)
ID= 1 DT= 5.0 min
Area (ha)= 4.40
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.98 2.42
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 63.41
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.95 (ii) 8.82 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

PEAK FLOW (cms)= 0.45 0.29
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 59.34 24.87
TOTAL RAINFALL (mm)= 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.41 0.55

TOTALS

0.593 (iii)

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

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)				
1 + 2 = 3				

ID1= 1 (0302):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (0304):	2.90	0.138	1.92	24.02
=====				
ID = 3 (2300):	7.30	0.613	1.33	29.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0308)			
ID= 1 DT= 5.0 min			

Area (ha)=	0.20		
Total Imp(%)=	45.00	Dir. Conn.(%)= 25.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	147.79	63.41
over (min)=	5.00	10.00
Storage Coeff. (min)=	0.95 (ii)	8.82 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.12

TOTALS

PEAK FLOW (cms)=	0.02	0.01	0.027 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	59.34	24.87	33.47
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.97	0.41	0.55

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

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0310)			
ID= 1 DT= 5.0 min			

Area (ha)=	5.70		
Total Imp(%)=	16.00	Dir. Conn.(%)= 8.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.91	4.79
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	147.79	42.42
over (min)=	5.00	10.00
Storage Coeff. (min)=	0.90 (ii)	9.64 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.11

TOTALS

PEAK FLOW (cms)=	0.19	0.38	0.447 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.50
RUNOFF VOLUME (mm)=	59.34	21.28	24.32
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.97	0.35	0.40

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)				
1 + 2 = 3				

ID1= 1 (2300):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (0308):	7.30	0.613	1.33	29.73
	0.20	0.027	1.33	33.47
=====				
ID = 3 (2301):	7.50	0.640	1.33	29.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)				
3 + 2 = 1				

ID1= 3 (2301):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (0310):	7.50	0.640	1.33	29.83
	5.70	0.447	1.50	24.32
=====				
ID = 1 (2301):	13.20	1.046	1.42	27.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2302)				
1 + 2 = 3				

ID1= 1 (2100):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (2301):	168.78	3.097	2.83	20.65
	13.20	1.046	1.42	27.45
=====				
ID = 3 (2302):	181.98	3.268	2.75	21.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0400)	
Area (ha)= 82.86	

|ID= 1 DT= 5.0 min | Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 101.75 34.92
over (min)= 15.00 25.00
Storage Coeff. (min)= 13.97 (ii) 24.72 (ii)
Unit Hyd. Tpeak (min)= 15.00 25.00
Unit Hyd. peak (cms)= 0.08 0.05

TOTALS
PEAK FLOW (cms)= 0.48 3.39 3.711 (iii)
TIME TO PEAK (hrs)= 1.50 1.83 1.75
RUNOFF VOLUME (mm)= 59.34 20.39 21.56
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.33 0.35

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2400)
1 + 2 = 3
ID1= 1 (2302): 181.98 3.268 2.75 21.15
+ ID2= 2 (0400): 82.86 3.711 1.75 21.56
ID = 3 (2400): 264.84 6.060 1.83 21.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4400)
IN= 2--> OUT= 1 | Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550
96.60 409.10 0.0550
115.80 408.90 0.0550
124.80 409.10 0.0550
131.00 408.90 0.0550 /0.0350 Main Channel
133.60 408.00 0.0350 Main Channel
134.40 407.60 0.0350 Main Channel
135.00 407.50 0.0350 Main Channel
135.80 407.60 0.0350 Main Channel
136.50 408.00 0.0350 Main Channel
139.40 408.80 0.0350 /0.0550 Main Channel
143.50 408.90 0.0550

148.50 408.70 0.0550
163.80 408.90 0.0550
183.20 408.90 0.0550
243.70 409.70 0.0550
278.70 410.20 0.0550
330.50 411.40 0.0550

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.19	407.69	.366E+03	0.1	0.51	58.83
0.37	407.87	.106E+04	0.5	0.81	37.08
0.56	408.06	.199E+04	1.1	1.00	29.93
0.74	408.24	.328E+04	2.1	1.14	26.32
0.93	408.43	.498E+04	3.6	1.28	23.32
1.11	408.61	.708E+04	5.6	1.43	20.94
1.30	408.80	.105E+05	8.5	1.45	20.61
1.49	408.99	.247E+05	14.8	1.07	27.91
1.68	409.18	.601E+05	30.4	0.91	32.97
1.87	409.37	.109E+06	58.5	0.96	31.05
2.06	409.56	.166E+06	98.3	1.06	28.11
2.25	409.75	.231E+06	150.3	1.17	25.57
2.44	409.94	.303E+06	215.4	1.28	23.46
2.64	410.14	.383E+06	293.8	1.38	21.74
2.83	410.33	.470E+06	390.1	1.49	20.10
3.02	410.52	.563E+06	502.4	1.60	18.66
3.21	410.71	.660E+06	628.8	1.71	17.48
3.40	410.90	.762E+06	769.5	1.81	16.49
3.59	411.09	.868E+06	924.9	1.91	15.65

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (2400) 264.84 6.06 1.83 21.28 1.14 1.43
OUTFLOW: ID= 1 (4400) 264.84 5.32 2.33 21.20 1.09 1.40

**** WARNING : THE HYD WAS CUT TO 2000 POINTS

CALIB
NASHYD (0515)
ID= 1 DT= 5.0 min | Area (ha)= 5.01 Curve Number (CN)= 65.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW (cms)= 0.187 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 18.213
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.297

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

CALIB
NASHYD (0510)
ID= 1 DT= 5.0 min | Area (ha)= 91.44 Curve Number (CN)= 71.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.09

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)= 2.120 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 21.892
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.357

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

RUNOFF VOLUME (mm)= 21.885
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.357

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

CALIB
STANDHYD (0511)
ID= 1 DT= 5.0 min | Area (ha)= 52.87
Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 26.43 26.43
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 1.00
Length (m)= 593.69 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 71.37
over (min)= 5.00 20.00
Storage Coeff. (min)= 6.36 (ii) 16.31 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.18 0.06

TOTALS
PEAK FLOW (cms)= 4.54 2.68 5.388 (iii)
TIME TO PEAK (hrs)= 1.33 1.67 1.42
RUNOFF VOLUME (mm)= 60.54 27.03 37.09
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.44 0.60

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0516)
ID= 1 DT= 5.0 min | Area (ha)= 10.78
Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.85 5.93
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 1.00
Length (m)= 268.08 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 34.87
over (min)= 5.00 20.00
Storage Coeff. (min)= 3.95 (ii) 17.19 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.24 0.06

TOTALS
PEAK FLOW (cms)= 1.65 0.33 1.726 (iii)
TIME TO PEAK (hrs)= 1.33 1.67 1.33
RUNOFF VOLUME (mm)= 60.54 21.89 39.28
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.36 0.64

ROUTE CHN(4510)
IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .206E+02 0.0 0.19 101.61
0.16 412.86 .822E+02 0.0 0.30 64.01
0.24 412.94 .185E+03 0.1 0.39 48.85
0.32 413.02 .329E+03 0.1 0.48 40.33
0.39 413.09 .514E+03 0.2 0.55 34.75
0.47 413.17 .740E+03 0.4 0.62 30.77
0.55 413.25 .101E+04 0.6 0.69 27.77
0.63 413.33 .132E+04 0.9 0.75 25.40
0.71 413.41 .166E+04 1.2 0.82 23.48
0.79 413.49 .206E+04 1.6 0.88 21.89
0.87 413.57 .249E+04 2.0 0.93 20.54
0.95 413.65 .296E+04 2.5 0.99 19.39
1.03 413.73 .347E+04 3.1 1.04 18.38
1.11 413.81 .403E+04 3.8 1.10 17.49
1.18 413.88 .462E+04 4.6 1.15 16.71
1.26 413.96 .526E+04 5.5 1.20 16.00
1.34 414.04 .594E+04 6.4 1.25 15.37
1.42 414.12 .666E+04 7.5 1.30 14.79
1.50 414.20 .742E+04 8.7 1.34 14.27

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0510) 91.44 2.12 2.75 21.89 0.88 0.94
OUTFLOW: ID= 1 (4510) 91.44 2.01 3.00 21.89 0.86 0.93

CALIB
NASHYD (0517)
ID= 1 DT= 5.0 min | Area (ha)= 2.14 Curve Number (CN)= 71.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.32

Unit Hyd Qpeak (cms)= 0.255

PEAK FLOW (cms)= 0.113 (i)
TIME TO PEAK (hrs)= 1.750

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2511)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0511):	52.87	5.388	1.42	37.09
+ ID2= 2 (0516):	10.78	1.726	1.33	39.28
=====				
ID = 3 (2511):	63.65	6.912	1.33	37.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(4511)				
IN= 2---> OUT= 1				
DT= 5.0 min				
***** WARNING : FIRST OUTFLOW IS NOT ZERO.				
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.7700	0.9000	3.2130	1.6220
	1.6000	1.1400	3.9540	1.8810
	2.2900	1.2810	4.9000	2.3000
=====				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2511)	63.650	6.912	1.33	37.46
OUTFLOW: ID= 1 (4511)	63.650	2.331	2.17	37.45

PEAK FLOW REDUCTION [Qout/Qin](%)= 33.73
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 1.2977

ADD HYD (2510)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (4510):	91.44	2.008	3.00	21.89
+ ID2= 2 (4511):	63.65	2.331	2.17	37.45
=====				
ID = 3 (2510):	155.09	3.740	2.50	28.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2510)				
3 + 2 = 1				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2510):	155.09	3.740	2.50	28.27
+ ID2= 2 (0517):	2.14	0.113	1.75	21.88
=====				
ID = 1 (2510):	157.23	3.782	2.50	28.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0512)			
ID= 1 DT= 5.0 min	Area (ha)=	27.13	
	Total Imp(%)=	50.00	Dir. Conn.(%)= 30.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	13.56	13.56
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	425.28	40.00
Mannings n =	0.013	0.250
=====		
Max.Eff.Inten.(mm/hr)=	147.79	71.37
over (min)=	5.00	15.00
Storage Coeff. (min)=	5.21 (ii)	13.29 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.21	0.08

TOTALS

PEAK FLOW (cms)=	2.53	1.54	3.164 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.42
RUNOFF VOLUME (mm)=	60.54	27.03	37.09
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.99	0.44	0.60

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0513)			
ID= 1 DT= 5.0 min	Area (ha)=	6.44	
	Total Imp(%)=	65.00	Dir. Conn.(%)= 35.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.19	2.25
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	207.20	40.00
Mannings n =	0.013	0.250
=====		
Max.Eff.Inten.(mm/hr)=	147.79	112.86
over (min)=	5.00	15.00
Storage Coeff. (min)=	3.38 (ii)	11.66 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.26	0.09

TOTALS

PEAK FLOW (cms)=	0.80	0.43	0.953 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	60.54	31.48	41.65
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.99	0.51	0.68

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

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

```
-----
| DUHYD   ( 8512) |
| Inlet Cap.= 0.732 |
| #of Inlets= 1 |
| Total(cms)= 0.7 |
|-----|
| AREA   QPEAK   TPEAK   R.V. |
| (ha)   (cms)   (hrs)   (mm) |
|-----|
| TOTAL HYD.(ID= 1): 6.44 0.95 1.33 41.65 |
|-----|
| MAJOR SYS.(ID= 2): 0.33 0.22 1.33 41.65 |
| MINOR SYS.(ID= 3): 6.11 0.73 1.33 41.65 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2512) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 0512): 27.13 3.164 1.42 37.09 |
| + ID2= 2 ( 8512): 6.11 0.732 1.33 41.65 |
|-----|
| ID = 3 ( 2512): 33.24 3.896 1.42 37.93 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 5512) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
|-----|
| OUTFLOW STORAGE | OUTFLOW STORAGE |
| (cms) (ha.m.) | (cms) (ha.m.) |
|-----|
| 0.0000 0.0000 | 0.6640 0.9151 |
| 0.0210 0.1601 | 0.8570 1.0220 |
| 0.0360 0.3317 | 1.0660 1.1320 |
| 0.0410 0.4218 | 1.2900 1.2450 |
| 0.1000 0.5147 | 1.5290 1.3610 |
| 0.2030 0.6105 | 1.7810 1.4800 |
| 0.3340 0.7092 | 2.0460 1.6020 |
| 0.4890 0.8107 | 2.3220 1.7260 |
|-----|
```

```

| AREA   QPEAK   TPEAK   R.V. |
| (ha)   (cms)   (hrs)   (mm) |
|-----|
| INFLOW : ID= 2 ( 2512) 33.244 3.896 1.42 37.93 |
| OUTFLOW: ID= 1 ( 5512) 33.244 0.628 2.50 37.87 |
|-----|
```

PEAK FLOW REDUCTION [Qout/Qin](%)= 16.12
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.8939

```
-----
| ADD HYD ( 2514) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2510): 157.23 3.782 2.50 28.19 |
| + ID2= 2 ( 0515): 5.01 0.187 1.83 18.21 |
|-----|
| ID = 3 ( 2514): 162.24 3.886 2.50 27.88 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2514) |
| 3 + 2 = 1 |
|-----|
| AREA   QPEAK   TPEAK   R.V. |
| (ha)   (cms)   (hrs)   (mm) |
|-----|
| ID1= 3 ( 2514): 162.24 3.886 2.50 27.88 |
| + ID2= 2 ( 5512): 33.24 0.628 2.50 37.87 |
|-----|
| ID = 1 ( 2514): 195.48 4.515 2.50 29.58 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0058) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 6.68 |
| Ia (mm)= 5.00 |
| U.H. Tp(hrs)= 0.20 |
|-----|
```

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.405 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 19.792
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

```
-----
| ADD HYD ( 2513) |
| 1 + 2 = 3 |
|-----|
| AREA   QPEAK   TPEAK   R.V. |
| (ha)   (cms)   (hrs)   (mm) |
|-----|
| ID1= 1 ( 2514): 195.48 4.515 2.50 29.58 |
| + ID2= 2 ( 4400): 264.84 5.316 2.33 21.20 |
|-----|
| ID = 3 ( 2513): 460.32 9.800 2.42 24.63 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2513) |
| 3 + 2 = 1 |
|-----|
| AREA   QPEAK   TPEAK   R.V. |
| (ha)   (cms)   (hrs)   (mm) |
|-----|
| ID1= 3 ( 2513): 460.32 9.800 2.42 24.63 |
| + ID2= 2 ( 0058): 6.68 0.405 1.58 19.79 |
|-----|
| ID = 1 ( 2513): 467.00 9.900 2.39 24.56 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0520) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 108.36 |
| Ia (mm)= 5.00 |
| U.H. Tp(hrs)= 1.20 |
|-----|
```

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 2.103 (i)
TIME TO PEAK (hrs)= 2.917
RUNOFF VOLUME (mm)= 19.830
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

```
-----  
| ADD HYD ( 2520) |  
| 1 + 2 = 3 |  
-----  
ID1= 1 ( 2513): 467.00 9.900 2.39 24.56  
+ ID2= 2 ( 0520): 108.36 2.103 2.92 19.83  
=====
```

ID = 3 (2520): 575.36 11.791 2.50 23.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----  
| ROUTE CHN( 4500) |  
| IN= 2--> OUT= 1 | Routing time step (min)'= 2.00  
-----
```

```
<----- DATA FOR SECTION ( 1.1) ----->  
Distance Elevation Manning  
0.00 409.70 0.0550  
19.70 408.80 0.0550  
41.70 407.20 0.0550  
60.50 405.30 0.0550  
80.00 404.50 0.0550  
95.70 404.60 0.0550 /0.0350 Main Channel  
98.60 403.40 0.0350 Main Channel  
100.40 403.40 0.0350 Main Channel  
100.80 402.90 0.0350 Main Channel  
101.50 402.70 0.0350 Main Channel  
102.30 402.80 0.0350 Main Channel  
103.30 403.20 0.0350 Main Channel  
104.00 403.20 0.0350 Main Channel  
105.60 404.40 0.0350 /0.0550 Main Channel  
109.70 404.30 0.0550  
128.60 404.20 0.0550  
154.10 405.40 0.0550  
179.10 406.70 0.0550  
201.90 408.60 0.0550  
224.20 410.60 0.0550
```

```
<----- TRAVEL TIME TABLE ----->  
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME  
(m) (m) (cu.m.) (cms) (m/s) (min)  
0.34 403.04 .954E+03 0.3 0.70 47.40  
0.68 403.38 .304E+04 1.6 1.03 32.27  
1.02 403.72 .718E+04 4.5 1.25 26.57  
1.36 404.06 .122E+05 9.7 1.58 20.96  
1.70 404.40 .251E+05 18.1 1.44 23.04  
2.08 404.78 .650E+05 42.3 1.29 25.62  
2.46 405.16 .122E+06 86.3 1.40 23.62  
2.84 405.54 .192E+06 151.6 1.57 21.10  
3.21 405.91 .270E+06 238.3 1.75 18.90  
3.59 406.29 .357E+06 345.8 1.93 17.20  
3.97 406.67 .452E+06 474.9 2.09 15.85
```

4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

```
<---- hydrograph ----> <-pipe / channel->  
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL  
(ha) (cms) (hrs) (mm) (m) (m/s)  
INFLOW : ID= 2 ( 2520) 575.36 11.79 2.50 23.67 1.44 1.54  
OUTFLOW: ID= 1 ( 4500) 575.36 11.12 2.94 23.66 1.41 1.56
```

```
-----  
| CALIB  
| NASHYD ( 0610) | Area (ha)= 78.05 Curve Number (CN)= 71.0  
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00  
-----  
U.H. Tp(hrs)= 1.00
```

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 1.733 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 19.830
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

```
-----  
| ADD HYD ( 2610) |  
| 1 + 2 = 3 |  
-----  
ID1= 1 ( 4500): 575.36 11.119 2.94 23.66  
+ ID2= 2 ( 0610): 78.05 1.733 2.67 19.83  
=====
```

ID = 3 (2610): 653.41 12.786 2.89 23.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----  
| CALIB  
| NASHYD ( 0621) | Area (ha)= 6.56 Curve Number (CN)= 70.0  
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00  
-----  
U.H. Tp(hrs)= 0.37
```

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.274 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.213
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

| CALIB
| NASHYD (0622) |
ID= 1 DT= 5.0 min
Area (ha)= 9.69 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.36

Unit Hyd Qpeak (cms)= 1.028
PEAK FLOW (cms)= 0.412 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.213
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

| CALIB
| NASHYD (0623) |
ID= 1 DT= 5.0 min
Area (ha)= 19.37 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.45

Unit Hyd Qpeak (cms)= 1.644
PEAK FLOW (cms)= 0.718 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 19.215
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

| CALIB
| NASHYD (0624) |
ID= 1 DT= 5.0 min
Area (ha)= 11.84 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.51

Unit Hyd Qpeak (cms)= 0.887
PEAK FLOW (cms)= 0.405 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 19.216
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

| CALIB
| NASHYD (0625) |
ID= 1 DT= 5.0 min
Area (ha)= 6.72 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.39

Unit Hyd Qpeak (cms)= 0.658
PEAK FLOW (cms)= 0.272 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.214

TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

| ROUTE CHN(4625) |
IN= 2---> OUT= 1
Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0360 Main Channel
4.30 412.70 0.0360 Main Channel
8.60 414.20 0.0360 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .108E+02 0.0 0.24 42.13
0.16 412.86 .434E+02 0.0 0.38 26.54
0.24 412.94 .976E+02 0.1 0.50 20.26
0.32 413.02 .174E+03 0.2 0.61 16.72
0.39 413.09 .271E+03 0.3 0.70 14.41
0.47 413.17 .390E+03 0.5 0.79 12.76
0.55 413.25 .532E+03 0.8 0.88 11.51
0.63 413.33 .694E+03 1.1 0.96 10.53
0.71 413.41 .879E+03 1.5 1.04 9.74
0.79 413.49 .108E+04 2.0 1.11 9.08
0.87 413.57 .131E+04 2.6 1.19 8.52
0.95 413.65 .156E+04 3.2 1.26 8.04
1.03 413.73 .183E+04 4.0 1.33 7.62
1.11 413.81 .213E+04 4.9 1.39 7.25
1.18 413.88 .244E+04 5.9 1.46 6.93
1.26 413.96 .278E+04 7.0 1.52 6.64
1.34 414.04 .313E+04 8.2 1.59 6.37
1.42 414.12 .351E+04 9.5 1.65 6.13
1.50 414.20 .392E+04 11.0 1.71 5.92

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0625) 6.72 0.27 1.83 19.21 0.37 0.67
OUTFLOW: ID= 1 (4625) 6.72 0.24 2.08 19.18 0.35 0.65

| CALIB
| STANDHYD (0626) |
ID= 1 DT= 5.0 min
Area (ha)= 1.06
Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.64 0.42
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 84.06 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 147.79 57.12
over (min)= 5.00 15.00
Storage Coeff. (min)= 1.97 (ii) 10.80 (ii)

Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.31	0.09	
PEAK FLOW (cms)=	0.21	0.04	0.222 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	60.34	24.57	42.45
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.98	0.40	0.69

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2625)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4625):	6.72	0.236	2.08	19.18
+ ID2= 2 (0621):	6.56	0.274	1.83	19.21
=====				
ID = 3 (2625):	13.28	0.487	1.92	19.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2625):	13.28	0.487	1.92	19.20
+ ID2= 2 (0622):	9.69	0.412	1.83	19.21
=====				
ID = 1 (2625):	22.97	0.887	1.92	19.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2625):	22.97	0.887	1.92	19.20
+ ID2= 2 (0623):	19.37	0.718	1.92	19.22
=====				
ID = 3 (2625):	42.34	1.604	1.92	19.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2625):	42.34	1.604	1.92	19.21
+ ID2= 2 (0624):	11.84	0.405	2.00	19.22
=====				
ID = 1 (2625):	54.18	2.001	1.92	19.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2625):	54.18	2.001	1.92	19.21
+ ID2= 2 (0626):	1.06	0.222	1.33	42.45
=====				
ID = 3 (2625):	55.24	2.048	1.92	19.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (627)				
ID= 1 DT= 5.0 min	Area (ha)=	9.39	Curve Number (CN)=	70.0
	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.20		

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)=	0.550 (i)
TIME TO PEAK (hrs)=	1.583
RUNOFF VOLUME (mm)=	19.180
TOTAL RAINFALL (mm)=	61.344
RUNOFF COEFFICIENT =	0.313

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

CALIB			
STANDHYD (6240)			
ID= 1 DT= 5.0 min	Area (ha)=	0.79	Dir. Conn.(%)= 70.00
	Total Imp(%)=	90.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.71	0.08
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	20.00	20.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	147.79	238.82
over (min)=	5.00	5.00
Storage Coeff. (min)=	0.68 (ii)	2.50 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.29

PEAK FLOW (cms)=	0.23	0.06	0.283 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	60.82	39.18	54.33
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.99	0.64	0.89

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (6210)
ID= 1 DT= 5.0 min

Area (ha)= 1.96
Total Imp(%)= 60.00 Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.18 0.78
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 78.95
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.02 (ii) 8.78 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

TOTALS
PEAK FLOW (cms)= 0.32 0.12 0.377 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 60.82 27.57 40.87
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.45 0.67

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26240)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (6210):	1.96	0.377	1.33	40.87
+ ID2= 2 (6240):	0.79	0.283	1.33	54.33
=====				
ID = 3 (26240):	2.75	0.660	1.33	44.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(46240)
IN= 2--> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1390	0.0686
0.0060	0.0042	0.1510	0.0822
0.0130	0.0130	0.1630	0.0967
0.0200	0.0250	0.1730	0.1121
0.0250	0.0328	0.1780	0.1202
0.0290	0.0439	2.5750	0.1742
0.1260	0.0558	0.0000	0.0000

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
2.750	0.660	1.33	44.74

INFLOW : ID= 2 (26240)

OUTFLOW: ID= 1 (46240) 2.750 0.137 1.83 44.68

PEAK FLOW REDUCTION [Qout/Qin](%)= 20.75
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.0667

CALIB
STANDHYD (6220)
ID= 1 DT= 5.0 min

Area (ha)= 0.92
Total Imp(%)= 40.00 Dir. Conn.(%)= 20.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.37 0.55
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 63.86
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.02 (ii) 9.47 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

TOTALS
PEAK FLOW (cms)= 0.08 0.07 0.105 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 60.82 25.49 32.55
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.42 0.53

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(46220)
IN= 2--> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.2590	0.0708
0.0050	0.0089	0.2910	0.0871
0.0100	0.0187	0.3210	0.1045
0.0130	0.0298	0.3720	0.1438
0.0150	0.0422	2.8080	0.2087
0.2220	0.0559	0.0000	0.0000

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
0.920	0.105	1.33	32.55

INFLOW : ID= 2 (6220)

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
0.920	0.011	2.83	32.07

OUTFLOW: ID= 1 (46220)

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.23
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.0215

CALIB
STANDHYD (6230)
ID= 1 DT= 5.0 min

Area (ha)= 0.48
Total Imp(%)= 10.00 Dir. Conn.(%)= 5.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.05 0.43
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 20.00 20.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 40.87
over (min) 5.00 10.00
Storage Coeff. (min)= 0.68 (ii) 7.34 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.13

PEAK FLOW (cms)= 0.01 0.04
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 60.82 21.40
TOTAL RAINFALL (mm)= 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.35

TOTALS
0.040 (iii)

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (0004)
1 + 2 = 3

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (46220): 0.92 0.011 2.83 32.07
+ ID2= 2 (46240): 2.75 0.137 1.83 44.68
=====

ID = 3 (0004): 3.67 0.147 1.92 41.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0004)
3 + 2 = 1

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (0004): 3.67 0.147 1.92 41.51
+ ID2= 2 (6230): 0.48 0.040 1.50 23.36
=====

ID = 1 (0004): 4.15 0.174 1.58 39.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4620)
IN= 2--> OUT= 1

Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0004) 4.15 0.17 1.58 39.42 0.23 1.12
OUTFLOW: ID= 1 (4620) 4.15 0.17 1.67 39.16 0.23 1.11

ADD HYD (0117)
1 + 2 = 3

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2625): 55.24 2.048 1.92 19.66
+ ID2= 2 (4620): 4.15 0.171 1.67 39.16
=====

ID = 3 (0117): 59.39 2.212 1.92 21.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0117)
3 + 2 = 1

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (0117): 59.39 2.212 1.92 21.02
+ ID2= 2 (0627): 9.39 0.550 1.58 19.18
=====

ID = 1 (0117): 68.78 2.579 1.83 20.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0116)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0117):   68.78   2.579   1.83   20.77
+ ID2= 2 ( 2610):  653.41  12.786   2.89  23.21
=====
ID = 3 ( 0116):   722.19  13.850   2.75  22.97
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0637)|
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)=   8.36   Curve Number (CN)= 70.0
          Ia     (mm)=   5.00   # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)=   0.47
```

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 0.301 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 19.215
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| CALIB
| NASHYD ( 0630)|
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)=  33.04   Curve Number (CN)= 70.0
          Ia     (mm)=   5.00   # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)=   0.38
```

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 1.360 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.214
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| ROUTE CHN( 4630)|
| IN= 2---> OUT= 1 |
-----
          Routing time step (min)'= 5.00
```

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94

0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0630)	33.04	1.36	1.83	19.21	0.77	0.80
OUTFLOW: ID= 1 (4630)	33.04	1.25	2.00	19.21	0.75	0.78

```
-----
| ADD HYD ( 2637)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0116):   722.19  13.850   2.75  22.97
+ ID2= 2 ( 4630):   33.04   1.251   2.00  19.21
=====
ID = 3 ( 2637):   755.23  14.517   2.64  22.81
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2637)|
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2637):   755.23  14.517   2.64  22.81
+ ID2= 2 ( 0637):   8.36   0.301   2.00  19.22
=====
ID = 1 ( 2637):   763.59  14.694   2.61  22.77
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0636)|
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)=   3.32   Curve Number (CN)= 70.0
          Ia     (mm)=   5.00   # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)=   0.48
```

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.118 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 19.215
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| ADD HYD ( 2636)|
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2637): 763.59 14.694 2.61 22.77
+ ID2= 2 ( 0636): 3.32 0.118 2.00 19.22
|=====|
| ID = 3 ( 2636): 766.91 14.767 2.61 22.75
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0638)|
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 20.63 Curve Number (CN)= 70.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.46
```

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 0.753 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 19.215
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| CALIB
| NASHYD ( 0639)|
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 4.60 Curve Number (CN)= 70.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.43
```

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.176 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 19.215
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| ADD HYD ( 2630)|
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2636): 766.91 14.767 2.61 22.75
+ ID2= 2 ( 0638): 20.63 0.753 1.92 19.22
|=====|
| ID = 3 ( 2630): 787.54 15.228 2.56 22.66
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2630)|
| 3 + 2 = 1 |
|-----|
| ID1= 3 ( 2630): 787.54 15.228 2.56 22.66
+ ID2= 2 ( 0639): 4.60 0.176 1.92 19.21
|=====|
| ID = 1 ( 2630): 792.14 15.328 2.56 22.64
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0709)|
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 21.19 Curve Number (CN)= 70.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.65
```

Unit Hyd Qpeak (cms)= 1.245

PEAK FLOW (cms)= 0.616 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 19.216
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

FINISH

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*****
** SIMULATION : 25 year Fergus Shand Dam Chic **
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| CHICAGO STORM
| Ptotal= 74.68 mm |
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IDF curve parameters: A=3023.000
B= 18.000
C= 0.916

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

Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.03	1.00	25.41	2.00	13.91	3.00	4.68
0.08	3.31	1.08	41.74	2.08	12.18	3.08	4.41
0.17	3.65	1.17	86.90	2.17	10.79	3.17	4.17
0.25	4.05	1.25	170.99	2.25	9.65	3.25	3.95
0.33	4.54	1.33	106.07	2.33	8.70	3.33	3.75
0.42	5.15	1.42	67.82	2.42	7.91	3.42	3.56
0.50	5.92	1.50	47.76	2.50	7.23	3.50	3.40
0.58	6.93	1.58	35.82	2.58	6.65	3.58	3.24
0.67	8.29	1.67	28.10	2.67	6.15	3.67	3.10
0.75	10.20	1.75	22.79	2.75	5.71	3.75	2.97
0.83	13.02	1.83	18.97	2.83	5.33	3.83	2.85
0.92	17.51	1.92	16.11	2.92	4.99	3.92	2.74

CALIB			
NASHYD (0100)	Area (ha)= 136.98	Curve Number (CN)= 69.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.17		

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 3.656 (i)
 TIME TO PEAK (hrs)= 2.833
 RUNOFF VOLUME (mm)= 26.414
 TOTAL RAINFALL (mm)= 74.676
 RUNOFF COEFFICIENT = 0.354

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

CALIB			
NASHYD (0203)	Area (ha)= 14.60	Curve Number (CN)= 74.0	
ID= 1 DT= 5.0 min	Ia (mm)= 1.50	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.97		

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.567 (i)
 TIME TO PEAK (hrs)= 2.583
 RUNOFF VOLUME (mm)= 32.968
 TOTAL RAINFALL (mm)= 74.676
 RUNOFF COEFFICIENT = 0.441

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

CALIB			
STANDHYD (0203)	Area (ha)= 8.20		
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00	Dir. Conn.(%)= 25.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	170.99	86.41
over (min)=	5.00	10.00
Storage Coeff. (min)=	0.85 (ii)	7.43 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

TOTALS
 1.394 (iii)
 1.33
 43.88
 74.68
 0.59

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. 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 (2200)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	14.60	0.567	2.58	32.97
+ ID2= 2 (0203):	8.20	1.394	1.33	43.88
ID = 3 (2200):	22.80	1.419	1.33	36.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)	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	0.1980	0.2314
	0.0040	0.0218	0.2920	0.2621
	0.0060	0.0446	0.3980	0.2937
	0.0070	0.0683	0.5150	0.3261
	0.0080	0.0930	0.8290	0.3592
	0.0090	0.1187	1.3520	0.3930
	0.0230	0.1453	2.0570	0.4275
	0.0610	0.1730	2.9590	0.4629
	0.1200	0.2017	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2200)	22.800	1.419	1.33	36.89
OUTFLOW: ID= 1 (5200)	22.800	0.653	2.83	36.83

PEAK FLOW REDUCTION [Qout/Qin](%)= 46.01
 TIME SHIFT OF PEAK FLOW (min)= 90.00
 MAXIMUM STORAGE USED (ha.m.)= 0.3407

CALIB			
NASHYD (0205)	Area (ha)= 4.80	Curve Number (CN)= 90.0	
ID= 1 DT= 5.0 min	Ia (mm)= 1.50	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.41		

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.568 (i)
 TIME TO PEAK (hrs)= 1.833
 RUNOFF VOLUME (mm)= 52.802
 TOTAL RAINFALL (mm)= 74.676
 RUNOFF COEFFICIENT = 0.707

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

CALIB			
STANDHYD (0206)	Area (ha)= 0.20		
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00	Dir. Conn.(%)= 25.00	

IMPERVIOUS PERVIOUS (i)

Surface Area	(ha)=	0.09	0.11
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.20	1.20
Length	(m)=	25.00	25.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=	170.99	86.41	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.85 (ii)	7.43 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.13	
PEAK FLOW (cms)=	0.02	0.02	0.034 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	72.68	34.28	43.85
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.97	0.46	0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201)				
1 + 2 = 3				

ID1= 1 (0205):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
+ ID2= 2 (0206):	4.80	0.568	1.83	52.80
	0.20	0.034	1.33	43.85
=====				
ID = 3 (2201):	5.00	0.581	1.83	52.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201)				
3 + 2 = 1				

ID1= 3 (2201):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
+ ID2= 2 (5200):	5.00	0.581	1.83	52.44
	22.80	0.653	2.83	36.83
=====				
ID = 1 (2201):	27.80	0.888	2.00	39.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB		
STANDHYD (0209)		
ID= 1 DT= 5.0 min		

	Area (ha)=	2.70
	Total Imp(%)=	16.00
	Dir. Conn.(%)=	8.00
	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.43
Dep. Storage	(mm)=	2.00
Average Slope	(%)=	1.20
Length	(m)=	35.00
Mannings n	=	0.013

Max.Eff.Inten.(mm/hr)=	170.99	58.93	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.04 (ii)	10.42 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.34	0.09	
PEAK FLOW (cms)=	0.10	0.24	0.268 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.58
RUNOFF VOLUME (mm)=	72.68	29.82	33.25
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.97	0.40	0.45

TOTALS

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB		
STANDHYD (0207)		
ID= 1 DT= 5.0 min		

	Area (ha)=	1.30
	Total Imp(%)=	45.00
	Dir. Conn.(%)=	25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.58
Dep. Storage	(mm)=	0.72
Average Slope	(%)=	5.00
Length	(m)=	1.20
Mannings n	=	1.20
		25.00
		0.013
		0.250

Max.Eff.Inten.(mm/hr)=	170.99	86.41
over (min)	5.00	10.00
Storage Coeff. (min)=	0.85 (ii)	7.43 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

TOTALS

PEAK FLOW (cms)=	0.15	0.13	0.221 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	72.68	34.28	43.88
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.97	0.46	0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)				
1 + 2 = 3				

ID1= 1 (0207):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
+ ID2= 2 (0209):	1.30	0.221	1.33	43.88
	2.70	0.268	1.58	33.25

=====

ID = 3 (2202):	4.00	0.452	1.50	36.70
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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2202):	4.00	0.452	1.50	36.70
+ ID2= 2 (2201):	27.80	0.888	2.00	39.64
	=====	=====	=====	=====
ID = 1 (2202):	31.80	1.104	1.83	39.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2100)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0100):	136.98	3.656	2.83	26.41
+ ID2= 2 (2202):	31.80	1.104	1.83	39.27
	=====	=====	=====	=====
ID = 3 (2100):	168.78	4.532	2.75	28.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0302)	Area (ha)=	2.90	Curve Number (CN)=	74.0
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.45		

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.192 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 32.965
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.441

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

CALIB				
STANDHYD (0304)	Area (ha)=	4.40		
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00	Dir. Conn.(%)=	25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.98	2.42
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	86.41
over (min)	5.00	10.00
Storage Coeff. (min)=	0.90 (ii)	7.85 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

			TOTALS
PEAK FLOW (cms)=	0.52	0.42	0.741 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	72.68	34.28	43.88
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.97	0.46	0.59

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0302):	2.90	0.192	1.92	32.97
+ ID2= 2 (0304):	4.40	0.741	1.33	43.88
	=====	=====	=====	=====
ID = 3 (2300):	7.30	0.780	1.42	39.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0308)	Area (ha)=	0.20		
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00	Dir. Conn.(%)=	25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	170.99	86.41
over (min)	5.00	10.00
Storage Coeff. (min)=	0.90 (ii)	7.85 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

			TOTALS
PEAK FLOW (cms)=	0.02	0.02	0.034 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	72.68	34.28	43.86
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.97	0.46	0.59

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
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| STANDHYD (0310)| Area (ha)= 5.70
| ID= 1 DT= 5.0 min | Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 170.99 58.93
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.85 (ii) 8.52 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

TOTALS
PEAK FLOW (cms)= 0.22 0.56 0.645 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.50
RUNOFF VOLUME (mm)= 72.68 29.82 33.25
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.40 0.45

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)|
| 1 + 2 = 3 |
ID1= 1 (2300): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0308): 7.30 0.780 1.42 39.54
0.20 0.034 1.33 43.86
ID = 3 (2301): 7.50 0.813 1.42 39.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2301)|
| 3 + 2 = 1 |
ID1= 3 (2301): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0310): 7.50 0.813 1.42 39.66
5.70 0.645 1.50 33.25
ID = 1 (2301): 13.20 1.452 1.42 36.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2302)|
| 1 + 2 = 3 |
ID1= 1 (2100): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
168.78 4.532 2.75 28.84

+ ID2= 2 (2301): 13.20 1.452 1.42 36.89
ID = 3 (2302): 181.98 4.761 2.75 29.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| STANDHYD (0400)| Area (ha)= 82.86
| ID= 1 DT= 5.0 min | Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 121.32 55.40
over (min)= 15.00 25.00
Storage Coeff. (min)= 13.02 (ii) 21.96 (ii)
Unit Hyd. Tpeak (min)= 15.00 25.00
Unit Hyd. peak (cms)= 0.08 0.05

TOTALS
PEAK FLOW (cms)= 0.60 5.12 5.557 (iii)
TIME TO PEAK (hrs)= 1.50 1.83 1.75
RUNOFF VOLUME (mm)= 72.68 28.68 30.00
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.38 0.40

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2400)|
| 1 + 2 = 3 |
ID1= 1 (2302): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0400): 181.98 4.761 2.75 29.42
82.86 5.557 1.75 30.00
ID = 3 (2400): 264.84 8.919 1.83 29.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4400)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550
96.60 409.10 0.0550
115.80 408.90 0.0550

124.80	409.10	0.0550	
131.00	408.90	0.0550 / 0.0350	Main Channel
133.60	408.00	0.0350	Main Channel
134.40	407.60	0.0350	Main Channel
135.00	407.50	0.0350	Main Channel
135.80	407.60	0.0350	Main Channel
136.50	408.00	0.0350	Main Channel
139.40	408.80	0.0350 / 0.0550	Main Channel
143.50	408.90	0.0550	
148.50	408.70	0.0550	
163.80	408.90	0.0550	
183.20	408.90	0.0550	
243.70	409.70	0.0550	
278.70	410.20	0.0550	
330.50	411.40	0.0550	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.19	407.69	.366E+03	0.1	0.51	58.83
0.37	407.87	.106E+04	0.5	0.81	37.08
0.56	408.06	.199E+04	1.1	1.00	29.93
0.74	408.24	.328E+04	2.1	1.14	26.32
0.93	408.43	.498E+04	3.6	1.28	23.32
1.11	408.61	.708E+04	5.6	1.43	20.94
1.30	408.80	.105E+05	8.5	1.45	20.61
1.49	408.99	.247E+05	14.8	1.07	27.91
1.68	409.18	.601E+05	30.4	0.91	32.97
1.87	409.37	.109E+06	58.5	0.96	31.05
2.06	409.56	.166E+06	98.3	1.06	28.11
2.25	409.75	.231E+06	150.3	1.17	25.57
2.44	409.94	.303E+06	215.4	1.28	23.46
2.64	410.14	.383E+06	293.8	1.38	21.74
2.83	410.33	.470E+06	390.1	1.49	20.10
3.02	410.52	.563E+06	502.4	1.60	18.66
3.21	410.71	.660E+06	628.8	1.71	17.48
3.40	410.90	.762E+06	769.5	1.81	16.49
3.59	411.09	.868E+06	924.9	1.91	15.65

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (2400)	264.84	8.92	1.83	29.60	1.31	1.42
OUTFLOW: ID= 1 (4400)	264.84	7.70	2.31	29.52	1.24	1.45

**** WARNING : THE HYD WAS CUT TO 2000 POINTS

CALIB			
NASHYD (0515)	Area (ha)=	5.01	Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.41	

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW (cms)= 0.265 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 25.502
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.342

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

CALIB			
NASHYD (0510)	Area (ha)=	91.44	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.09	

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)= 2.973 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 30.266
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.405

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

ROUTE CHN(4510)	
IN= 2--> OUT= 1	Routing time step (min)'= 5.00

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.206E+02	0.0	0.19	101.61
0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0510)	91.44	2.97	2.75	30.27	1.00	1.03
OUTFLOW: ID= 1 (4510)	91.44	2.84	3.00	30.26	0.98	1.01

CALIB			
NASHYD (0517)	Area (ha)=	2.14	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.32	

Unit Hyd Qpeak (cms)= 0.255

PEAK FLOW (cms)= 0.158 (i)
 TIME TO PEAK (hrs)= 1.750
 RUNOFF VOLUME (mm)= 30.256
 TOTAL RAINFALL (mm)= 74.676
 RUNOFF COEFFICIENT = 0.405

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

CALIB			
STANDHYD (0511)	Area (ha)=	52.87	Dir. Conn.(%)= 30.00
ID= 1 DT= 5.0 min	Total Imp(%)=	50.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	26.43	26.43
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	593.69	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 170.99 95.30
 over (min)= 5.00 15.00
 Storage Coeff. (min)= 6.00 (ii) 14.86 (ii)
 Unit Hyd. Tpeak (min)= 5.00 15.00
 Unit Hyd. peak (cms)= 0.19 0.08

PEAK FLOW (cms)= 5.47 3.91 *TOTALS*
 TIME TO PEAK (hrs)= 1.33 7.494 (iii)
 RUNOFF VOLUME (mm)= 73.88 36.68 1.42
 TOTAL RAINFALL (mm)= 74.68 74.68 47.84
 RUNOFF COEFFICIENT = 0.99 0.49 0.64

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0516)	Area (ha)=	10.78	Dir. Conn.(%)= 45.00
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.85	5.93
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	268.08	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 170.99 47.89
 over (min)= 5.00 20.00
 Storage Coeff. (min)= 3.72 (ii) 15.39 (ii)

Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.25	0.07	
PEAK FLOW (cms)=	1.96	0.49	*TOTALS* 2.076 (iii)
TIME TO PEAK (hrs)=	1.33	1.67	1.33
RUNOFF VOLUME (mm)=	73.88	30.27	49.89
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.99	0.41	0.67

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. 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 (2511)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0511):	52.87	7.494	1.42	47.84
+ ID2= 2 (0516):	10.78	2.076	1.33	49.89
ID = 3 (2511):	63.65	9.282	1.42	48.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(4511)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
**** WARNING : FIRST	0.7700	0.9000	3.2130	1.6220
OUTFLOW IS NOT ZERO.	1.6000	1.1400	3.9540	1.8810
	2.2900	1.2810	4.9000	2.3000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2511)	63.650	9.282	1.42	48.18
OUTFLOW: ID= 1 (4511)	63.650	3.199	2.08	48.18

PEAK FLOW REDUCTION [Qout/Qin](%)= 34.46
 TIME SHIFT OF PEAK FLOW (min)= 40.00
 MAXIMUM STORAGE USED (ha.m.)= 1.6168

ADD HYD (2510)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (4510):	91.44	2.836	3.00	30.26
+ ID2= 2 (4511):	63.65	3.199	2.08	48.18
ID = 3 (2510):	155.09	5.325	2.67	37.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```

-----
| ADD HYD ( 2510) |
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2510): 155.09 5.325 2.67 37.61
+ ID2= 2 ( 0517): 2.14 0.158 1.75 30.26
=====
ID = 1 ( 2510): 157.23 5.372 2.58 37.51

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| STANDHYD ( 0512) |
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)= 27.13
          Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00

          IMPERVIOUS   PERVIOUS (i)
Surface Area   (ha)= 13.56 13.56
Dep. Storage   (mm)= 0.80 1.50
Average Slope   (%)= 1.00 2.00
Length   (m)= 425.28 40.00
Mannings n   = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 170.99 95.30
over (min)= 5.00 15.00
Storage Coeff. (min)= 4.91 (ii) 12.11 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.22 0.09

          *TOTALS*
PEAK FLOW (cms)= 3.02 2.18 4.053 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.42
RUNOFF VOLUME (mm)= 73.88 36.68 47.84
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.99 0.49 0.64

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB
| STANDHYD ( 0513) |
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)= 6.44
          Total Imp(%)= 65.00 Dir. Conn.(%)= 35.00

          IMPERVIOUS   PERVIOUS (i)
Surface Area   (ha)= 4.19 2.25
Dep. Storage   (mm)= 0.80 1.50
Average Slope   (%)= 1.00 1.00
Length   (m)= 207.20 40.00
Mannings n   = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 170.99 148.20
over (min)= 5.00 15.00
Storage Coeff. (min)= 3.19 (ii) 10.62 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.27 0.09

          *TOTALS*
PEAK FLOW (cms)= 0.95 0.59 1.170 (iii)

```

```

TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 73.88 42.06 53.19
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.99 0.56 0.71

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| DUHYD ( 8512) |
| Inlet Cap.= 0.732 |
| #of Inlets= 1 |
| Total(cms)= 0.7 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
TOTAL HYD.(ID= 1): 6.44 1.17 1.33 53.19
=====
MAJOR SYS.(ID= 2): 0.79 0.44 1.33 53.19
MINOR SYS.(ID= 3): 5.65 0.73 1.33 53.19

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2512) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0512): 27.13 4.053 1.42 47.84
+ ID2= 2 ( 8512): 5.65 0.732 1.33 53.19
=====
ID = 3 ( 2512): 32.78 4.785 1.42 48.76

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 5512) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
OVERFLOW IS OFF

          OUTFLOW   STORAGE   OUTFLOW   STORAGE
          (cms)   (ha.m.)   (cms)   (ha.m.)
0.0000 0.0000 | 0.6640 0.9151
0.0210 0.1601 | 0.8570 1.0220
0.0360 0.3317 | 1.0660 1.1320
0.0410 0.4218 | 1.2900 1.2450
0.1000 0.5147 | 1.5290 1.3610
0.2030 0.6105 | 1.7810 1.4800
0.3340 0.7092 | 2.0460 1.6020
0.4890 0.8107 | 2.3220 1.7260

          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
INFLOW : ID= 2 ( 2512) 32.777 4.785 1.42 48.76
OUTFLOW: ID= 1 ( 5512) 32.777 0.972 2.42 48.70

```

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 20.31
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 1.0834

```

```
-----
| ADD HYD ( 2514)|
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
| ID1= 1 ( 2510): 157.23 5.372 2.58 37.51 |
| + ID2= 2 ( 0515): 5.01 0.265 1.83 25.50 |
|=====|
| ID = 3 ( 2514): 162.24 5.504 2.58 37.14 |
|=====|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2514)|
| 3 + 2 = 1 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
| ID1= 3 ( 2514): 162.24 5.504 2.58 37.14 |
| + ID2= 2 ( 5512): 32.78 0.972 2.42 48.70 |
|=====|
| ID = 1 ( 2514): 195.02 6.459 2.58 39.09 |
|=====|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0058) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 6.68 Curve Number (CN)= 71.0 |
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
| U.H. Tp(hrs)= 0.20 |
|-----|
```

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.579 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 27.940
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.374

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

```
-----
| ADD HYD ( 2513)|
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
| ID1= 1 ( 2514): 195.02 6.459 2.58 39.09 |
| + ID2= 2 ( 4400): 264.84 7.701 2.31 29.52 |
|=====|
| ID = 3 ( 2513): 459.86 14.074 2.42 33.45 |
|=====|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2513)|
| 3 + 2 = 1 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
| ID1= 3 ( 2513): 459.86 14.074 2.42 33.45 |
| + ID2= 2 ( 0058): 6.68 0.579 1.58 27.94 |
|=====|
| ID = 1 ( 2513): 466.54 14.212 2.42 33.37 |
|=====|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0520) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 108.36 Curve Number (CN)= 71.0 |
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 |
| U.H. Tp(hrs)= 1.20 |
|-----|
```

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 3.015 (i)
TIME TO PEAK (hrs)= 2.917
RUNOFF VOLUME (mm)= 27.993
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.375

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

```
-----
| ADD HYD ( 2520)|
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
| ID1= 1 ( 2513): 466.54 14.212 2.42 33.37 |
| + ID2= 2 ( 0520): 108.36 3.015 2.92 27.99 |
|=====|
| ID = 3 ( 2520): 574.90 16.962 2.50 32.36 |
|=====|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTE CHN( 4500)|
| IN= 2---> OUT= 1 |
|-----|
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 /0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 /0.0550 Main Channel
109.70 404.30 0.0550
128.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
```

0.68	403.38	.304E+04	1.6	1.03	32.27
1.02	403.72	.718E+04	4.5	1.25	26.57
1.36	404.06	.122E+05	9.7	1.58	20.96
1.70	404.40	.251E+05	18.1	1.44	23.04
2.08	404.78	.650E+05	42.3	1.29	25.62
2.46	405.16	.122E+06	86.3	1.40	23.62
2.84	405.54	.192E+06	151.6	1.57	21.10
3.21	405.91	.270E+06	238.3	1.75	18.90
3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
INFLOW : ID= 2 (2520)	574.90	16.96	2.50	32.36	1.65
OUTFLOW: ID= 1 (4500)	574.90	15.87	3.00	32.35	1.46
					1.48

CALIB			
NASHYD (0610)	Area (ha)= 78.05	Curve Number (CN)= 71.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.00		

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 2.489 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 27.993
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.375

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

ADD HYD (2610)				
1 + 2 = 3				
ID1= 1 (4500):	574.90	15.866	3.00	32.35
+ ID2= 2 (0610):	78.05	2.489	2.67	27.99
=====				
ID = 3 (2610):	652.95	18.213	2.94	31.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0621)	Area (ha)= 6.56	Curve Number (CN)= 70.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.37		

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.396 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 27.188
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

CALIB			
NASHYD (0622)	Area (ha)= 9.69	Curve Number (CN)= 70.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.36		

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW (cms)= 0.594 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 27.187
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

CALIB			
NASHYD (0623)	Area (ha)= 19.37	Curve Number (CN)= 70.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.45		

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW (cms)= 1.037 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 27.190
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

CALIB			
NASHYD (0624)	Area (ha)= 11.84	Curve Number (CN)= 70.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.51		

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 0.585 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 27.191
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

CALIB
NASHYD (0625) | Area (ha)= 6.72 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.39

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW (cms)= 0.393 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 27.188
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

ROUTE CHN(4625) |
IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0360 Main Channel
4.30 412.70 0.0360 Main Channel
8.60 414.20 0.0360 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .108E+02 0.0 0.24 42.13
0.16 412.86 .434E+02 0.0 0.38 26.54
0.24 412.94 .976E+02 0.1 0.50 20.26
0.32 413.02 .174E+03 0.2 0.61 16.72
0.39 413.09 .271E+03 0.3 0.70 14.41
0.47 413.17 .390E+03 0.5 0.79 12.76
0.55 413.25 .532E+03 0.8 0.88 11.51
0.63 413.33 .694E+03 1.1 0.96 10.53
0.71 413.41 .879E+03 1.5 1.04 9.74
0.79 413.49 .108E+04 2.0 1.11 9.08
0.87 413.57 .131E+04 2.6 1.19 8.52
0.95 413.65 .156E+04 3.2 1.26 8.04
1.03 413.73 .183E+04 4.0 1.33 7.62
1.11 413.81 .213E+04 4.9 1.39 7.25
1.18 413.88 .244E+04 5.9 1.46 6.93
1.26 413.96 .278E+04 7.0 1.52 6.64
1.34 414.04 .313E+04 8.2 1.59 6.37
1.42 414.12 .351E+04 9.5 1.65 6.13
1.50 414.20 .392E+04 11.0 1.71 5.92

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0625) 6.72 0.39 1.83 27.19 0.43 0.74
OUTFLOW: ID= 1 (4625) 6.72 0.35 2.08 27.15 0.41 0.72

CALIB
STANDHYD (0626) | Area (ha)= 1.06
ID= 1 DT= 5.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.64 0.42
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 84.06 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 170.99 76.95
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.86 (ii) 9.70 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.32 0.11

TOTALS
PEAK FLOW (cms)= 0.24 0.06 0.275 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 73.68 33.62 53.64
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.99 0.45 0.72

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2625) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (4625): 6.72 0.349 2.08 27.15
+ ID2= 2 (0621): 6.56 0.396 1.83 27.19
=====

ID = 3 (2625): 13.28 0.715 1.92 27.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625) |
3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2625): 13.28 0.715 1.92 27.17
+ ID2= 2 (0622): 9.69 0.594 1.83 27.19
=====

ID = 1 (2625): 22.97 1.291 1.92 27.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2625): 22.97 1.291 1.92 27.18
+ ID2= 2 (0623): 19.37 1.037 1.92 27.19
=====

ID = 3 (2625): 42.34 2.328 1.92 27.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2625):	42.34	2.328	1.92	27.18
+ ID2= 2 (0624):	11.84	0.585	2.00	27.19
=====				
ID = 1 (2625):	54.18	2.902	1.92	27.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2625):	54.18	2.902	1.92	27.18
+ ID2= 2 (0626):	1.06	0.275	1.33	53.64
=====				
ID = 3 (2625):	55.24	2.959	1.92	27.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0627)				
ID= 1 DT= 5.0 min				
	Area	(ha)=	9.39	Curve Number (CN)= 70.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.20		

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.788 (i)
 TIME TO PEAK (hrs)= 1.583
 RUNOFF VOLUME (mm)= 27.140
 TOTAL RAINFALL (mm)= 74.676
 RUNOFF COEFFICIENT = 0.363

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

CALIB				
STANDHYD (6240)				
ID= 1 DT= 5.0 min				
	Area	(ha)=	0.79	
	Total Imp(%)=	90.00	Dir. Conn.(%)=	70.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.71	0.08
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	20.00	20.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	305.25
over (min)=	5.00	5.00
Storage Coeff. (min)=	0.64 (ii)	2.36 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.30

TOTALS
 PEAK FLOW (cms)= 0.26 0.07 0.335 (iii)
 TIME TO PEAK (hrs)= 1.33 1.33
 RUNOFF VOLUME (mm)= 74.16 51.21 67.27

TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.99	0.69	0.90

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 74.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (6210)			
ID= 1 DT= 5.0 min			
	Area	(ha)=	1.96
	Total Imp(%)=	60.00	Dir. Conn.(%)= 40.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.18	0.78
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	107.08
over (min)=	5.00	10.00
Storage Coeff. (min)=	0.97 (ii)	7.83 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

TOTALS
 PEAK FLOW (cms)= 0.37 0.17 0.459 (iii)
 TIME TO PEAK (hrs)= 1.33 1.50 1.33
 RUNOFF VOLUME (mm)= 74.16 37.76 52.32
 TOTAL RAINFALL (mm)= 74.68 74.68 74.68
 RUNOFF COEFFICIENT = 0.99 0.51 0.70

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 74.0 Ia = Dep. 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 (26240)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (6210):	1.96	0.459	1.33	52.32
+ ID2= 2 (6240):	0.79	0.335	1.33	67.27
=====				
ID = 3 (26240):	2.75	0.794	1.33	56.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(46240)			
IN= 2---> OUT= 1			
DT= 5.0 min			
	OVERFLOW IS OFF		
	OUTFLOW	STORAGE	OUTFLOW STORAGE
	(cms)	(ha.m.)	(cms) (ha.m.)
	0.0000	0.0000	0.1390 0.0686

0.0060	0.0042	0.1510	0.0822
0.0130	0.0130	0.1630	0.0967
0.0200	0.0250	0.1730	0.1121
0.0250	0.0328	0.1780	0.1202
0.0290	0.0439	2.5750	0.1742
0.1260	0.0558	0.0000	0.0000

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (26240)	2.750	0.794	1.33	56.61
OUTFLOW: ID= 1 (46240)	2.750	0.155	1.92	56.55

PEAK FLOW REDUCTION [Qout/Qin](%)= 19.45
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= 0.0865

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (6220)	0.920	0.142	1.42	43.03
OUTFLOW: ID= 1 (46220)	0.920	0.013	2.83	42.55

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.06
TIME SHIFT OF PEAK FLOW (min)= 85.00
MAXIMUM STORAGE USED (ha.m.)= 0.0294

CALIB	Area	(ha)=	0.48
STANDHYD (6230)	Total Imp(%)=	10.00	Dir. Conn.(%)= 5.00
ID= 1 DT= 5.0 min			

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)= 0.05	0.43
Dep. Storage	(mm)= 0.52	7.16
Average Slope	(%)= 2.00	2.00
Length	(m)= 20.00	20.00
Mannings n	= 0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	57.71
over (min)=	5.00	10.00
Storage Coeff. (min)=	0.64 (ii)	6.44 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.14

TOTALS
PEAK FLOW (cms)= 0.01 0.05 0.058 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.50
RUNOFF VOLUME (mm)= 74.16 30.24 32.42
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.99 0.40 0.43

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (0004)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (46220):	0.92	0.013	2.83	42.55
+ ID2= 2 (46240):	2.75	0.155	1.92	56.55
ID = 3 (0004):	3.67	0.166	1.92	53.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0004)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)

CALIB	Area	(ha)=	0.92
STANDHYD (6220)	Total Imp(%)=	40.00	Dir. Conn.(%)= 20.00
ID= 1 DT= 5.0 min			

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)= 0.37	0.55
Dep. Storage	(mm)= 0.52	7.16
Average Slope	(%)= 2.00	2.00
Length	(m)= 40.00	40.00
Mannings n	= 0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	87.70
over (min)=	5.00	10.00
Storage Coeff. (min)=	0.97 (ii)	8.40 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.12

TOTALS
PEAK FLOW (cms)= 0.09 0.10 0.142 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 74.16 35.26 43.03
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.99 0.47 0.58

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(46220)	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	0.2590	0.0708
0.0050	0.0089	0.2910	0.0871
0.0100	0.0187	0.3210	0.1045
0.0130	0.0298	0.3720	0.1438
0.0150	0.0422	2.8080	0.2087
0.2220	0.0559	0.0000	0.0000


```
ID1= 3 ( 0004): 3.67 0.166 1.92 53.04
+ ID2= 2 ( 6230): 0.48 0.058 1.50 32.42
=====
ID = 1 ( 0004): 4.15 0.205 1.58 50.66
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN( 4620)|
| IN= 2--> OUT= 1 | Routing time step (min)'= 2.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel
```

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.456E+01	0.0	0.55	7.70
0.16	412.86	.182E+02	0.1	0.88	4.85
0.24	412.94	.410E+02	0.2	1.15	3.70
0.32	413.02	.729E+02	0.4	1.39	3.05
0.39	413.09	.114E+03	0.7	1.61	2.63
0.47	413.17	.164E+03	1.2	1.82	2.33
0.55	413.25	.223E+03	1.8	2.02	2.10
0.63	413.33	.292E+03	2.5	2.21	1.92
0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0004)	4.15	0.21	1.58	50.66	0.24	1.17
OUTFLOW: ID= 1 (4620)	4.15	0.20	1.64	50.34	0.24	1.16

```
| ADD HYD ( 0117)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 0117): 59.39 3.150 1.92 29.28
+ ID2= 2 ( 0627): 9.39 0.788 1.58 27.14
=====
ID = 1 ( 0117): 68.78 3.680 1.83 28.98
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 0116)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0117): 68.78 3.680 1.83 28.98
+ ID2= 2 ( 2610): 652.95 18.213 2.94 31.83
=====
ID = 3 ( 0116): 721.73 19.630 2.83 31.56
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB
| NASHYD ( 0637)| Area (ha)= 8.36 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.47
```

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 0.434 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 27.190
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

```
| CALIB
| NASHYD ( 0630)| Area (ha)= 33.04 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.38
```

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 1.963 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 27.188
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

```
| ROUTE CHN( 4630)|
| IN= 2--> OUT= 1 | Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
```

4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

TRAVEL TIME TABLE					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

<--- hydrograph --->					<- pipe / channel ->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0630)	33.04	1.96	1.83	27.19	0.88	0.87
OUTFLOW : ID= 1 (4630)	33.04	1.83	2.00	27.18	0.86	0.86

ADD HYD (2637)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0116):	721.73	19.630	2.83	31.56
+ ID2= 2 (4630):	33.04	1.829	2.00	27.18
=====				
ID = 3 (2637):	754.77	20.486	2.69	31.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637)				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2637):	754.77	20.486	2.69	31.37
+ ID2= 2 (0637):	8.36	0.434	2.00	27.19
=====				
ID = 1 (2637):	763.13	20.719	2.69	31.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0636)	Area	(ha)=	3.32	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.48

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.170 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 27.190
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

ADD HYD (2636)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2637):	763.13	20.719	2.69	31.32
+ ID2= 2 (0636):	3.32	0.170	2.00	27.19
=====				
ID = 3 (2636):	766.45	20.815	2.67	31.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0638)	Area	(ha)=	20.63	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.46		

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 1.087 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 27.190
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

CALIB				
NASHYD (0639)	Area	(ha)=	4.60	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.43		

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.253 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 27.190
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

ADD HYD (2630)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.

 (ha) (cms) (hrs) (mm)
ID1= 1 (2636): 766.45 20.815 2.67 31.30
+ ID2= 2 (0638): 20.63 1.087 1.92 27.19
=====

ID = 3 (2630): 787.08 21.424 2.61 31.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2630) |
3 + 2 = 1
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 3 (2630): 787.08 21.424 2.61 31.19
+ ID2= 2 (0639): 4.60 0.253 1.92 27.19
=====

ID = 1 (2630): 791.68 21.557 2.58 31.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0709) |
ID= 1 DT= 5.0 min
Area (ha)= 21.19 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.65

Unit Hyd Qpeak (cms)= 1.245

PEAK FLOW (cms)= 0.891 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 27.192
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

FINISH

** SIMULATION : 50 year Fergus Shand Dam Chic **

| CHICAGO STORM |
Ptotal= 84.43 mm
IDF curve parameters: A=3574.000
B= 19.000
C= 0.924
used in: INTENSITY = A / (t + B)^C
Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	3.36	1.00	29.13	2.00	15.89	3.00	5.24
0.08	3.68	1.08	47.79	2.08	13.89	3.08	4.93
0.17	4.06	1.17	98.38	2.17	12.28	3.17	4.65
0.25	4.51	1.25	189.90	2.25	10.96	3.25	4.40
0.33	5.08	1.33	119.63	2.33	9.87	3.33	4.17
0.42	5.77	1.42	77.23	2.42	8.95	3.42	3.96

0.50	6.66	1.50	54.63	2.50	8.18	3.50	3.77
0.58	7.83	1.58	41.06	2.58	7.51	3.58	3.60
0.67	9.40	1.67	32.23	2.67	6.93	3.67	3.44
0.75	11.60	1.75	26.13	2.75	6.42	3.75	3.29
0.83	14.86	1.83	21.72	2.83	5.98	3.83	3.15
0.92	20.04	1.92	18.43	2.92	5.59	3.92	3.03

| CALIB
| NASHYD (0100) |
ID= 1 DT= 5.0 min
Area (ha)= 136.98 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.17

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 4.537 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 32.598
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.386

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

| CALIB
| NASHYD (0201) |
ID= 1 DT= 5.0 min
Area (ha)= 14.60 Curve Number (CN)= 74.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.97

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.690 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 39.944
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.473

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

| CALIB
| STANDHYD (0203) |
ID= 1 DT= 5.0 min
Area (ha)= 8.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	189.90	104.78
over (min)	5.00	10.00
Storage Coeff. (min)=	0.81 (ii)	6.90 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.14

PEAK FLOW (cms)=	1.08	0.99	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	1.639 (iii)
			1.42

RUNOFF VOLUME (mm)= 82.43 41.59 51.80
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.49 0.61

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2200)|
| 1 + 2 = 3 |
=====
ID1= 1 ( 0201): 14.60 0.690 2.58 39.94
+ ID2= 2 ( 0203): 8.20 1.639 1.42 51.80
=====
ID = 3 ( 2200): 22.80 1.706 1.42 44.21
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| RESERVOIR( 5200)| 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 | 0.1980 0.2314
0.0040 0.0218 | 0.2920 0.2621
0.0060 0.0446 | 0.3980 0.2937
0.0070 0.0683 | 0.5150 0.3261
0.0080 0.0930 | 0.8290 0.3592
0.0090 0.1187 | 1.3520 0.3930
0.0230 0.1453 | 2.0570 0.4275
0.0610 0.1730 | 2.9590 0.4629
0.1200 0.2017 | 0.0000 0.0000
=====
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 2200) 22.800 1.706 1.42 44.21
OUTFLOW: ID= 1 ( 5200) 22.800 0.840 2.67 44.15
=====
PEAK FLOW REDUCTION [Qout/Qin](%)= 49.23
TIME SHIFT OF PEAK FLOW (min)= 75.00
MAXIMUM STORAGE USED (ha.m.)= 0.3599
```

```
| CALIB
| NASHYD ( 0205)|
| ID= 1 DT= 5.0 min |
=====
Area (ha)= 4.80 Curve Number (CN)= 90.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.668 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 61.867
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.733
```

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

```
| CALIB
| STANDHYD ( 0206)|
| ID= 1 DT= 5.0 min |
=====
Area (ha)= 0.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 104.78
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.81 (ii) 6.90 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

*TOTALS*
PEAK FLOW (cms)= 0.03 0.02 0.040 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 82.43 41.59 51.77
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.49 0.61
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2201)|
| 1 + 2 = 3 |
=====
ID1= 1 ( 0205): 4.80 0.668 1.83 61.87
+ ID2= 2 ( 0206): 0.20 0.040 1.42 51.77
=====
ID = 3 ( 2201): 5.00 0.683 1.83 61.46
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 2201)|
| 3 + 2 = 1 |
=====
ID1= 3 ( 2201): 5.00 0.683 1.83 61.46
+ ID2= 2 ( 5200): 22.80 0.840 2.67 44.15
=====
ID = 1 ( 2201): 27.80 1.195 2.25 47.26
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB
|
```

| STANDHYD (0209) | Area (ha)= 2.70
| ID= 1 DT= 5.0 min | Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.43 2.27
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 35.00 35.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 72.28
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.00 (ii) 9.64 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.11

TOTALS
PEAK FLOW (cms)= 0.11 0.31 0.358 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.50
RUNOFF VOLUME (mm)= 82.43 36.53 40.20
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.43 0.48

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (0207) | Area (ha)= 1.30
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.58 0.72
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 104.78
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.81 (ii) 6.90 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

TOTALS
PEAK FLOW (cms)= 0.17 0.16 0.260 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 82.43 41.59 51.80
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.49 0.61

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202) |
| 1 + 2 = 3 |
ID1= 1 (0207): AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
+ ID2= 2 (0209): 1.30 0.260 1.42 51.80
2.70 0.358 1.50 40.20
ID = 3 (2202): 4.00 0.610 1.42 43.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2202) |
| 3 + 2 = 1 |
ID1= 3 (2202): AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
+ ID2= 2 (2201): 4.00 0.610 1.42 43.97
27.80 1.195 2.25 47.26
ID = 1 (2202): 31.80 1.368 1.83 46.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2100) |
| 1 + 2 = 3 |
ID1= 1 (0100): AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
+ ID2= 2 (2202): 136.98 4.537 2.83 32.60
31.80 1.368 1.83 46.85
ID = 3 (2100): 168.78 5.637 2.75 35.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0302) | Area (ha)= 2.90 Curve Number (CN)= 74.0
| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.45

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.234 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 39.941
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.473

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

| CALIB
| STANDHYD (0304) | Area (ha)= 4.40
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.98 2.42

Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 104.78
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.86 (ii) 7.29 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

TOTALS
PEAK FLOW (cms)= 0.58 0.53 0.867 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 82.43 41.59 51.80
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.49 0.61

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)
1 + 2 = 3
ID1= 1 (0302): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0304): 2.90 0.234 1.92 39.94
4.40 0.867 1.42 51.80
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0308)
ID= 1 DT= 5.0 min
Area (ha)= 0.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 104.78
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.86 (ii) 7.29 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

TOTALS
PEAK FLOW (cms)= 0.03 0.02 0.039 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 82.43 41.59 51.78
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.49 0.61

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0310)
ID= 1 DT= 5.0 min
Area (ha)= 5.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 72.28
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.81 (ii) 7.88 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.13

TOTALS
PEAK FLOW (cms)= 0.24 0.71 0.803 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.50
RUNOFF VOLUME (mm)= 82.43 36.53 40.20
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.43 0.48

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)
1 + 2 = 3
ID1= 1 (2300): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0308): 7.30 0.941 1.42 47.09
0.20 0.039 1.42 51.78
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)
3 + 2 = 1
ID1= 3 (2301): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (0310): 7.50 0.980 1.42 47.21
5.70 0.803 1.50 40.20
=====

ID = 1 (2301): 13.20 1.782 1.42 44.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2302) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2100): 168.78 5.637 2.75 35.28 |
| + ID2= 2 ( 2301): 13.20 1.782 1.42 44.19 |
|=====|
| ID = 3 ( 2302): 181.98 5.927 2.67 35.93 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0400) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 82.86 |
| Total Imp(%)= 10.00 |
| Dir. Conn.(%)= 3.00 |
|-----|
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	8.29	74.57
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	0.70	2.00
Length (m)=	1437.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	154.76	68.11
over (min)=	10.00	25.00
Storage Coeff. (min)=	11.81 (ii)	20.04 (ii)
Unit Hyd. Tpeak (min)=	10.00	25.00
Unit Hyd. peak (cms)=	0.10	0.05

PEAK FLOW (cms)=	0.71	6.64	*TOTALS*
TIME TO PEAK (hrs)=	1.42	1.75	7.075 (iii)
RUNOFF VOLUME (mm)=	82.43	35.21	36.63
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.98	0.42	0.43

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 ( 2400) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2302): 181.98 5.927 2.67 35.93 |
| + ID2= 2 ( 0400): 82.86 7.075 1.75 36.63 |
|=====|
| ID = 3 ( 2400): 264.84 11.170 1.83 36.15 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTE CHN( 4400) |
| IN= 2---> OUT= 1 |
|-----|
Routing time step (min)'= 2.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550
96.60 409.10 0.0550
115.80 408.90 0.0550
124.80 409.10 0.0550
131.00 408.90 0.0550 / 0.0350 Main Channel
133.60 408.00 0.0350 Main Channel
134.40 407.60 0.0350 Main Channel
135.00 407.50 0.0350 Main Channel
135.80 407.60 0.0350 Main Channel
136.50 408.00 0.0350 Main Channel
139.40 408.80 0.0350 / 0.0550 Main Channel
143.50 408.90 0.0550
148.50 408.70 0.0550
163.80 408.90 0.0550
183.20 408.90 0.0550
243.70 409.70 0.0550
278.70 410.20 0.0550
330.50 411.40 0.0550
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.19 407.69 .366E+03 0.1 0.51 58.83
0.37 407.87 .106E+04 0.5 0.81 37.08
0.56 408.06 .199E+04 1.1 1.00 29.93
0.74 408.24 .328E+04 2.1 1.14 26.32
0.93 408.43 .498E+04 3.6 1.28 23.32
1.11 408.61 .708E+04 5.6 1.43 20.94
1.30 408.80 .105E+05 8.5 1.45 20.61
1.49 408.99 .247E+05 14.8 1.07 27.91
1.68 409.18 .601E+05 30.4 0.91 32.97
1.87 409.37 .109E+06 58.5 0.96 31.05
2.06 409.56 .166E+06 98.3 1.06 28.11
2.25 409.75 .231E+06 150.3 1.17 25.57
2.44 409.94 .303E+06 215.4 1.28 23.46
2.64 410.14 .383E+06 293.8 1.38 21.74
2.83 410.33 .470E+06 390.1 1.49 20.10
3.02 410.52 .563E+06 502.4 1.60 18.66
3.21 410.71 .660E+06 628.8 1.71 17.48
3.40 410.90 .762E+06 769.5 1.81 16.49
3.59 411.09 .868E+06 924.9 1.91 15.65
```

```
<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 2400) 264.84 11.17 1.83 36.15 1.38 1.26
OUTFLOW: ID= 1 ( 4400) 264.84 9.54 2.42 36.07 1.33 1.37
```

**** WARNING : THE HYD WAS CUT TO 2000 POINTS

```
-----
| CALIB |
| NASHYD ( 0515) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 5.01 |
| Ia (mm)= 1.50 |
| Curve Number (CN)= 65.0 |
| # of Linear Res.(N)= 3.00 |
|-----|
```

----- U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW (cms)= 0.328 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 31.300
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.371

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

| CALIB |
| NASHYD (0510) | Area (ha)= 91.44 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 1.09

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)= 3.635 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 36.841
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.436

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

| ROUTE CHN(4510) |
| IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.206E+02	0.0	0.19	101.61
0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0510)	91.44	3.64	2.75	36.84	1.08	1.08
OUTFLOW: ID= 1 (4510)	91.44	3.48	3.00	36.84	1.06	1.07

| CALIB |
| NASHYD (0517) | Area (ha)= 2.14 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.32

Unit Hyd Qpeak (cms)= 0.255

PEAK FLOW (cms)= 0.194 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 36.830
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.436

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

| CALIB |
| STANDHYD (0511) | Area (ha)= 52.87
| ID= 1 DT= 5.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	26.43	26.43
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	593.69	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	189.90	114.36
over (min)=	5.00	15.00
Storage Coeff. (min)=	5.76 (ii)	13.99 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.20	0.08

PEAK FLOW (cms)=	6.21	4.85	8.838 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.50
RUNOFF VOLUME (mm)=	83.63	44.13	55.98
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.99	0.52	0.66

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0516) | Area (ha)= 10.78
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	4.85	5.93	
Dep. Storage	(mm)=	0.80	1.50	
Average Slope	(%)=	1.00	1.00	
Length	(m)=	268.08	40.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		189.90	58.24	
over (min)		5.00	15.00	
Storage Coeff. (min)=		3.57 (ii)	14.36 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.26	0.08	
				TOTALS
PEAK FLOW (cms)=		2.21	0.62	2.415 (iii)
TIME TO PEAK (hrs)=		1.33	1.58	1.33
RUNOFF VOLUME (mm)=		83.63	36.84	57.90
TOTAL RAINFALL (mm)=		84.43	84.43	84.43
RUNOFF COEFFICIENT =		0.99	0.44	0.69

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2511)				
1 + 2 = 3				
ID1= 1 (0511):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (0516):	52.87	8.838	1.50	55.98
	10.78	2.415	1.33	57.90
ID = 3 (2511):	63.65	10.942	1.42	56.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(4511)	OVERFLOW IS OFF			
IN= 2--> OUT= 1				
DT= 5.0 min				
	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
**** WARNING : FIRST OUTFLOW IS NOT ZERO.				
	0.7700	0.9000	3.2130	1.6220
	1.6000	1.1400	3.9540	1.8810
	2.2900	1.2810	4.9000	2.3000
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2511)	63.650	10.942	1.42	56.30
OUTFLOW: ID= 1 (4511)	63.650	3.893	2.08	56.30

PEAK FLOW REDUCTION [Qout/Qin](%)= 35.58
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 1.8626

ADD HYD (2510)

1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (4510):	91.44	3.482	3.00	36.84	
+ ID2= 2 (4511):	63.65	3.893	2.08	56.30	
ID = 3 (2510):	155.09	6.454	2.58	44.82	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2510)				
3 + 2 = 1				
ID1= 3 (2510):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (0517):	155.09	6.454	2.58	44.82
	2.14	0.194	1.75	36.83
ID = 1 (2510):	157.23	6.517	2.58	44.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0512)	Area (ha)=	27.13	
ID= 1 DT= 5.0 min	Total Imp(%)=	50.00	Dir. Conn.(%)= 30.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	13.56	13.56
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	425.28	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	189.90	114.36
over (min)	5.00	15.00
Storage Coeff. (min)=	4.71 (ii)	11.40 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.22	0.09

			TOTALS
PEAK FLOW (cms)=	3.42	2.70	4.753 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.42
RUNOFF VOLUME (mm)=	83.63	44.13	55.98
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.99	0.52	0.66

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0513)	Area (ha)=	6.44	
ID= 1 DT= 5.0 min	Total Imp(%)=	65.00	Dir. Conn.(%)= 35.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.19	2.25
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00

Length (m)= 207.20 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 189.90 175.96
over (min)= 5.00 10.00
Storage Coeff. (min)= 3.06 (ii) 9.99 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.27 0.11
TOTALS
PEAK FLOW (cms)= 1.06 0.75 1.507 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 83.63 50.13 61.86
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.59 0.73

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| DUHYD (8512) |
| Inlet Cap.= 0.732 |
| #of Inlets= 1 |
| Total(cms)= 0.7 |
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
|=====|
TOTAL HYD.(ID= 1): 6.44 1.51 1.42 61.86
|=====|
MAJOR SYS.(ID= 2): 1.24 0.78 1.42 61.86
MINOR SYS.(ID= 3): 5.20 0.73 1.33 61.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2512) |
| 1 + 2 = 3 |
| ID1= 1 (0512): 27.13 4.753 1.42 55.98 |
| + ID2= 2 (8512): 5.20 0.732 1.33 61.86 |
|=====|
ID = 3 (2512): 32.33 5.485 1.42 56.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(5512) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
|=====|
OVERFLOW IS OFF
OUTFLOW STORAGE	OUTFLOW STORAGE
(cms) (ha.m.)	(cms) (ha.m.)
0.0000 0.0000	0.6640 0.9151
0.0210 0.1601	0.8570 1.0220
0.0360 0.3317	1.0660 1.1320
0.0410 0.4218	1.2900 1.2450
0.1000 0.5147	1.5290 1.3610
0.2030 0.6105	1.7810 1.4800
0.3340 0.7092	2.0460 1.6020
0.4890 0.8107	2.3220 1.7260

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2512) 32.335 5.485 1.42 56.92
OUTFLOW: ID= 1 (5512) 32.335 1.229 2.33 56.87

PEAK FLOW REDUCTION [Qout/Qin](%)= 22.40
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 1.2149

| ADD HYD (2514) |
| 1 + 2 = 3 |
| ID1= 1 (2510): 157.23 6.517 2.58 44.71 |
| + ID2= 2 (0515): 5.01 0.328 1.83 31.30 |
|=====|
ID = 3 (2514): 162.24 6.678 2.58 44.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2514) |
| 3 + 2 = 1 |
| ID1= 3 (2514): 162.24 6.678 2.58 44.30 |
| + ID2= 2 (5512): 32.33 1.229 2.33 56.87 |
|=====|
ID = 1 (2514): 194.57 7.884 2.50 46.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0058) | Area (ha)= 6.68 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.718 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 34.377
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.407

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

| ADD HYD (2513) |
| 1 + 2 = 3 |
| ID1= 1 (2514): 194.57 7.884 2.50 46.39 |
| + ID2= 2 (4400): 264.84 9.537 2.42 36.07 |
|=====|
ID = 3 (2513): 459.41 17.398 2.44 40.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 2513)|
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2513): 459.41 17.398 2.44 40.31
+ ID2= 2 ( 0058): 6.68 0.718 1.58 34.38
=====
ID = 1 ( 2513): 466.09 17.564 2.42 40.22

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB
| NASHYD ( 0520)|
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)= 108.36   Curve Number (CN)= 71.0
          Ia     (mm)= 5.00     # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)= 1.20

```

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 3.730 (i)
 TIME TO PEAK (hrs)= 2.833
 RUNOFF VOLUME (mm)= 34.443
 TOTAL RAINFALL (mm)= 84.430
 RUNOFF COEFFICIENT = 0.408

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

```

-----
| ADD HYD ( 2520)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2513): 466.09 17.564 2.42 40.22
+ ID2= 2 ( 0520): 108.36 3.730 2.83 34.44
=====
ID = 3 ( 2520): 574.45 21.008 2.50 39.13

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 4500)|
| IN= 2---> OUT= 1 |
-----
          Routing time step (min)'= 2.00

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance   Elevation   Manning
0.00       409.70       0.0550
19.70      408.80       0.0550
41.70      407.20       0.0550
60.50      405.30       0.0550
80.00      404.50       0.0550
95.70      404.60       0.0550 /0.0350 Main Channel
98.60      403.40       0.0350 Main Channel
100.40     403.40       0.0350 Main Channel
100.80     402.90       0.0350 Main Channel
101.50     402.70       0.0350 Main Channel
102.30     402.80       0.0350 Main Channel
103.30     403.20       0.0350 Main Channel
104.00     403.20       0.0350 Main Channel
105.60     404.40       0.0350 /0.0550 Main Channel
109.70     404.30       0.0550

```

```

128.60      404.20      0.0550
154.10      405.40      0.0550
179.10      406.70      0.0550
201.90      408.60      0.0550
224.20      410.60      0.0550

```

```

<----- TRAVEL TIME TABLE ----->
DEPTH   ELEV   VOLUME   FLOW RATE   VELOCITY   TRAV.TIME
(m)      (m)   (cu.m.)   (cms)       (m/s)      (min)
0.34    403.04   .954E+03   0.3         0.70       47.40
0.68    403.38   .304E+04   1.6         1.03       32.27
1.02    403.72   .718E+04   4.5         1.25       26.57
1.36    404.06   .122E+05   9.7         1.58       20.96
1.70    404.40   .251E+05   18.1        1.44       23.04
2.08    404.78   .650E+05   42.3        1.29       25.62
2.46    405.16   .122E+06   86.3        1.40       23.62
2.84    405.54   .192E+06   151.6       1.57       21.10
3.21    405.91   .270E+06   238.3       1.75       18.90
3.59    406.29   .357E+06   345.8       1.93       17.20
3.97    406.67   .452E+06   474.9       2.09       15.85
4.35    407.05   .554E+06   631.1       2.26       14.63
4.73    407.43   .663E+06   807.8       2.42       13.67
5.11    407.81   .779E+06   1006.4      2.57       12.89
5.49    408.19   .902E+06   1229.0      2.71       12.23
5.86    408.56   .103E+07   1476.4      2.84       11.66
6.24    408.94   .117E+07   1745.6      2.96       11.18
6.62    409.32   .132E+07   2034.5      3.07       10.79
7.00    409.70   .147E+07   2353.2      3.17       10.44

```

```

<---- hydrograph ---->
          AREA   QPEAK   TPEAK   R.V.   <-pipe / channel->
          (ha)   (cms)   (hrs)   (mm)   MAX DEPTH MAX VEL
INFLOW : ID= 2 ( 2520) 574.45 21.01 2.50 39.13 1.75 1.42
OUTFLOW: ID= 1 ( 4500) 574.45 19.52 3.00 39.13 1.72 1.43

```

```

-----
| CALIB
| NASHYD ( 0610)|
| ID= 1 DT= 5.0 min |
-----
          Area   (ha)= 78.05   Curve Number (CN)= 71.0
          Ia     (mm)= 5.00     # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)= 1.00

```

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 3.080 (i)
 TIME TO PEAK (hrs)= 2.583
 RUNOFF VOLUME (mm)= 34.443
 TOTAL RAINFALL (mm)= 84.430
 RUNOFF COEFFICIENT = 0.408

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

```

-----
| ADD HYD ( 2610)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 4500): 574.45 19.520 3.00 39.13
+ ID2= 2 ( 0610): 78.05 3.080 2.58 34.44
=====

```

ID = 3 (2610): 652.50 22.413 2.94 38.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0621) | Area (ha)= 6.56 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.37
```

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.492 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 33.502
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

```
-----
| CALIB
| NASHYD ( 0622) | Area (ha)= 9.69 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.36
```

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW (cms)= 0.737 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 33.502
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

```
-----
| CALIB
| NASHYD ( 0623) | Area (ha)= 19.37 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.45
```

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW (cms)= 1.288 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 33.506
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

```
-----
| CALIB
| NASHYD ( 0624) | Area (ha)= 11.84 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.51
```

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 0.727 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 33.507
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

```
-----
| CALIB
| NASHYD ( 0625) | Area (ha)= 6.72 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.39
```

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW (cms)= 0.488 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 33.503
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

```
-----
| ROUTE CHN( 4625) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
|-----
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          414.20        0.0360    Main Channel
4.30          412.70        0.0360    Main Channel
8.60          414.20        0.0360    Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH    ELEV    VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
(m)      (m)      (cu.m.)   (cms)        (m/s)      (min)
0.08     412.78   .108E+02   0.0          0.24       42.13
0.16     412.86   .434E+02   0.0          0.38       26.54
0.24     412.94   .976E+02   0.1          0.50       20.26
0.32     413.02   .174E+03   0.2          0.61       16.72
0.39     413.09   .271E+03   0.3          0.70       14.41
0.47     413.17   .390E+03   0.5          0.79       12.76
0.55     413.25   .532E+03   0.8          0.88       11.51
0.63     413.33   .694E+03   1.1          0.96       10.53
0.71     413.41   .879E+03   1.5          1.04       9.74
0.79     413.49   .108E+04   2.0          1.11       9.08
0.87     413.57   .131E+04   2.6          1.19       8.52
0.95     413.65   .156E+04   3.2          1.26       8.04
1.03     413.73   .183E+04   4.0          1.33       7.62
1.11     413.81   .213E+04   4.9          1.39       7.25
1.18     413.88   .244E+04   5.9          1.46       6.93
1.26     413.96   .278E+04   7.0          1.52       6.64
1.34     414.04   .313E+04   8.2          1.59       6.37
1.42     414.12   .351E+04   9.5          1.65       6.13
1.50     414.20   .392E+04   11.0         1.71       5.92
```

```
<---- hydrograph ----> <-pipe / channel->
AREA    QPEAK    TPEAK    R.V.    MAX DEPTH    MAX VEL
(ha)    (cms)    (hrs)    (mm)    (m)          (m/s)
INFLOW : ID= 2 ( 0625) 6.72    0.49    1.83    33.50    0.46    0.78
```


OUTFLOW: ID= 1 (4625) 6.72 0.44 2.08 33.47 0.44 0.76

CALIB
STANDHYD (0626)
ID= 1 DT= 5.0 min
Area (ha)= 1.06
Total Imp(%)= 60.00
Dir. Conn.(%)= 50.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.64 0.42
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 84.06 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 92.87
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.78 (ii) 6.78 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.32 0.14

PEAK FLOW (cms)= 0.27 0.08
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 83.43 40.67
TOTAL RAINFALL (mm)= 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.48
TOTALS
0.319 (iii)
0.73

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2625)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (4625): 6.72 0.436 2.08 33.47
+ ID2= 2 (0621): 6.56 0.492 1.83 33.50
=====

ID = 3 (2625): 13.28 0.896 1.92 33.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2625): 13.28 0.896 1.92 33.49
+ ID2= 2 (0622): 9.69 0.737 1.83 33.50
=====

ID = 1 (2625): 22.97 1.610 1.92 33.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2625): 22.97 1.610 1.92 33.49
+ ID2= 2 (0623): 19.37 1.288 1.92 33.51
=====

ID = 3 (2625): 42.34 2.898 1.92 33.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2625): 42.34 2.898 1.92 33.50
+ ID2= 2 (0624): 11.84 0.727 2.00 33.51
=====

ID = 1 (2625): 54.18 3.612 1.92 33.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2625): 54.18 3.612 1.92 33.50
+ ID2= 2 (0626): 1.06 0.319 1.33 62.05
=====

ID = 3 (2625): 55.24 3.675 1.92 34.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0627)
ID= 1 DT= 5.0 min
Area (ha)= 9.39
Ia (mm)= 5.00
U.H. Tp(hrs)= 0.20
Curve Number (CN)= 70.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.978 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 33.444
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.396

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

CALIB
STANDHYD (6240)
ID= 1 DT= 5.0 min
Area (ha)= 0.79
Total Imp(%)= 90.00
Dir. Conn.(%)= 70.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.71 0.08
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 20.00 20.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)=	189.90	356.02	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.61 (ii)	2.27 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.30	
			TOTALS
PEAK FLOW (cms)=	0.29	0.09	0.377 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	83.91	60.21	76.80
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.99	0.71	0.91

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)=	1.96	
STANDHYD (6210)	Total Imp(%)=	60.00	Dir. Conn.(%)= 40.00
ID= 1 DT= 5.0 min			

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.18	0.78
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	189.90	129.27	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.93 (ii)	7.30 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.14	
			TOTALS
PEAK FLOW (cms)=	0.41	0.21	0.527 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	83.91	45.60	60.92
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.99	0.54	0.72

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26240)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (6210):	1.96	0.527	1.33	60.92
+ ID2= 2 (6240):	0.79	0.377	1.33	76.80

ID = 3 (26240): 2.75 0.904 1.33 65.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(46240)	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	0.1390	0.0686
	0.0060	0.0042	0.1510	0.0822
	0.0130	0.0130	0.1630	0.0967
	0.0200	0.0250	0.1730	0.1121
	0.0250	0.0328	0.1780	0.1202
	0.0290	0.0439	2.5750	0.1742
	0.1260	0.0558	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (26240)	2.750	0.904	1.33	65.48
OUTFLOW: ID= 1 (46240)	2.750	0.167	1.92	65.42

PEAK FLOW REDUCTION [Qout/Qin](%)= 18.48
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= 0.1030

CALIB	Area (ha)=	0.92	
STANDHYD (6220)	Total Imp(%)=	40.00	Dir. Conn.(%)= 20.00
ID= 1 DT= 5.0 min			

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.37	0.55
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	189.90	106.62	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.93 (ii)	7.81 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.13	
			TOTALS
PEAK FLOW (cms)=	0.10	0.12	0.173 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.42
RUNOFF VOLUME (mm)=	83.91	42.81	51.03
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.99	0.51	0.60

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
RESERVOIR( 46220)
IN= 2---> OUT= 1
DT= 5.0 min
OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.2590 0.0708
0.0050 0.0089 | 0.2910 0.0871
0.0100 0.0187 | 0.3210 0.1045
0.0130 0.0298 | 0.3720 0.1438
0.0150 0.0422 | 2.8080 0.2087
0.2220 0.0559 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 6220) 0.920 0.173 1.42 51.03
OUTFLOW: ID= 1 ( 46220) 0.920 0.014 2.92 50.54

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.04
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.0355
```

```
CALIB
STANDHYD ( 6230)
ID= 1 DT= 5.0 min
Area (ha)= 0.48
Total Imp(%)= 10.00 Dir. Conn.(%)= 5.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.05 0.43
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 20.00 20.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 71.26
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.61 (ii) 5.94 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.15

*TOTALS*
PEAK FLOW (cms)= 0.01 0.07 0.073 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 83.91 37.17 39.50
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.44 0.47
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 ( 0004)
1 + 2 = 3
ID1= 1 ( 46220): AREA QPEAK TPEAK R.V.
+ ID2= 2 ( 46240): (ha) (cms) (hrs) (mm)
0.92 0.014 2.92 50.54
2.75 0.167 1.92 65.42
```

```
=====
ID = 3 ( 0004): 3.67 0.180 2.00 61.69
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
ADD HYD ( 0004)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 0004): 3.67 0.180 2.00 61.69
+ ID2= 2 ( 6230): 0.48 0.073 1.42 39.50
=====
ID = 1 ( 0004): 4.15 0.230 1.50 59.12
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
ROUTE CHN( 4620)
IN= 2---> OUT= 1
Routing time step (min)'= 2.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08
```

```
<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 0004) 4.15 0.23 1.50 59.12 0.25 1.19
OUTFLOW: ID= 1 ( 4620) 4.15 0.23 1.61 58.81 0.25 1.19
```

```
ADD HYD ( 0117)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
```

 (ha) (cms) (hrs) (mm)
ID1= 1 (2625): 55.24 3.675 1.92 34.05
+ ID2= 2 (4620): 4.15 0.227 1.61 58.81
=====

ID = 3 (0117): 59.39 3.884 1.92 35.78
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0117) |
3 + 2 = 1
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 3 (0117): 59.39 3.884 1.92 35.78
+ ID2= 2 (0627): 9.39 0.978 1.58 33.44
=====

ID = 1 (0117): 68.78 4.547 1.83 35.46
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0116) |
1 + 2 = 3
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 1 (0117): 68.78 4.547 1.83 35.46
+ ID2= 2 (2610): 652.50 22.413 2.94 38.57
=====

ID = 3 (0116): 721.28 24.103 2.83 38.27
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0637) |
ID= 1 DT= 5.0 min
 Area (ha)= 8.36 Curve Number (CN)= 70.0
 Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 U.H. Tp(hrs)= 0.47

Unit Hyd Qpeak (cms)= 0.679
PEAK FLOW (cms)= 0.539 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 33.506
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

| CALIB
| NASHYD (0630) |
ID= 1 DT= 5.0 min
 Area (ha)= 33.04 Curve Number (CN)= 70.0
 Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 U.H. Tp(hrs)= 0.38

Unit Hyd Qpeak (cms)= 3.321
PEAK FLOW (cms)= 2.438 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 33.503
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

| ROUTE CHN(4630) |
IN= 2---> OUT= 1
Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .893E+01 0.0 0.17 47.72
0.16 412.86 .357E+02 0.0 0.28 30.06
0.24 412.94 .804E+02 0.1 0.36 22.94
0.32 413.02 .143E+03 0.1 0.44 18.94
0.39 413.09 .223E+03 0.2 0.51 16.32
0.47 413.17 .322E+03 0.4 0.58 14.45
0.55 413.25 .438E+03 0.6 0.64 13.04
0.63 413.33 .572E+03 0.8 0.70 11.93
0.71 413.41 .724E+03 1.1 0.76 11.03
0.79 413.49 .893E+03 1.4 0.81 10.28
0.87 413.57 .108E+04 1.9 0.86 9.65
0.95 413.65 .129E+04 2.4 0.92 9.10
1.03 413.73 .151E+04 2.9 0.97 8.63
1.11 413.81 .175E+04 3.6 1.01 8.22
1.18 413.88 .201E+04 4.3 1.06 7.85
1.26 413.96 .229E+04 5.1 1.11 7.52
1.34 414.04 .258E+04 6.0 1.15 7.22
1.42 414.12 .289E+04 6.9 1.20 6.95
1.50 414.20 .323E+04 8.0 1.24 6.70

<---- hydrograph ----> <-pipe / channel->
 AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
 (ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0630) 33.04 2.44 1.83 33.50 0.96 0.92
OUTFLOW: ID= 1 (4630) 33.04 2.28 2.00 33.49 0.93 0.91

| ADD HYD (2637) |
1 + 2 = 3
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 1 (0116): 721.28 24.103 2.83 38.27
+ ID2= 2 (4630): 33.04 2.282 2.00 33.49
=====

ID = 3 (2637): 754.32 25.110 2.75 38.06
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2637) |
3 + 2 = 1
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 3 (2637): 754.32 25.110 2.75 38.06

+ ID2= 2 (0637): 8.36 0.539 1.92 33.51
=====

ID = 1 (2637): 762.68 25.386 2.72 38.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0636) Area (ha)= 3.32 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.48

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.212 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 33.506
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

ADD HYD (2636)
1 + 2 = 3
ID1= 1 (2637): 762.68 25.386 2.72 38.01
+ ID2= 2 (0636): 3.32 0.212 2.00 33.51
=====

ID = 3 (2636): 766.00 25.498 2.69 37.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0638) Area (ha)= 20.63 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.46

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 1.351 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 33.506
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

CALIB
NASHYD (0639) Area (ha)= 4.60 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.43

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.315 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 33.505

TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

ADD HYD (2630)
1 + 2 = 3
ID1= 1 (2636): 766.00 25.498 2.69 37.99
+ ID2= 2 (0638): 20.63 1.351 1.92 33.51
=====

ID = 3 (2630): 786.63 26.204 2.64 37.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2630)
3 + 2 = 1
ID1= 3 (2630): 786.63 26.204 2.64 37.87
+ ID2= 2 (0639): 4.60 0.315 1.92 33.50
=====

ID = 1 (2630): 791.23 26.361 2.64 37.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0709) Area (ha)= 21.19 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.65

Unit Hyd Qpeak (cms)= 1.245

PEAK FLOW (cms)= 1.106 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 33.508
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

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

FINISH

** SIMULATION : 100 year Fergus Shand Dam Chi **

CHICAGO STORM IDF curve parameters: A=4382.000
Ptotal= 94.08 mm B= 21.000
C= 0.939
used in: INTENSITY = A / (t + B)^C
Duration of storm = 4.00 hrs
Storm time step = 5.00 min

Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	'	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	3.55	1.00	33.31	'	2.00	18.02	3.00	5.69
0.08	3.91	1.08	54.51	'	2.08	15.69	3.08	5.34
0.17	4.34	1.17	109.99	'	2.17	13.83	3.17	5.02
0.25	4.86	1.25	205.33	'	2.25	12.30	3.25	4.73
0.33	5.50	1.33	132.84	'	2.33	11.04	3.33	4.47
0.42	6.30	1.42	87.25	'	2.42	9.97	3.42	4.24
0.50	7.33	1.50	62.23	'	2.50	9.07	3.50	4.02
0.58	8.67	1.58	46.93	'	2.58	8.30	3.58	3.82
0.67	10.48	1.67	36.86	'	2.67	7.63	3.67	3.64
0.75	13.04	1.75	29.86	'	2.75	7.05	3.75	3.48
0.83	16.82	1.83	24.77	'	2.83	6.54	3.83	3.32
0.92	22.83	1.92	20.96	'	2.92	6.09	3.92	3.18

Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=	205.33	122.38	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.79 (ii)	6.51 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.14	
TOTALS			
PEAK FLOW (cms)=	1.17	1.18	1.912 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.42
RUNOFF VOLUME (mm)=	92.08	49.10	59.84
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.98	0.52	0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0100)	Area (ha)= 136.98	Curve Number (CN)= 69.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.17		

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 5.477 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 39.053
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.415

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

CALIB			
NASHYD (0201)	Area (ha)= 14.60	Curve Number (CN)= 74.0	
ID= 1 DT= 5.0 min	Ia (mm)= 1.50	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.97		

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.820 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 47.141
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.501

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

CALIB			
STANDHYD (0203)	Area (ha)= 8.20	Dir. Conn.(%)= 25.00	
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00		

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.69 4.51
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00

ADD HYD (2200)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	14.60	0.820	2.58	47.14
+ ID2= 2 (0203):	8.20	1.912	1.42	59.84
ID = 3 (2200):	22.80	1.993	1.42	51.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)	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	0.1980	0.2314
	0.0040	0.0218	0.2920	0.2621
	0.0060	0.0446	0.3980	0.2937
	0.0070	0.0683	0.5150	0.3261
	0.0080	0.0930	0.8290	0.3592
	0.0090	0.1187	1.3520	0.3930
	0.0230	0.1453	2.0570	0.4275
	0.0610	0.1730	2.9590	0.4629
	0.1200	0.2017	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2200)	22.800	1.993	1.42	51.71
OUTFLOW: ID= 1 (5200)	22.800	1.037	2.50	51.65

PEAK FLOW REDUCTION [Qout/Qin](%)= 52.04
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.3727

CALIB			
NASHYD (0205)	Area (ha)= 4.80	Curve Number (CN)= 90.0	

| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00

 U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.768 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 70.945
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.754

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

| CALIB
| STANDHYD (0206) | Area (ha)= 0.20
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	122.38
over (min)	5.00	10.00
Storage Coeff. (min)=	0.79 (ii)	6.51 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.14

PEAK FLOW (cms)=	0.03	0.03	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	0.047 (iii)
RUNOFF VOLUME (mm)=	92.08	49.10	1.42
TOTAL RAINFALL (mm)=	94.08	94.08	59.82
RUNOFF COEFFICIENT =	0.98	0.52	94.08
			0.64

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. 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 (2201) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.

 (ha) (cms) (hrs) (mm)
ID1= 1 (0205): 4.80 0.768 1.83 70.94
+ ID2= 2 (0206): 0.20 0.047 1.42 59.82
=====

ID = 3 (2201): 5.00 0.785 1.83 70.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2201) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.

 (ha) (cms) (hrs) (mm)
ID1= 3 (2201): 5.00 0.785 1.83 70.50
+ ID2= 2 (5200): 22.80 1.037 2.50 51.65
=====

ID = 1 (2201): 27.80 1.567 2.17 55.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| STANDHYD (0209) | Area (ha)= 2.70
| ID= 1 DT= 5.0 min | Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.43	2.27
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	35.00	35.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	85.24
over (min)	5.00	10.00
Storage Coeff. (min)=	0.97 (ii)	9.06 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.12

PEAK FLOW (cms)=	0.12	0.38	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	0.432 (iii)
RUNOFF VOLUME (mm)=	92.08	43.49	1.50
TOTAL RAINFALL (mm)=	94.08	94.08	47.38
RUNOFF COEFFICIENT =	0.98	0.46	94.08
			0.50

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (0207) | Area (ha)= 1.30
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.58	0.72
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	122.38
over (min)	5.00	10.00
Storage Coeff. (min)=	0.79 (ii)	6.51 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.14

PEAK FLOW (cms)=	0.19	0.19	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	0.303 (iii)
			1.42

RUNOFF VOLUME (mm)= 92.08 49.10 59.84
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.52 0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0207):	1.30	0.303	1.42	59.84
+ ID2= 2 (0209):	2.70	0.432	1.50	47.38
=====				
ID = 3 (2202):	4.00	0.725	1.42	51.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2202):	4.00	0.725	1.42	51.43
+ ID2= 2 (2201):	27.80	1.567	2.17	55.04
=====				
ID = 1 (2202):	31.80	1.765	2.08	54.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2100)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0100):	136.98	5.477	2.83	39.05
+ ID2= 2 (2202):	31.80	1.765	2.08	54.59
=====				
ID = 3 (2100):	168.78	6.786	2.67	41.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	2.90	Curve Number (CN)=	74.0
NASHYD (0302)	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.45		

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.277 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 47.137
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.501

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

CALIB	Area (ha)=	4.40	Dir. Conn.(%)=	25.00
STANDHYD (0304)	Total Imp(%)=	45.00		
ID= 1 DT= 5.0 min				

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.98	2.42
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	122.38
over (min)	5.00	10.00
Storage Coeff. (min)=	0.83 (ii)	6.88 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.14

PEAK FLOW (cms)=	0.63	0.63	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	1.012 (iii)
RUNOFF VOLUME (mm)=	92.08	49.10	1.42
TOTAL RAINFALL (mm)=	94.08	94.08	59.84
RUNOFF COEFFICIENT =	0.98	0.52	94.08
			0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0302):	2.90	0.277	1.92	47.14
+ ID2= 2 (0304):	4.40	1.012	1.42	59.84
=====				
ID = 3 (2300):	7.30	1.100	1.42	54.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	0.20	Dir. Conn.(%)=	25.00
STANDHYD (0308)	Total Imp(%)=	45.00		
ID= 1 DT= 5.0 min				

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	122.38
over (min)	5.00	10.00
Storage Coeff. (min)=	0.83 (ii)	6.88 (ii)

Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.14	
TOTALS			
PEAK FLOW (cms)=	0.03	0.03	0.046 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.42
RUNOFF VOLUME (mm)=	92.08	49.10	59.82
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.98	0.52	0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)=	5.70	
STANDHYD (0310)	Total Imp(%)=	16.00	Dir. Conn.(%)= 8.00
ID= 1 DT= 5.0 min			

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.91	4.79
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	85.24
over (min)	5.00	10.00
Storage Coeff. (min)=	0.79 (ii)	7.40 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

TOTALS			
PEAK FLOW (cms)=	0.26	0.85	0.965 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.42
RUNOFF VOLUME (mm)=	92.08	43.49	47.38
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.98	0.46	0.50

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2300):	7.30	1.100	1.42	54.80
+ ID2= 2 (0308):	0.20	0.046	1.42	59.82
ID = 3 (2301):	7.50	1.146	1.42	54.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2301):	7.50	1.146	1.42	54.93
+ ID2= 2 (0310):	5.70	0.965	1.42	47.38
ID = 1 (2301):	13.20	2.111	1.42	51.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2302)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2100):	168.78	6.786	2.67	41.98
+ ID2= 2 (2301):	13.20	2.111	1.42	51.67
ID = 3 (2302):	181.98	7.131	2.67	42.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	82.86	
STANDHYD (0400)	Total Imp(%)=	10.00	Dir. Conn.(%)= 3.00
ID= 1 DT= 5.0 min			

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	8.29	74.57
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	0.70	2.00
Length (m)=	1437.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	169.08	80.49
over (min)	10.00	20.00
Storage Coeff. (min)=	11.40 (ii)	19.10 (ii)
Unit Hyd. Tpeak (min)=	10.00	20.00
Unit Hyd. peak (cms)=	0.10	0.06

TOTALS			
PEAK FLOW (cms)=	0.80	8.26	8.850 (iii)
TIME TO PEAK (hrs)=	1.42	1.67	1.67
RUNOFF VOLUME (mm)=	92.08	42.01	43.51
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.98	0.45	0.46

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2400)

```
| 1 + 2 = 3 |
-----
ID1= 1 ( 2302): 181.98 7.131 2.67 42.68
+ ID2= 2 ( 0400): 82.86 8.850 1.67 43.51
=====
ID = 3 ( 2400): 264.84 13.550 1.75 42.94
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN( 4400) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 2.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550
96.60 409.10 0.0550
115.80 408.90 0.0550
124.80 409.10 0.0550
131.00 408.90 0.0550 / 0.0350 Main Channel
133.60 408.00 0.0350 Main Channel
134.40 407.60 0.0350 Main Channel
135.00 407.50 0.0350 Main Channel
135.80 407.60 0.0350 Main Channel
136.50 408.00 0.0350 Main Channel
139.40 408.80 0.0350 / 0.0550 Main Channel
143.50 408.90 0.0550
148.50 408.70 0.0550
163.80 408.90 0.0550
183.20 408.90 0.0550
243.70 409.70 0.0550
278.70 410.20 0.0550
330.50 411.40 0.0550
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.19 407.69 .366E+03 0.1 0.51 58.83
0.37 407.87 .106E+04 0.5 0.81 37.08
0.56 408.06 .199E+04 1.1 1.00 29.93
0.74 408.24 .328E+04 2.1 1.14 26.32
0.93 408.43 .498E+04 3.6 1.28 23.32
1.11 408.61 .708E+04 5.6 1.43 20.94
1.30 408.80 .105E+05 8.5 1.45 20.61
1.49 408.99 .247E+05 14.8 1.07 27.91
1.68 409.18 .601E+05 30.4 0.91 32.97
1.87 409.37 .109E+06 58.5 0.96 31.05
2.06 409.56 .166E+06 98.3 1.06 28.11
2.25 409.75 .231E+06 150.3 1.17 25.57
2.44 409.94 .303E+06 215.4 1.28 23.46
2.64 410.14 .383E+06 293.8 1.38 21.74
2.83 410.33 .470E+06 390.1 1.49 20.10
3.02 410.52 .563E+06 502.4 1.60 18.66
3.21 410.71 .660E+06 628.8 1.71 17.48
3.40 410.90 .762E+06 769.5 1.81 16.49
3.59 411.09 .868E+06 924.9 1.91 15.65
```

```
<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 2400) 264.84 13.55 1.75 42.94 1.45 1.13
```

OUTFLOW: ID= 1 (4400) 264.84 11.20 2.42 42.86 1.38 1.26

**** WARNING : THE HYD WAS CUT TO 2000 POINTS

```
| CALIB
| NASHYD ( 0515) | Area (ha)= 5.01 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.41
```

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW (cms)= 0.393 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 37.368
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.397

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

```
| CALIB
| NASHYD ( 0510) | Area (ha)= 91.44 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 1.09
```

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)= 4.338 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 43.658
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.464

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

```
| ROUTE CHN( 4510) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .206E+02 0.0 0.19 101.61
0.16 412.86 .822E+02 0.0 0.30 64.01
0.24 412.94 .185E+03 0.1 0.39 48.85
0.32 413.02 .329E+03 0.1 0.48 40.33
0.39 413.09 .514E+03 0.2 0.55 34.75
0.47 413.17 .740E+03 0.4 0.62 30.77
0.55 413.25 .101E+04 0.6 0.69 27.77
0.63 413.33 .132E+04 0.9 0.75 25.40
0.71 413.41 .166E+04 1.2 0.82 23.48
0.79 413.49 .206E+04 1.6 0.88 21.89
```

0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (	0510)	91.44	4.34	2.67	43.66	1.16	1.13
OUTFLOW: ID= 1 (	4510)	91.44	4.17	3.00	43.65	1.14	1.11

CALIB					
NASHYD (	0517)	Area (ha)=	2.14	Curve Number (CN)=	71.0
ID= 1 DT= 5.0 min		Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
		U.H. Tp(hrs)=	0.32		

Unit Hyd Qpeak	(cms)=	0.255
PEAK FLOW	(cms)=	0.231 (i)
TIME TO PEAK	(hrs)=	1.750
RUNOFF VOLUME	(mm)=	43.645
TOTAL RAINFALL	(mm)=	94.082
RUNOFF COEFFICIENT	=	0.464

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

CALIB					
STANDHYD (	0511)	Area (ha)=	52.87		
ID= 1 DT= 5.0 min		Total Imp(%)=	50.00	Dir. Conn.(%)=	30.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	26.43	26.43
Dep. Storage	(mm)=	0.80	1.50
Average Slope	(%)=	1.00	1.00
Length	(m)=	593.69	40.00
Mannings n	=	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	132.52
over (min)	5.00	15.00
Storage Coeff. (min)=	5.58 (ii)	13.34 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.20	0.08

PEAK FLOW	(cms)=	6.85	5.80	*TOTALS*
TIME TO PEAK	(hrs)=	1.33	1.58	10.226 (iii)
RUNOFF VOLUME	(mm)=	93.28	51.77	64.22
TOTAL RAINFALL	(mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT	=	0.99	0.55	0.68

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (	0516)	Area (ha)=	10.78		
ID= 1 DT= 5.0 min		Total Imp(%)=	45.00	Dir. Conn.(%)=	45.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.85	5.93
Dep. Storage	(mm)=	0.80	1.50
Average Slope	(%)=	1.00	1.00
Length	(m)=	268.08	40.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=	205.33	77.66	
over (min)	5.00	15.00	
Storage Coeff. (min)=	3.46 (ii)	13.08 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.26	0.08	

PEAK FLOW	(cms)=	2.42	0.77	*TOTALS*
TIME TO PEAK	(hrs)=	1.33	1.58	2.681 (iii)
RUNOFF VOLUME	(mm)=	93.28	43.66	1.33
TOTAL RAINFALL	(mm)=	94.08	94.08	65.99
RUNOFF COEFFICIENT	=	0.99	0.46	94.08
				0.70

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (	2511)				
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (	0511):	52.87	10.226	1.50	64.22
+ ID2= 2 (	0516):	10.78	2.681	1.33	65.99
=====					
ID = 3 (	2511):	63.65	12.493	1.42	64.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(	4511)	OVERFLOW IS OFF			
IN= 2---> OUT= 1					
DT= 5.0 min		OUTFLOW	STORAGE	OUTFLOW	STORAGE
		(cms)	(ha.m.)	(cms)	(ha.m.)
***** WARNING : FIRST OUTFLOW IS NOT ZERO.					
		0.7700	0.9000	3.2130	1.6220
		1.6000	1.1400	3.9540	1.8810
		2.2900	1.2810	4.9000	2.3000

		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (	2511)	63.650	12.493	1.42	64.52

OUTFLOW: ID= 1 (4511) 63.650 4.489 2.08 64.52

PEAK FLOW REDUCTION [Qout/Qin](%)= 35.93
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 2.1214

```
-----
| ADD HYD ( 2510) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 4510):  91.44  4.166   3.00  43.65
+ ID2= 2 ( 4511):  63.65  4.489   2.08  64.52
=====
ID = 3 ( 2510):  155.09  7.715   2.58  52.21
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2510) |
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2510):  155.09  7.715   2.58  52.21
+ ID2= 2 ( 0517):   2.14  0.231   1.75  43.65
=====
ID = 1 ( 2510):  157.23  7.789   2.58  52.10
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 0512) |
| ID= 1 DT= 5.0 min |
-----
          Area (ha)= 27.13
          Total Imp(%)= 50.00  Dir. Conn.(%)= 30.00

          IMPERVIOUS   PERVIOUS (i)
Surface Area (ha)= 13.56  13.56
Dep. Storage (mm)= 0.80   1.50
Average Slope (%)= 1.00   2.00
Length (m)= 425.28  40.00
Mannings n = 0.013  0.250

Max.Eff.Inten.(mm/hr)= 205.33  132.52
over (min)= 5.00  15.00
Storage Coeff. (min)= 4.57 (ii)  10.87 (ii)
Unit Hyd. Tpeak (min)= 5.00  15.00
Unit Hyd. peak (cms)= 0.23  0.09

          *TOTALS*
PEAK FLOW (cms)= 3.76  3.21  5.472 (iii)
TIME TO PEAK (hrs)= 1.33  1.58  1.50
RUNOFF VOLUME (mm)= 93.28  51.77  64.22
TOTAL RAINFALL (mm)= 94.08  94.08  94.08
RUNOFF COEFFICIENT = 0.99  0.55  0.68
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 0513) |
| ID= 1 DT= 5.0 min |
-----
          Area (ha)= 6.44
          Total Imp(%)= 65.00  Dir. Conn.(%)= 35.00
```

```

          IMPERVIOUS   PERVIOUS (i)
Surface Area (ha)= 4.19  2.25
Dep. Storage (mm)= 0.80  1.50
Average Slope (%)= 1.00  1.00
Length (m)= 207.20  40.00
Mannings n = 0.013  0.250

Max.Eff.Inten.(mm/hr)= 205.33  202.03
over (min)= 5.00  10.00
Storage Coeff. (min)= 2.97 (ii)  9.52 (ii)
Unit Hyd. Tpeak (min)= 5.00  10.00
Unit Hyd. peak (cms)= 0.28  0.12
```

```

          *TOTALS*
PEAK FLOW (cms)= 1.16  0.88  1.720 (iii)
TIME TO PEAK (hrs)= 1.33  1.50  1.42
RUNOFF VOLUME (mm)= 93.28  58.34  70.57
TOTAL RAINFALL (mm)= 94.08  94.08  94.08
RUNOFF COEFFICIENT = 0.99  0.62  0.75
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| DUHYD ( 8512) |
| Inlet Cap.= 0.732 |
| #of Inlets= 1 |
| Total(cms)= 0.7 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
TOTAL HYD.(ID= 1):  6.44  1.72  1.42  70.57
=====
MAJOR SYS.(ID= 2):  1.54  0.99  1.42  70.57
MINOR SYS.(ID= 3):  4.90  0.73  1.25  70.57
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2512) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0512):  27.13  5.472   1.50  64.22
+ ID2= 2 ( 8512):  4.90  0.732   1.25  70.57
=====
ID = 3 ( 2512):  32.03  6.204   1.50  65.19
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 5512) |
| IN= 2--> OUT= 1 |
-----
          OVERFLOW IS OFF
```


DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.6640	0.9151
	0.0210	0.1601	0.8570	1.0220
	0.0360	0.3317	1.0660	1.1320
	0.0410	0.4218	1.2900	1.2450
	0.1000	0.5147	1.5290	1.3610
	0.2030	0.6105	1.7810	1.4800
	0.3340	0.7092	2.0460	1.6020
	0.4890	0.8107	2.3220	1.7260

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2512)	32.033	6.204	1.50	65.19
OUTFLOW: ID= 1 (5512)	32.033	1.506	2.25	65.13

PEAK FLOW REDUCTION [Qout/Qin](%)= 24.27
TIME SHIFT OF PEAK FLOW (min)= 45.00
MAXIMUM STORAGE USED (ha.m.)= 1.3505

ADD HYD (2514)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2510):	157.23	7.789	2.58	52.10
+ ID2= 2 (0515):	5.01	0.393	1.83	37.37
ID = 3 (2514):	162.24	7.983	2.58	51.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2514)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (2514):	162.24	7.983	2.58	51.64
+ ID2= 2 (5512):	32.03	1.506	2.25	65.13
ID = 1 (2514):	194.27	9.433	2.50	53.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	6.68	Curve Number (CN)=	71.0
NASHYD (0058)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.20		

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.861 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 41.075
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.437

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

ADD HYD (2513)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2514):	194.27	9.433	2.50	53.87
+ ID2= 2 (4400):	264.84	11.202	2.42	42.86
ID = 3 (2513):	459.11	20.598	2.47	47.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2513)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (2513):	459.11	20.598	2.47	47.38
+ ID2= 2 (0058):	6.68	0.861	1.58	41.08
ID = 1 (2513):	465.79	20.788	2.44	47.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	108.36	Curve Number (CN)=	71.0
NASHYD (0520)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	1.20		

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 4.491 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 41.154
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.437

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

ADD HYD (2520)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2513):	465.79	20.788	2.44	47.29
+ ID2= 2 (0520):	108.36	4.491	2.83	41.15
ID = 3 (2520):	574.15	24.972	2.58	46.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4500)	Routing time step (min)='	2.00
IN= 2---> OUT= 1		

<----- DATA FOR SECTION (1.1) ----->		
Distance	Elevation	Manning
0.00	409.70	0.0550
19.70	408.80	0.0550
41.70	407.20	0.0550
60.50	405.30	0.0550
80.00	404.50	0.0550

95.70	404.60	0.0550 /0.0350	Main Channel
98.60	403.40	0.0350	Main Channel
100.40	403.40	0.0350	Main Channel
100.80	402.90	0.0350	Main Channel
101.50	402.70	0.0350	Main Channel
102.30	402.80	0.0350	Main Channel
103.30	403.20	0.0350	Main Channel
104.00	403.20	0.0350	Main Channel
105.60	404.40	0.0350 /0.0550	Main Channel
109.70	404.30	0.0550	
128.60	404.20	0.0550	
154.10	405.40	0.0550	
179.10	406.70	0.0550	
201.90	408.60	0.0550	
224.20	410.60	0.0550	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.34	403.04	.954E+03	0.3	0.70	47.40
0.68	403.38	.304E+04	1.6	1.03	32.27
1.02	403.72	.718E+04	4.5	1.25	26.57
1.36	404.06	.122E+05	9.7	1.58	20.96
1.70	404.40	.251E+05	18.1	1.44	23.04
2.08	404.78	.650E+05	42.3	1.29	25.62
2.46	405.16	.122E+06	86.3	1.40	23.62
2.84	405.54	.192E+06	151.6	1.57	21.10
3.21	405.91	.270E+06	238.3	1.75	18.90
3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (2520)	574.15	24.97	2.58	46.13	1.81	1.39
OUTFLOW: ID= 1 (4500)	574.15	23.26	3.03	46.13	1.78	1.41

ADD HYD (2610)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (4500):	574.15	23.255	3.03	46.13
+ ID2= 2 (0610):	78.05	3.712	2.58	41.15
ID = 3 (2610):	652.20	26.709	2.97	45.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	6.56	Curve Number (CN)=	70.0
NASHYD (0621)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.37		

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW	(cms)=	0.593 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	40.084
TOTAL RAINFALL	(mm)=	94.082
RUNOFF COEFFICIENT	=	0.426

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

CALIB	Area (ha)=	9.69	Curve Number (CN)=	70.0
NASHYD (0622)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.36		

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW	(cms)=	0.888 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	40.083
TOTAL RAINFALL	(mm)=	94.082
RUNOFF COEFFICIENT	=	0.426

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

CALIB	Area (ha)=	19.37	Curve Number (CN)=	70.0
NASHYD (0623)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.45		

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW	(cms)=	1.554 (i)
TIME TO PEAK	(hrs)=	1.917
RUNOFF VOLUME	(mm)=	40.088
TOTAL RAINFALL	(mm)=	94.082
RUNOFF COEFFICIENT	=	0.426

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

CALIB	Area (ha)=	78.05	Curve Number (CN)=	71.0
NASHYD (0610)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	1.00		

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW	(cms)=	3.712 (i)
TIME TO PEAK	(hrs)=	2.583
RUNOFF VOLUME	(mm)=	41.153
TOTAL RAINFALL	(mm)=	94.082
RUNOFF COEFFICIENT	=	0.437

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

| CALIB
| NASHYD (0624) | Area (ha)= 11.84 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.51

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 0.877 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 40.089
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

| CALIB
| NASHYD (0625) | Area (ha)= 6.72 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.39

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW (cms)= 0.588 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.085
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

| ROUTE CHN(4625) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0360	Main Channel
4.30	412.70	0.0360	Main Channel
8.60	414.20	0.0360	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.108E+02	0.0	0.24	42.13
0.16	412.86	.434E+02	0.0	0.38	26.54
0.24	412.94	.976E+02	0.1	0.50	20.26
0.32	413.02	.174E+03	0.2	0.61	16.72
0.39	413.09	.271E+03	0.3	0.70	14.41
0.47	413.17	.390E+03	0.5	0.79	12.76
0.55	413.25	.532E+03	0.8	0.88	11.51
0.63	413.33	.694E+03	1.1	0.96	10.53
0.71	413.41	.879E+03	1.5	1.04	9.74
0.79	413.49	.108E+04	2.0	1.11	9.08
0.87	413.57	.131E+04	2.6	1.19	8.52
0.95	413.65	.156E+04	3.2	1.26	8.04
1.03	413.73	.183E+04	4.0	1.33	7.62
1.11	413.81	.213E+04	4.9	1.39	7.25

1.18	413.88	.244E+04	5.9	1.46	6.93
1.26	413.96	.278E+04	7.0	1.52	6.64
1.34	414.04	.313E+04	8.2	1.59	6.37
1.42	414.12	.351E+04	9.5	1.65	6.13
1.50	414.20	.392E+04	11.0	1.71	5.92

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0625) 6.72 0.59 1.83 40.09 0.50 0.82
OUTFLOW : ID= 1 (4625) 6.72 0.53 2.00 40.05 0.48 0.80

| CALIB
| STANDHYD (0626) | Area (ha)= 1.06
| ID= 1 DT= 5.0 min | Total Imp(%)= 60.00 Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.64	0.42
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	84.06	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	108.17
over (min)	5.00	10.00
Storage Coeff. (min)=	1.73 (ii)	6.57 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.32	0.14

PEAK FLOW (cms)=	0.29	0.10	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	0.352 (iii)
RUNOFF VOLUME (mm)=	93.08	47.94	1.33
TOTAL RAINFALL (mm)=	94.08	94.08	70.51
RUNOFF COEFFICIENT =	0.99	0.51	94.08
			0.75

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2625) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (4625): 6.72 0.532 2.00 40.05
+ ID2= 2 (0621): 6.56 0.593 1.83 40.08
=====

ID = 3 (2625): 13.28 1.089 1.92 40.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)

3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2625):	13.28	1.089	1.92	40.07
+ ID2= 2 (0622):	9.69	0.888	1.83	40.08
ID = 1 (2625):	22.97	1.949	1.92	40.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2625):	22.97	1.949	1.92	40.07
+ ID2= 2 (0623):	19.37	1.554	1.92	40.09
ID = 3 (2625):	42.34	3.503	1.92	40.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (2625):	42.34	3.503	1.92	40.08
+ ID2= 2 (0624):	11.84	0.877	2.00	40.09
ID = 1 (2625):	54.18	4.365	1.92	40.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2625):	54.18	4.365	1.92	40.08
+ ID2= 2 (0626):	1.06	0.352	1.33	70.51
ID = 3 (2625):	55.24	4.438	1.92	40.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	9.39	Curve Number (CN)=	70.0
NASHYD (0627)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.20		

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 1.174 (i)
 TIME TO PEAK (hrs)= 1.583
 RUNOFF VOLUME (mm)= 40.015
 TOTAL RAINFALL (mm)= 94.082
 RUNOFF COEFFICIENT = 0.425

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

CALIB	Area (ha)=	0.79		
STANDHYD (6240)	Total Imp(%)=	90.00	Dir. Conn.(%)=	70.00
ID= 1 DT= 5.0 min				

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.71	0.08
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	20.00	20.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	402.32
over (min)	5.00	5.00
Storage Coeff. (min)=	0.59 (ii)	2.20 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.30

TOTALS

PEAK FLOW (cms)=	0.32	0.10	0.412 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	93.56	69.23	86.26
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.99	0.74	0.92

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 74.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)=	1.96		
STANDHYD (6210)	Total Imp(%)=	60.00	Dir. Conn.(%)=	40.00
ID= 1 DT= 5.0 min				

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.18	0.78
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	150.29
over (min)	5.00	10.00
Storage Coeff. (min)=	0.90 (ii)	6.89 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.14

TOTALS

PEAK FLOW (cms)=	0.45	0.25	0.588 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	93.56	53.60	69.58
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.99	0.57	0.74

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 74.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26240)				
1 + 2 = 3				
ID1= 1 (6210):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (6240):	1.96	0.588	1.33	69.58
ID = 3 (26240):	2.75	1.000	1.33	74.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(46240)				
IN= 2---> OUT= 1				
DT= 5.0 min				
OVERFLOW IS OFF				
OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
0.0000	0.0000	0.1390	0.0686	
0.0060	0.0042	0.1510	0.0822	
0.0130	0.0130	0.1630	0.0967	
0.0200	0.0250	0.1730	0.1121	
0.0250	0.0328	0.1780	0.1202	
0.0290	0.0439	2.5750	0.1742	
0.1260	0.0558	0.0000	0.0000	
INFLOW : ID= 2 (26240)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
OUTFLOW: ID= 1 (46240)	2.750	1.000	1.33	74.37
	2.750	0.177	2.00	74.31

PEAK FLOW REDUCTION [Qout/Qin](%)= 17.73
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 0.1192

CALIB			
STANDHYD (6220)			
ID= 1 DT= 5.0 min			
Area (ha)=	0.92	Dir. Conn.(%)=	20.00
Total Imp(%)=	40.00		
IMPERVIOUS	PERVIOUS (i)		
Surface Area (ha)=	0.37	0.55	
Dep. Storage (mm)=	0.52	7.16	
Average Slope (%)=	2.00	2.00	
Length (m)=	40.00	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	205.33	124.69	
over (min)=	5.00	10.00	
Storage Coeff. (min)=	0.90 (ii)	7.36 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.13	
PEAK FLOW (cms)=	0.10	0.14	0.204 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.42
RUNOFF VOLUME (mm)=	93.56	50.56	59.16
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.99	0.54	0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%

RESERVOIR(46220)				
IN= 2---> OUT= 1				
DT= 5.0 min				
OVERFLOW IS OFF				
OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
0.0000	0.0000	0.2590	0.0708	
0.0050	0.0089	0.2910	0.0871	
0.0100	0.0187	0.3210	0.1045	
0.0130	0.0298	0.3720	0.1438	
0.0150	0.0422	2.8080	0.2087	
0.2220	0.0559	0.0000	0.0000	
INFLOW : ID= 2 (6220)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
OUTFLOW: ID= 1 (46220)	0.920	0.204	1.42	59.16
	0.920	0.015	3.00	58.67

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.34
TIME SHIFT OF PEAK FLOW (min)= 95.00
MAXIMUM STORAGE USED (ha.m.)= 0.0420

CALIB			
STANDHYD (6230)			
ID= 1 DT= 5.0 min			
Area (ha)=	0.48	Dir. Conn.(%)=	5.00
Total Imp(%)=	10.00		
IMPERVIOUS	PERVIOUS (i)		
Surface Area (ha)=	0.05	0.43	
Dep. Storage (mm)=	0.52	7.16	
Average Slope (%)=	2.00	2.00	
Length (m)=	20.00	20.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	205.33	84.41	
over (min)=	5.00	10.00	
Storage Coeff. (min)=	0.59 (ii)	5.58 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.16	
PEAK FLOW (cms)=	0.01	0.08	*TOTALS* 0.088 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.42
RUNOFF VOLUME (mm)=	93.56	44.35	46.80
TOTAL RAINFALL (mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT =	0.99	0.47	0.50

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

INFLOW : ID= 2 (0004) 4.15 0.25 1.50 67.66 0.26 1.22
OUTFLOW: ID= 1 (4620) 4.15 0.25 1.58 67.35 0.26 1.21

```
| ADD HYD ( 0004) |
| 1 + 2 = 3 |
=====
ID1= 1 ( 46220): 0.92 0.015 3.00 58.67
+ ID2= 2 ( 46240): 2.75 0.177 2.00 74.31
=====
ID = 3 ( 0004): 3.67 0.191 2.00 70.39
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 0004) |
| 3 + 2 = 1 |
=====
ID1= 3 ( 0004): 3.67 0.191 2.00 70.39
+ ID2= 2 ( 6230): 0.48 0.088 1.42 46.80
=====
ID = 1 ( 0004): 4.15 0.255 1.50 67.66
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN( 4620) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 2.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08
```

```
<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
```

```
| ADD HYD ( 0117) |
| 1 + 2 = 3 |
=====
ID1= 1 ( 2625): 55.24 4.438 1.92 40.67
+ ID2= 2 ( 4620): 4.15 0.249 1.58 67.35
=====
ID = 3 ( 0117): 59.39 4.663 1.92 42.53
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 0117) |
| 3 + 2 = 1 |
=====
ID1= 3 ( 0117): 59.39 4.663 1.92 42.53
+ ID2= 2 ( 0627): 9.39 1.174 1.58 40.01
=====
ID = 1 ( 0117): 68.78 5.462 1.83 42.19
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 0116) |
| 1 + 2 = 3 |
=====
ID1= 1 ( 0117): 68.78 5.462 1.83 42.19
+ ID2= 2 ( 2610): 652.20 26.709 2.97 45.53
=====
ID = 3 ( 0116): 720.98 28.679 2.83 45.21
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB
| NASHYD ( 0637) | Area (ha)= 8.36 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.47
```

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 0.650 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 40.088
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

```
| CALIB
| NASHYD ( 0630) | Area (ha)= 33.04 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
```


----- U.H. Tp(hrs)= 0.38

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 2.939 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.085
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

| ROUTE CHN(4630)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

<---- hydrograph ---->

<-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0630)	33.04	2.94	1.83	40.08	1.03	0.97
OUTFLOW : ID= 1 (4630)	33.04	2.76	2.00	40.08	1.00	0.95

ID = 3 (2637): 754.02 29.867 2.72 44.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2637)|
3 + 2 = 1
ID1= 3 (2637): 754.02 29.867 2.72 44.99
+ ID2= 2 (0637): 8.36 0.650 1.92 40.09
=====

ID = 1 (2637): 762.38 30.198 2.72 44.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0636)|
ID= 1 DT= 5.0 min
Area (ha)= 3.32 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.48

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.255 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 40.088
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

| ADD HYD (2636)|
1 + 2 = 3
ID1= 1 (2637): 762.38 30.198 2.72 44.94
+ ID2= 2 (0636): 3.32 0.255 2.00 40.09
=====

ID = 3 (2636): 765.70 30.336 2.69 44.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0638)|
ID= 1 DT= 5.0 min
Area (ha)= 20.63 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.46

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 1.630 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 40.088
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

| ADD HYD (2637)|
1 + 2 = 3
ID1= 1 (0116): 720.98 28.679 2.83 45.21
+ ID2= 2 (4630): 33.04 2.762 2.00 40.08
=====

CALIB
NASHYD (0639) | Area (ha)= 4.60 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.43

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.379 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 40.087
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

ADD HYD (2630) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2636): 765.70 30.336 2.69 44.91
+ ID2= 2 (0638): 20.63 1.630 1.92 40.09
=====

ID = 3 (2630): 786.33 31.198 2.64 44.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2630) |
3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2630): 786.33 31.198 2.64 44.79
+ ID2= 2 (0639): 4.60 0.379 1.92 40.09
=====

ID = 1 (2630): 790.93 31.385 2.64 44.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0709) | Area (ha)= 21.19 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.65

Unit Hyd Qpeak (cms)= 1.245

PEAK FLOW (cms)= 1.335 (i)
TIME TO PEAK (hrs)= 2.167
RUNOFF VOLUME (mm)= 40.090
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

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

FINISH

** SIMULATION : Hazel **

READ STORM | Filename: C:\Users\TNuman\AppData\Local\Temp\
41034a8c-d05e-425c-b27b-2fd854ff89f8\910fba68
Ptotal=212.00 mm | Comments: Hazel

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	6.00	3.00	13.00	6.00	23.00	9.00	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00

CALIB
NASHYD (0100) | Area (ha)= 136.98 Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # 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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00

2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 13.243 (i)
TIME TO PEAK (hrs)= 11.250
RUNOFF VOLUME (mm)= 170.155
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

CALIB			
NASHYD (0201)	Area (ha)= 14.60	Curve Number (CN)= 88.0	
ID= 1 DT= 5.0 min	Ia (mm)= 1.50	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.97		

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

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

3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00
-------	------	-------	-------	-------	-------	-------	-------

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 1.537 (i)
TIME TO PEAK (hrs)= 11.083
RUNOFF VOLUME (mm)= 180.757
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.853

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

CALIB			
STANDHYD (0203)	Area (ha)= 8.20		
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00	Dir. Conn.(%)= 25.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n	= 0.013	0.250

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

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

2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 70.29
over (min) 5.00 10.00
Storage Coeff. (min)= 1.36 (ii) 8.50 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.12

TOTALS
PEAK FLOW (cms)= 0.30 0.88 1.180 (iii)
TIME TO PEAK (hrs)= 9.42 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 181.86 188.90
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.86 0.89

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	14.60	1.537	11.08	180.76
+ ID2= 2 (0203):	8.20	1.180	10.00	188.90
ID = 3 (2200):	22.80	2.384	11.00	183.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	4.80	Curve Number (CN)=	96.0
NASHYD (0205)	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00

1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.651 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 200.401
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.945

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

CALIB	Area (ha)=	0.20	
STANDHYD (0206)	Total Imp(%)=	45.00	Dir. Conn.(%)= 25.00
ID= 1 DT= 5.0 min			

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00

0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 70.29
over (min) 5.00 10.00
Storage Coeff. (min)= 1.36 (ii) 8.50 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.12

TOTALS
PEAK FLOW (cms)= 0.01 0.02 0.029 (iii)
TIME TO PEAK (hrs)= 9.33 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 181.86 188.87
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.86 0.89

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2201)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0205):	4.80	0.651	10.17	200.40
+ ID2= 2 (0206):	0.20	0.029	10.00	188.87
=====				
ID = 3 (2201):	5.00	0.677	10.08	199.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2201)|

3 + 2 = 1					AREA	QPEAK	TPEAK	R.V.
-----					(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2201):					5.00	0.677	10.08	199.94
+ ID2= 2 (2200):					22.80	2.384	11.00	183.68
=====								
ID = 1 (2201):					27.80	2.932	11.00	186.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					Area			
STANDHYD (0209)					(ha)=	2.70		
ID= 1 DT= 5.0 min					Total Imp(%)=	16.00	Dir. Conn.(%)=	8.00

					IMPERVIOUS	PERVIOUS (i)		
Surface Area					(ha)=	0.43	2.27	
Dep. Storage					(mm)=	2.00	5.00	
Average Slope					(%)=	1.20	1.20	
Length					(m)=	35.00	35.00	
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	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00				
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00				
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00				
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00				
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00				
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00				
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00				
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00				
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00				
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00				
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00				
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00				
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00				
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00				
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00				
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00				
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00				
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00				
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00				
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00				
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00				
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00				
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00				
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00				
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00				
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00				
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00				
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00				
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00				
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00				
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00				
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00				
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00				
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00				
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00				
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00				

Max.Eff.Inten.(mm/hr)= 53.00 55.75
over (min) 5.00 15.00
Storage Coeff. (min)= 1.66 (ii) 11.25 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.32 0.09

TOTALS
PEAK FLOW (cms)= 0.03 0.35 0.379 (iii)
TIME TO PEAK (hrs)= 9.42 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 175.49 178.25
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.83 0.84

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0207) | Area (ha)= 1.30
| ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.58 0.72
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN TIME RAIN TIME RAIN TIME RAIN
hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr
0.083 6.00 3.083 13.00 6.083 23.00 9.08 53.00
0.167 6.00 3.167 13.00 6.167 23.00 9.17 53.00
0.250 6.00 3.250 13.00 6.250 23.00 9.25 53.00
0.333 6.00 3.333 13.00 6.333 23.00 9.33 53.00
0.417 6.00 3.417 13.00 6.417 23.00 9.42 53.00
0.500 6.00 3.500 13.00 6.500 23.00 9.50 53.00
0.583 6.00 3.583 13.00 6.583 23.00 9.58 53.00
0.667 6.00 3.667 13.00 6.667 23.00 9.67 53.00
0.750 6.00 3.750 13.00 6.750 23.00 9.75 53.00
0.833 6.00 3.833 13.00 6.833 23.00 9.83 53.00
0.917 6.00 3.917 13.00 6.917 23.00 9.92 53.00
1.000 6.00 4.000 13.00 7.000 23.00 10.00 53.00
1.083 4.00 4.083 17.00 7.083 13.00 10.08 38.00
1.167 4.00 4.167 17.00 7.167 13.00 10.17 38.00
1.250 4.00 4.250 17.00 7.250 13.00 10.25 38.00
1.333 4.00 4.333 17.00 7.333 13.00 10.33 38.00
1.417 4.00 4.417 17.00 7.417 13.00 10.42 38.00
1.500 4.00 4.500 17.00 7.500 13.00 10.50 38.00
1.583 4.00 4.583 17.00 7.583 13.00 10.58 38.00
1.667 4.00 4.667 17.00 7.667 13.00 10.67 38.00
1.750 4.00 4.750 17.00 7.750 13.00 10.75 38.00

1.833 4.00 4.833 17.00 7.833 13.00 10.83 38.00
1.917 4.00 4.917 17.00 7.917 13.00 10.92 38.00
2.000 4.00 5.000 17.00 8.000 13.00 11.00 38.00
2.083 6.00 5.083 13.00 8.083 13.00 11.08 13.00
2.167 6.00 5.167 13.00 8.167 13.00 11.17 13.00
2.250 6.00 5.250 13.00 8.250 13.00 11.25 13.00
2.333 6.00 5.333 13.00 8.333 13.00 11.33 13.00
2.417 6.00 5.417 13.00 8.417 13.00 11.42 13.00
2.500 6.00 5.500 13.00 8.500 13.00 11.50 13.00
2.583 6.00 5.583 13.00 8.583 13.00 11.58 13.00
2.667 6.00 5.667 13.00 8.667 13.00 11.67 13.00
2.750 6.00 5.750 13.00 8.750 13.00 11.75 13.00
2.833 6.00 5.833 13.00 8.833 13.00 11.83 13.00
2.917 6.00 5.917 13.00 8.917 13.00 11.92 13.00
3.000 6.00 6.000 13.00 9.000 13.00 12.00 13.00

Max.Eff.Inten.(mm/hr)= 53.00 70.29
over (min) 5.00 10.00
Storage Coeff. (min)= 1.36 (ii) 8.50 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.12

TOTALS
PEAK FLOW (cms)= 0.05 0.14 0.187 (iii)
TIME TO PEAK (hrs)= 9.42 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 181.86 188.89
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.86 0.89

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2202) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

ID1= 1 (0207): 1.30 0.187 10.00 188.89
+ ID2= 2 (0209): 2.70 0.379 10.00 178.25
=====

ID = 3 (2202): 4.00 0.566 10.00 181.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2202) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

ID1= 3 (2202): 4.00 0.566 10.00 181.71
+ ID2= 2 (2201): 27.80 2.932 11.00 186.61
=====

ID = 1 (2202): 31.80 3.484 10.00 185.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 2100)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0100): 136.98 13.243 11.25 170.15
+ ID2= 2 ( 2202): 31.80 3.484 10.00 185.99
=====
ID = 3 ( 2100): 168.78 16.256 11.00 173.14
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0302)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 2.90 Curve Number (CN)= 88.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.45
```

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

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

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.372 (i)
TIME TO PEAK (hrs)= 10.167

RUNOFF VOLUME (mm)= 180.743
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.853

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

```
-----
| CALIB
| STANDHYD ( 0304)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 4.40
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.98	2.42
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

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

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

Max.Eff.Inten.(mm/hr)= 53.00 70.29

over (min) 5.00 10.00
Storage Coeff. (min)= 1.43 (ii) 8.98 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.12

TOTALS
PEAK FLOW (cms)= 0.16 0.47 0.633 (iii)
TIME TO PEAK (hrs)= 9.42 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 181.86 188.90
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.86 0.89

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2300) |
1 + 2 = 3
ID1= 1 (0302): 2.90 0.372 10.17 180.74
+ ID2= 2 (0304): 4.40 0.633 10.00 188.90

ID = 3 (2300): 7.30 0.992 10.00 185.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| STANDHYD (0308) |
ID= 1 DT= 5.0 min
Area (ha)= 0.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 6.00 | 3.083 13.00 | 6.083 23.00 | 9.08 53.00
0.167 6.00 | 3.167 13.00 | 6.167 23.00 | 9.17 53.00
0.250 6.00 | 3.250 13.00 | 6.250 23.00 | 9.25 53.00
0.333 6.00 | 3.333 13.00 | 6.333 23.00 | 9.33 53.00
0.417 6.00 | 3.417 13.00 | 6.417 23.00 | 9.42 53.00
0.500 6.00 | 3.500 13.00 | 6.500 23.00 | 9.50 53.00
0.583 6.00 | 3.583 13.00 | 6.583 23.00 | 9.58 53.00
0.667 6.00 | 3.667 13.00 | 6.667 23.00 | 9.67 53.00
0.750 6.00 | 3.750 13.00 | 6.750 23.00 | 9.75 53.00
0.833 6.00 | 3.833 13.00 | 6.833 23.00 | 9.83 53.00
0.917 6.00 | 3.917 13.00 | 6.917 23.00 | 9.92 53.00
1.000 6.00 | 4.000 13.00 | 7.000 23.00 | 10.00 53.00
1.083 4.00 | 4.083 17.00 | 7.083 13.00 | 10.08 38.00

1.167 4.00 | 4.167 17.00 | 7.167 13.00 | 10.17 38.00
1.250 4.00 | 4.250 17.00 | 7.250 13.00 | 10.25 38.00
1.333 4.00 | 4.333 17.00 | 7.333 13.00 | 10.33 38.00
1.417 4.00 | 4.417 17.00 | 7.417 13.00 | 10.42 38.00
1.500 4.00 | 4.500 17.00 | 7.500 13.00 | 10.50 38.00
1.583 4.00 | 4.583 17.00 | 7.583 13.00 | 10.58 38.00
1.667 4.00 | 4.667 17.00 | 7.667 13.00 | 10.67 38.00
1.750 4.00 | 4.750 17.00 | 7.750 13.00 | 10.75 38.00
1.833 4.00 | 4.833 17.00 | 7.833 13.00 | 10.83 38.00
1.917 4.00 | 4.917 17.00 | 7.917 13.00 | 10.92 38.00
2.000 4.00 | 5.000 17.00 | 8.000 13.00 | 11.00 38.00
2.083 6.00 | 5.083 13.00 | 8.083 13.00 | 11.08 13.00
2.167 6.00 | 5.167 13.00 | 8.167 13.00 | 11.17 13.00
2.250 6.00 | 5.250 13.00 | 8.250 13.00 | 11.25 13.00
2.333 6.00 | 5.333 13.00 | 8.333 13.00 | 11.33 13.00
2.417 6.00 | 5.417 13.00 | 8.417 13.00 | 11.42 13.00
2.500 6.00 | 5.500 13.00 | 8.500 13.00 | 11.50 13.00
2.583 6.00 | 5.583 13.00 | 8.583 13.00 | 11.58 13.00
2.667 6.00 | 5.667 13.00 | 8.667 13.00 | 11.67 13.00
2.750 6.00 | 5.750 13.00 | 8.750 13.00 | 11.75 13.00
2.833 6.00 | 5.833 13.00 | 8.833 13.00 | 11.83 13.00
2.917 6.00 | 5.917 13.00 | 8.917 13.00 | 11.92 13.00
3.000 6.00 | 6.000 13.00 | 9.000 13.00 | 12.00 13.00

Max.Eff.Inten.(mm/hr)= 53.00 70.29
over (min) 5.00 10.00
Storage Coeff. (min)= 1.43 (ii) 8.98 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.12

TOTALS
PEAK FLOW (cms)= 0.01 0.02 0.029 (iii)
TIME TO PEAK (hrs)= 9.33 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 181.86 188.87
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.86 0.89

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0310) |
ID= 1 DT= 5.0 min
Area (ha)= 5.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
4.000 6.00 | 4.000 17.00 | 7.000 13.00 | 10.00 53.00
4.083 4.00 | 4.083 17.00 | 7.083 13.00 | 10.08 38.00

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

Max.Eff.Inten.(mm/hr)= 53.00 55.75
over (min) 5.00 10.00
Storage Coeff. (min)= 1.36 (ii) 9.20 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.12

TOTALS
PEAK FLOW (cms)= 0.07 0.74 0.805 (iii)
TIME TO PEAK (hrs)= 9.42 10.00 10.00
RUNOFF VOLUME (mm)= 210.00 175.49 178.25
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.83 0.84

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2301)|

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2300):	7.30	0.992	10.00	185.66
+ ID2= 2 (0308):	0.20	0.029	10.00	188.87
=====				
ID = 3 (2301):	7.50	1.020	10.00	185.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (2301):	7.50	1.020	10.00	185.74
+ ID2= 2 (0310):	5.70	0.805	10.00	178.25
=====				
ID = 1 (2301):	13.20	1.826	10.00	182.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2302)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2100):	168.78	16.256	11.00	173.14
+ ID2= 2 (2301):	13.20	1.826	10.00	182.51
=====				
ID = 3 (2302):	181.98	17.635	11.00	173.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)= 82.86	
STANDHYD (0400)	Total Imp(%)= 10.00	Dir. Conn.(%)= 3.00
ID= 1 DT= 5.0 min		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	8.29	74.57
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	0.70	2.00
Length (m)=	1437.00	40.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00

1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 54.48
over (min) 20.00 30.00
Storage Coeff. (min)= 18.14 (ii) 27.14 (ii)
Unit Hyd. Tpeak (min)= 20.00 30.00
Unit Hyd. peak (cms)= 0.06 0.04

PEAK FLOW (cms)= 0.35 9.86 10.195 (iii)
TIME TO PEAK (hrs)= 10.00 10.25
RUNOFF VOLUME (mm)= 210.00 172.72 173.84
TOTAL RAINFALL (mm)= 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.81 0.82

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

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

ADD HYD (2400)				
1 + 2 = 3				

ID1= 1 (2302):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
+ ID2= 2 (0400):	181.98	17.635	11.00	173.82
=====				
ID = 3 (2400):	264.84	26.477	11.00	173.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4400) |
IN= 2---> OUT= 1
Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	411.10	0.0550	
27.30	410.20	0.0550	
77.50	409.10	0.0550	
96.60	409.10	0.0550	
115.80	408.90	0.0550	
124.80	409.10	0.0550	
131.00	408.90	0.0550 /0.0350	Main Channel
133.60	408.00	0.0350	Main Channel
134.40	407.60	0.0350	Main Channel
135.00	407.50	0.0350	Main Channel
135.80	407.60	0.0350	Main Channel
136.50	408.00	0.0350	Main Channel
139.40	408.80	0.0350 /0.0550	Main Channel
143.50	408.90	0.0550	
148.50	408.70	0.0550	
163.80	408.90	0.0550	
183.20	408.90	0.0550	
243.70	409.70	0.0550	
278.70	410.20	0.0550	
330.50	411.40	0.0550	

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.19	407.69	.366E+03	0.1	0.51	58.83
0.37	407.87	.106E+04	0.5	0.81	37.08
0.56	408.06	.199E+04	1.1	1.00	29.93
0.74	408.24	.328E+04	2.1	1.14	26.32
0.93	408.43	.498E+04	3.6	1.28	23.32
1.11	408.61	.708E+04	5.6	1.43	20.94
1.30	408.80	.105E+05	8.5	1.45	20.61
1.49	408.99	.247E+05	14.8	1.07	27.91
1.68	409.18	.601E+05	30.4	0.91	32.97
1.87	409.37	.109E+06	58.5	0.96	31.05
2.06	409.56	.166E+06	98.3	1.06	28.11
2.25	409.75	.231E+06	150.3	1.17	25.57
2.44	409.94	.303E+06	215.4	1.28	23.46
2.64	410.14	.383E+06	293.8	1.38	21.74
2.83	410.33	.470E+06	390.1	1.49	20.10
3.02	410.52	.563E+06	502.4	1.60	18.66
3.21	410.71	.660E+06	628.8	1.71	17.48
3.40	410.90	.762E+06	769.5	1.81	16.49
3.59	411.09	.868E+06	924.9	1.91	15.65

		<---- hydrograph ---->			<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
		(ha)	(cms)	(hrs)	(mm)	(m)
INFLOW : ID= 2 (2400)		264.84	26.48	11.00	173.82	1.63
OUTFLOW: ID= 1 (4400)		264.84	24.73	11.31	173.82	0.96

CALIB					
NASHYD (0515)		Area (ha)=	5.01	Curve Number (CN)=	80.0
ID= 1 DT= 5.0 min		Ia (mm)=	1.50	# 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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW (cms)= 0.616 (i)
 TIME TO PEAK (hrs)= 10.167
 RUNOFF VOLUME (mm)= 161.698
 TOTAL RAINFALL (mm)= 212.000
 RUNOFF COEFFICIENT = 0.763

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

CALIB	Area (ha)=	91.44	Curve Number (CN)= 86.0
NASHYD (0510)	Ia (mm)=	1.50	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	1.09	

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

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

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)= 9.158 (i)
 TIME TO PEAK (hrs)= 11.250
 RUNOFF VOLUME (mm)= 175.940
 TOTAL RAINFALL (mm)= 212.000
 RUNOFF COEFFICIENT = 0.830

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

ROUTE CHN(4510)
 IN= 2---> OUT= 1 Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV. TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.206E+02	0.0	0.19	101.61

0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

**** WARNING: TRAVEL TIME TABLE EXCEEDED

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0510)	91.44	9.16	11.25	175.94	1.50	1.34
OUTFLOW: ID= 1 (4510)	91.44	9.02	11.42	175.93	1.50	1.34

CALIB	Area (ha)=	2.14	Curve Number (CN)=	86.0
NASHYD (0517)	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.32		

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00

1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.255

PEAK FLOW (cms)= 0.289 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 175.887
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.830

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

CALIB	Area (ha)=	52.87
STANDHYD (0511)	Total Imp(%)=	50.00
ID= 1 DT= 5.0 min	Dir. Conn.(%)=	30.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	26.43	26.43
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	593.69	40.00
Mannings n	=	0.013
		0.250

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00

1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 72.31
over (min) 10.00 20.00
Storage Coeff. (min)= 9.59 (ii) 19.48 (ii)
Unit Hyd. Tpeak (min)= 10.00 20.00
Unit Hyd. peak (cms)= 0.11 0.06

TOTALS

PEAK FLOW (cms)= 2.33 4.99 7.311 (iii)
TIME TO PEAK (hrs)= 10.00 10.08 10.00
RUNOFF VOLUME (mm)= 211.20 185.02 192.87
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.87 0.91

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0516)
ID= 1 DT= 5.0 min
Area (ha)= 10.78
Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.85	5.93
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	268.08	40.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00

0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 50.59
over (min) 5.00 20.00
Storage Coeff. (min)= 5.95 (ii) 17.36 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.19 0.06

TOTALS

PEAK FLOW (cms)= 0.71 0.79 1.506 (iii)
TIME TO PEAK (hrs)= 10.00 10.00 10.00
RUNOFF VOLUME (mm)= 211.20 175.94 191.81
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.83 0.90

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2511)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0511):	52.87	7.311	10.00	192.87
+ ID2= 2 (0516):	10.78	1.506	10.00	191.81
ID = 3 (2511):	63.65	8.818	10.00	192.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2510)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2511):	63.65	8.818	10.00	192.69
+ ID2= 2 (4510):	91.44	9.022	11.42	175.93
=====				
ID = 3 (2510):	155.09	15.328	11.00	182.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2510)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2510):	155.09	15.328	11.00	182.81
+ ID2= 2 (0517):	2.14	0.289	10.08	175.89
=====				
ID = 1 (2510):	157.23	15.550	11.00	182.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0512)			
ID= 1 DT= 5.0 min	Area (ha)=	27.13	
	Total Imp(%)=	50.00	Dir. Conn.(%)= 30.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	13.56	13.56
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	425.28	40.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00

1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	72.31
over (min)	10.00	20.00
Storage Coeff. (min)=	7.85 (ii)	15.88 (ii)
Unit Hyd. Tpeak (min)=	10.00	20.00
Unit Hyd. peak (cms)=	0.13	0.07

PEAK FLOW (cms)=	1.20	2.62	*TOTALS*
TIME TO PEAK (hrs)=	10.00	10.00	10.00
RUNOFF VOLUME (mm)=	211.20	185.02	192.87
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.87	0.91

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0513)			
ID= 1 DT= 5.0 min	Area (ha)=	6.44	
	Total Imp(%)=	65.00	Dir. Conn.(%)= 35.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.19	2.25
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	207.20	40.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00

0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 96.89
over (min) 5.00 15.00
Storage Coeff. (min)= 5.10 (ii) 13.90 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.21 0.08

PEAK FLOW (cms)= 0.33 0.60 0.927 (iii)
TIME TO PEAK (hrs)= 10.00 10.00 10.00
RUNOFF VOLUME (mm)= 211.20 191.05 198.10
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.90 0.93

TOTALS

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

DUHYD (8512)
Inlet Cap.= 0.732
#of Inlets= 1
Total(cms)= 0.7
=====

TOTAL HYD.(ID= 1):	6.44	0.93	10.00	198.10
MAJOR SYS.(ID= 2):	0.23	0.20	10.00	198.10
MINOR SYS.(ID= 3):	6.21	0.73	9.33	198.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)
1 + 2 = 3
=====

ID1= 1 (0512):	27.13	3.821	10.00	192.87
+ ID2= 2 (8512):	6.21	0.732	9.33	198.10
ID = 3 (2512):	33.34	4.553	10.00	193.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2514)
1 + 2 = 3
=====

ID1= 1 (2510):	157.23	15.550	11.00	182.72
+ ID2= 2 (2512):	33.34	4.553	10.00	193.85
ID = 3 (2514):	190.57	19.083	11.00	184.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2514)
3 + 2 = 1
=====

ID1= 3 (2514):	190.57	19.083	11.00	184.67
+ ID2= 2 (0515):	5.01	0.616	10.17	161.70
ID = 1 (2514):	195.58	19.594	11.00	184.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0518)
ID= 1 DT= 5.0 min
Area (ha)= 6.68 Curve Number (CN)= 86.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00

1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.930 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 172.207
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.812

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

ADD HYD (2513)				
1 + 2 = 3				
=====				
ID1= 1 (2514):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	195.58	19.594	11.00	184.08
+ ID2= 2 (4400):	264.84	24.727	11.31	173.82
=====				
ID = 3 (2513):	460.42	43.661	11.00	178.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2513)				
3 + 2 = 1				
=====				
ID1= 3 (2513):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	460.42	43.661	11.00	178.18
+ ID2= 2 (0518):	6.68	0.930	10.00	172.21
=====				
ID = 1 (2513):	467.10	44.342	11.00	178.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0520)			
ID= 1 DT= 5.0 min			
Area (ha)=	108.36	Curve Number (CN)=	86.0
Ia (mm)=	5.00	# 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	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 10.462 (i)
TIME TO PEAK (hrs)= 11.333
RUNOFF VOLUME (mm)= 172.535
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.814

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

ADD HYD (2520)				
1 + 2 = 3				
=====				
ID1= 1 (2513):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	467.10	44.342	11.00	178.09
+ ID2= 2 (0520):	108.36	10.462	11.33	172.54
=====				
ID = 3 (2520):	575.46	54.508	11.00	177.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4500)|
| IN= 2--> OUT= 1 | Routing time step (min)'= 2.00

|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.00

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

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	409.70	0.0550	
19.70	408.80	0.0550	
41.70	407.20	0.0550	
60.50	405.30	0.0550	
80.00	404.50	0.0550	
95.70	404.60	0.0550 / 0.0350	Main Channel
98.60	403.40	0.0350	Main Channel
100.40	403.40	0.0350	Main Channel
100.80	402.90	0.0350	Main Channel
101.50	402.70	0.0350	Main Channel
102.30	402.80	0.0350	Main Channel
103.30	403.20	0.0350	Main Channel
104.00	403.20	0.0350	Main Channel
105.60	404.40	0.0350 / 0.0550	Main Channel
109.70	404.30	0.0550	
128.60	404.20	0.0550	
154.10	405.40	0.0550	
179.10	406.70	0.0550	
201.90	408.60	0.0550	
224.20	410.60	0.0550	

---- TRANSFORMED HYETOGRAPH ----

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

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 8.022 (i)
TIME TO PEAK (hrs)= 11.167
RUNOFF VOLUME (mm)= 172.535
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.814

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

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

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.34	403.04	.954E+03	0.3	0.70	47.40
0.68	403.38	.304E+04	1.6	1.03	32.27
1.02	403.72	.718E+04	4.5	1.25	26.57
1.36	404.06	.122E+05	9.7	1.58	20.96
1.70	404.40	.251E+05	18.1	1.44	23.04
2.08	404.78	.650E+05	42.3	1.29	25.62
2.46	405.16	.122E+06	86.3	1.40	23.62
2.84	405.54	.192E+06	151.6	1.57	21.10
3.21	405.91	.270E+06	238.3	1.75	18.90
3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

<---- hydrograph ---->

<-pipe / channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2520)	575.46	54.51	11.00	177.05	2.18	1.32
OUTFLOW: ID= 1 (4500)	575.46	51.63	11.28	177.05	2.16	1.31

| ADD HYD (2610)|
1 + 2 = 3

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4500):	575.46	51.631	11.28	177.05

+ ID2= 2 (0610): 78.05 8.022 11.17 172.54
=====

ID = 3 (2610): 653.51 59.593 11.25 176.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0621) Area (ha)= 6.56 Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.37

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

----- TRANSFORMED HYETOGRAPH -----

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

Unit Hyd Qpeak (cms)= 0.677

PEAK FLOW (cms)= 0.857 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 170.126
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.802

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

CALIB
NASHYD (0622) Area (ha)= 9.69 Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.36

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

----- TRANSFORMED HYETOGRAPH -----

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

Unit Hyd Qpeak (cms)= 1.028

PEAK FLOW (cms)= 1.273 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 170.123
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.802

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

| CALIB
| NASHYD (0623) | Area (ha)= 19.37 Curve Number (CN)= 85.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.45

| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.51

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

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

----- TRANSFORMED HYETOGRAPH -----

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

Unit Hyd Qpeak (cms)= 1.644

PEAK FLOW (cms)= 2.425 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 170.142
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

| CALIB
| NASHYD (0624) | Area (ha)= 11.84 Curve Number (CN)= 85.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.39

----- TRANSFORMED HYETOGRAPH -----

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

Unit Hyd Qpeak (cms)= 0.887

PEAK FLOW (cms)= 1.435 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 170.147
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

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

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

Unit Hyd Qpeak (cms)= 0.658

PEAK FLOW (cms)= 0.868 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 170.132
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

ROUTE CHN(4625)
IN= 2--> OUT= 1

Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0360	Main Channel
4.30	412.70	0.0360	Main Channel
8.60	414.20	0.0360	Main Channel

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

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.108E+02	0.0	0.24	42.13
0.16	412.86	.434E+02	0.0	0.38	26.54
0.24	412.94	.976E+02	0.1	0.50	20.26
0.32	413.02	.174E+03	0.2	0.61	16.72
0.39	413.09	.271E+03	0.3	0.70	14.41
0.47	413.17	.390E+03	0.5	0.79	12.76
0.55	413.25	.532E+03	0.8	0.88	11.51
0.63	413.33	.694E+03	1.1	0.96	10.53
0.71	413.41	.879E+03	1.5	1.04	9.74
0.79	413.49	.108E+04	2.0	1.11	9.08
0.87	413.57	.131E+04	2.6	1.19	8.52
0.95	413.65	.156E+04	3.2	1.26	8.04
1.03	413.73	.183E+04	4.0	1.33	7.62
1.11	413.81	.213E+04	4.9	1.39	7.25
1.18	413.88	.244E+04	5.9	1.46	6.93
1.26	413.96	.278E+04	7.0	1.52	6.64
1.34	414.04	.313E+04	8.2	1.59	6.37
1.42	414.12	.351E+04	9.5	1.65	6.13
1.50	414.20	.392E+04	11.0	1.71	5.92

<---- hydrograph ---->				<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0625)	6.72	0.87	10.08	170.13	0.58
OUTFLOW: ID= 1 (4625)	6.72	0.85	10.25	170.10	0.57

CALIB
STANDHYD (0626)
ID= 1 DT= 5.0 min

Area (ha)= 1.06
Total Imp(%)= 60.00
Dir. Conn.(%)= 50.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.64	0.42
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	84.06	40.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00

1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 57.70
over (min) 5.00 15.00
Storage Coeff. (min)= 2.97 (ii) 11.76 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.28 0.09

TOTALS

PEAK FLOW (cms)= 0.08 0.07 0.144 (iii)
TIME TO PEAK (hrs)= 9.75 10.00 10.00
RUNOFF VOLUME (mm)= 211.00 149.17 180.08
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.70 0.85

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2625)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4625):	6.72	0.847	10.25	170.10
+ ID2= 2 (0621):	6.56	0.857	10.08	170.13
=====				
ID = 3 (2625):	13.28	1.692	10.17	170.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)				
3 + 2 = 1				

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

ID1= 3 (2625):	13.28	1.692	10.17	170.11
+ ID2= 2 (0622):	9.69	1.273	10.08	170.12
=====				
ID = 1 (2625):	22.97	2.953	10.17	170.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2625):	22.97	2.953	10.17	170.12
+ ID2= 2 (0623):	19.37	2.425	10.17	170.14
=====				
ID = 3 (2625):	42.34	5.378	10.17	170.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)				
3 + 2 = 1				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2625):	42.34	5.378	10.17	170.13
+ ID2= 2 (0624):	11.84	1.435	10.25	170.15
=====				
ID = 1 (2625):	54.18	6.802	10.17	170.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2625)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2625):	54.18	6.802	10.17	170.13
+ ID2= 2 (0626):	1.06	0.144	10.00	180.08
=====				
ID = 3 (2625):	55.24	6.921	10.17	170.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0627)				
ID= 1 DT= 5.0 min				

	Area	(ha)=	9.39	Curve Number (CN)= 85.0
	Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.20		

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

----- TRANSFORMED HYETOGRAPH -----									
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00		
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00		
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00		
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00		
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00		
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00		
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00		
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00		

0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 1.298 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 169.831
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.801

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

CALIB	
STANDHYD (6240)	Area (ha)= 0.79
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 70.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.71	0.08
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	20.00	20.00
Mannings n	= 0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00

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

Max.Eff.Inten.(mm/hr)= 53.00 158.23
over (min) 5.00 5.00
Storage Coeff. (min)= 1.02 (ii) 3.77 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.25

PEAK FLOW (cms)= 0.08 0.03 *TOTALS*
TIME TO PEAK (hrs)= 9.33 10.00 0.116 (iii)
RUNOFF VOLUME (mm)= 211.48 198.67 10.00
TOTAL RAINFALL (mm)= 212.00 212.00 207.64
RUNOFF COEFFICIENT = 1.00 0.94 212.00
0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (6210)	Area (ha)= 1.96
ID= 1 DT= 5.0 min	Total Imp(%)= 60.00 Dir. Conn.(%)= 40.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.18	0.78
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	40.00	40.00

Mannings n = 0.013 0.250

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

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

Max.Eff.Inten.(mm/hr)= 53.00 78.11
over (min) 5.00 10.00
Storage Coeff. (min)= 1.54 (ii) 9.33 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.12

TOTALS
PEAK FLOW (cms)= 0.12 0.17 0.285 (iii)
TIME TO PEAK (hrs)= 9.50 10.00 10.00
RUNOFF VOLUME (mm)= 211.48 186.45 196.46
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.88 0.93

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. 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 (26240)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (6210): 1.96 0.285 10.00 196.46
+ ID2= 2 (6240): 0.79 0.116 10.00 207.64
===== ID = 3 (26240): 2.75 0.401 10.00 199.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (6220) Area (ha)= 0.92
ID= 1 DT= 5.0 min Total Imp(%)= 40.00 Dir. Conn.(%)= 20.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.37 0.55
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250

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

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

2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 69.15
over (min) 5.00 10.00
Storage Coeff. (min)= 1.54 (ii) 9.72 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.11

TOTALS
PEAK FLOW (cms)= 0.03 0.11 0.133 (iii)
TIME TO PEAK (hrs)= 9.42 10.00 10.00
RUNOFF VOLUME (mm)= 211.48 183.55 189.13
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.87 0.89

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (6230)
ID= 1 DT= 5.0 min
Area (ha)= 0.48
Total Imp(%)= 10.00 Dir. Conn.(%)= 5.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.05	0.43
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	20.00	20.00
Mannings n	= 0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00

1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 54.14
over (min) 5.00 10.00
Storage Coeff. (min)= 1.02 (ii) 6.97 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

TOTALS
PEAK FLOW (cms)= 0.00 0.06 0.068 (iii)
TIME TO PEAK (hrs)= 9.25 10.00 10.00
RUNOFF VOLUME (mm)= 211.48 176.93 178.64
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.83 0.84

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. 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 (0004)
1 + 2 = 3
ID1= 1 (26240): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
+ ID2= 2 (6220): 0.92 0.133 10.00 189.13
ID = 3 (0004): 3.67 0.534 10.00 197.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0004)
3 + 2 = 1
ID1= 3 (0004): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
3.67 0.534 10.00 197.03

+ ID2= 2 (6230): 0.48 0.068 10.00 178.64
=====

ID = 1 (0004): 4.15 0.602 10.00 194.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4620)|
| IN= 2--> OUT= 1 | Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.456E+01	0.0	0.55	7.70
0.16	412.86	.182E+02	0.1	0.88	4.85
0.24	412.94	.410E+02	0.2	1.15	3.70
0.32	413.02	.729E+02	0.4	1.39	3.05
0.39	413.09	.114E+03	0.7	1.61	2.63
0.47	413.17	.164E+03	1.2	1.82	2.33
0.55	413.25	.223E+03	1.8	2.02	2.10
0.63	413.33	.292E+03	2.5	2.21	1.92
0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0004)	4.15	0.60	10.00	194.90	0.37	1.52
OUTFLOW: ID= 1 (4620)	4.15	0.60	10.00	194.89	0.36	1.52

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0117):	59.39	7.419	10.08	172.04
+ ID2= 2 (0627):	9.39	1.298	10.00	169.83
=====				
ID = 1 (0117):	68.78	8.675	10.08	171.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0117):	68.78	8.675	10.08	171.74
+ ID2= 2 (2610):	653.51	59.593	11.25	176.51
=====				
ID = 3 (0116):	722.29	65.896	11.14	176.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	8.36	Curve Number (CN)=	85.0
NASHYD (0637)	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.47		

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

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

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2625):	55.24	6.921	10.17	170.32
+ ID2= 2 (4620):	4.15	0.602	10.00	194.89
=====				
ID = 3 (0117):	59.39	7.419	10.08	172.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0117)|

2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 1.035 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 170.144
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

CALIB			
NASHYD (0630)	Area (ha)= 33.04	Curve Number (CN)= 85.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.38		

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

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

2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 4.294 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 170.129
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.802

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

ROUTE CHN(4630)
IN= 2---> OUT= 1 Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

<---- hydrograph ---->				<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
	(ha)	(cms)	(hrs)	(mm)	(m)
INFLOW : ID= 2 (0630)	33.04	4.29	10.08	170.13	1.19
OUTFLOW: ID= 1 (4630)	33.04	4.23	10.17	170.12	1.18
					MAX VEL
					(m/s)

ADD HYD (2637)
1 + 2 = 3
ID1= 1 (0116): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
722.29 65.896 11.14 176.05

+ ID2= 2 (4630): 33.04 4.228 10.17 170.12
=====

ID = 3 (2637): 755.33 69.296 11.11 175.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2637) |
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2637): 755.33 69.296 11.11 175.79
+ ID2= 2 (0637): 8.36 1.035 10.25 170.14
=====

ID = 1 (2637): 763.69 70.170 11.08 175.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0636) | Area (ha)= 3.32 Curve Number (CN)= 85.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.48

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

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

2.833 6.00 | 5.833 13.00 | 8.833 13.00 | 11.83 13.00
2.917 6.00 | 5.917 13.00 | 8.917 13.00 | 11.92 13.00
3.000 6.00 | 6.000 13.00 | 9.000 13.00 | 12.00 13.00

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.409 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 170.145
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

| ADD HYD (2636) |
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2637): 763.69 70.170 11.08 175.73
+ ID2= 2 (0636): 3.32 0.409 10.25 170.14
=====

ID = 3 (2636): 767.01 70.519 11.08 175.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0636) | Area (ha)= 20.63 Curve Number (CN)= 85.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.46

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN TIME RAIN TIME RAIN TIME RAIN
hrs mm/hr hrs mm/hr hrs mm/hr hrs mm/hr
0.083 6.00 3.083 13.00 6.083 23.00 9.08 53.00
0.167 6.00 3.167 13.00 6.167 23.00 9.17 53.00
0.250 6.00 3.250 13.00 6.250 23.00 9.25 53.00
0.333 6.00 3.333 13.00 6.333 23.00 9.33 53.00
0.417 6.00 3.417 13.00 6.417 23.00 9.42 53.00
0.500 6.00 3.500 13.00 6.500 23.00 9.50 53.00
0.583 6.00 3.583 13.00 6.583 23.00 9.58 53.00
0.667 6.00 3.667 13.00 6.667 23.00 9.67 53.00
0.750 6.00 3.750 13.00 6.750 23.00 9.75 53.00
0.833 6.00 3.833 13.00 6.833 23.00 9.83 53.00
0.917 6.00 3.917 13.00 6.917 23.00 9.92 53.00
1.000 6.00 4.000 13.00 7.000 23.00 10.00 53.00
1.083 4.00 4.083 17.00 7.083 13.00 10.08 38.00
1.167 4.00 4.167 17.00 7.167 13.00 10.17 38.00
1.250 4.00 4.250 17.00 7.250 13.00 10.25 38.00
1.333 4.00 4.333 17.00 7.333 13.00 10.33 38.00
1.417 4.00 4.417 17.00 7.417 13.00 10.42 38.00
1.500 4.00 4.500 17.00 7.500 13.00 10.50 38.00
1.583 4.00 4.583 17.00 7.583 13.00 10.58 38.00
1.667 4.00 4.667 17.00 7.667 13.00 10.67 38.00
1.750 4.00 4.750 17.00 7.750 13.00 10.75 38.00
1.833 4.00 4.833 17.00 7.833 13.00 10.83 38.00
1.917 4.00 4.917 17.00 7.917 13.00 10.92 38.00
2.000 4.00 5.000 17.00 8.000 13.00 11.00 38.00

2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 2.567 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 170.143
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

CALIB					
NASHYD (0639)	Area (ha)=	4.60	Curve Number (CN)=	85.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.43			

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00

2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.582 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 170.139
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

ADD HYD (2630)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2636):	767.01	70.519	11.08	175.71
+ ID2= 2 (0638):	20.63	2.567	10.17	170.14
ID = 3 (2630):	787.64	72.676	11.08	175.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2630)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2630):	787.64	72.676	11.08	175.56
+ ID2= 2 (0639):	4.60	0.582	10.17	170.14
ID = 1 (2630):	792.24	73.152	11.08	175.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0709)	Area (ha)=	21.19	Curve Number (CN)=	85.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.65			

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00

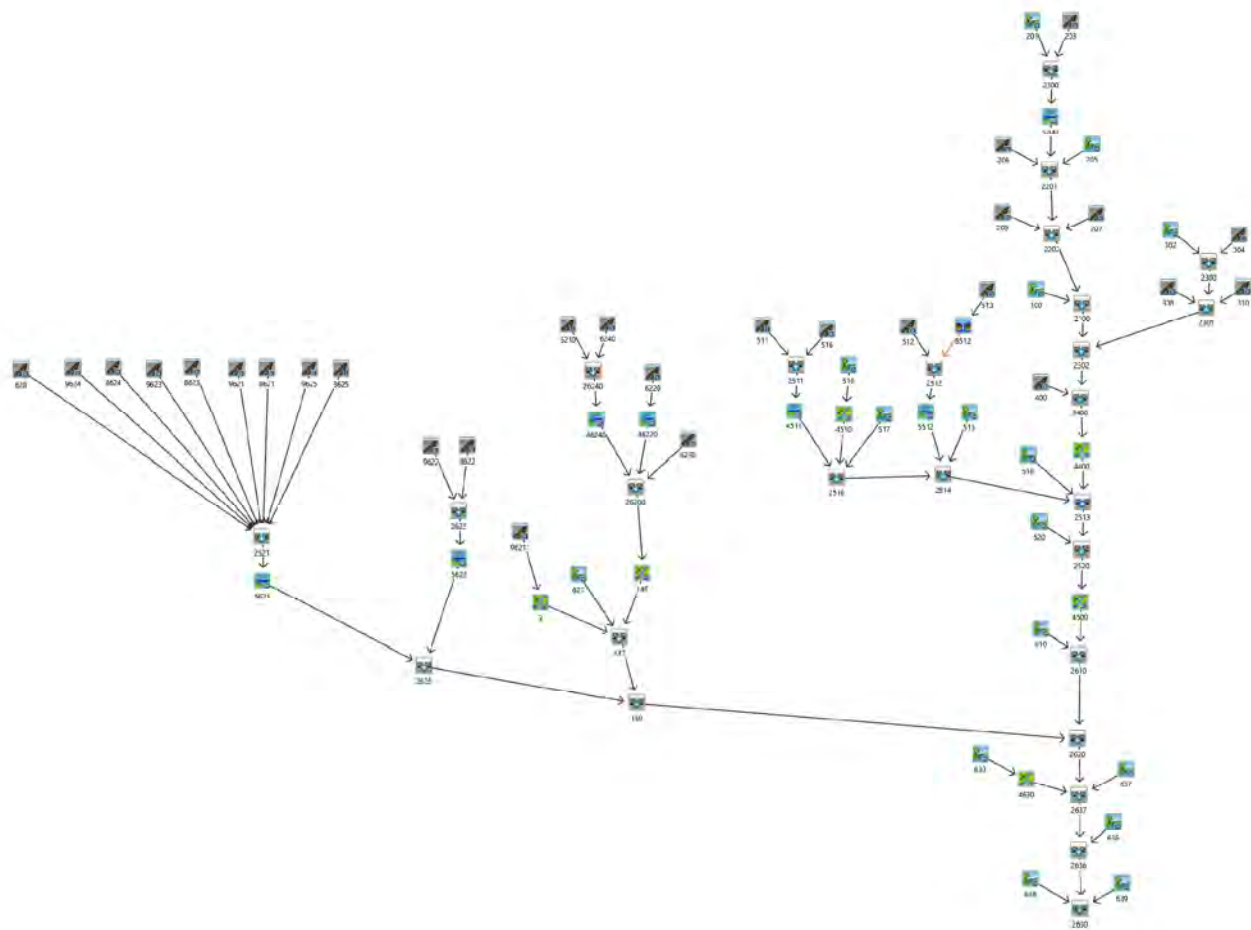
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.245

PEAK FLOW (cms)= 2.406 (i)
TIME TO PEAK (hrs)= 10.500
RUNOFF VOLUME (mm)= 170.152
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

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

FINISH



** SIMULATION : 2 year Fergus Shand Dam Chica **

CHICAGO STORM
Ptotal= 36.04 mm

IDF curve parameters: A= 721.000
B= 6.000
C= 0.796

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

Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	2.15	1.00	10.02	2.00	6.24	3.00	2.89
0.08	2.28	1.08	15.64	2.08	5.65	3.08	2.77
0.17	2.44	1.17	36.22	2.17	5.18	3.17	2.67
0.25	2.62	1.25	106.90	2.25	4.78	3.25	2.57
0.33	2.83	1.33	46.53	2.33	4.44	3.33	2.48
0.42	3.08	1.42	25.96	2.42	4.15	3.42	2.40
0.50	3.39	1.50	17.80	2.50	3.90	3.50	2.32
0.58	3.79	1.58	13.52	2.58	3.68	3.58	2.25
0.67	4.29	1.67	10.91	2.67	3.49	3.67	2.18
0.75	4.97	1.75	9.16	2.75	3.31	3.75	2.12
0.83	5.94	1.83	7.91	2.83	3.16	3.83	2.06
0.92	7.43	1.92	6.97	2.92	3.02	3.92	2.01

CALIB
NASHYD (0100)
ID= 1 DT= 2.0 min

Area (ha)= 136.98
Ia (mm)= 5.00
U.H. Tp(hrs)= 1.17
Curve Number (CN)= 69.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 0.841 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 6.637
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.184

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

CALIB
NASHYD (0201)
ID= 1 DT= 2.0 min

Area (ha)= 14.60
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.97
Curve Number (CN)= 74.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.153 (i)
TIME TO PEAK (hrs)= 2.633
RUNOFF VOLUME (mm)= 9.637
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.267

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

CALIB
STANDHYD (0203)
ID= 1 DT= 2.0 min

Area (ha)= 8.20
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	95.12	22.79
over (min)	5.00	14.00
Storage Coeff. (min)=	1.07 (ii)	12.29 (ii)
Unit Hyd. Tpeak (min)=	4.00	14.00
Unit Hyd. peak (cms)=	0.50	0.09

PEAK FLOW (cms)=	0.58	0.17	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.60	0.618 (iii)
RUNOFF VOLUME (mm)=	34.04	9.66	15.76
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.94	0.27	0.44

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0201):	14.60	0.153	2.63	9.64
+ ID2= 2 (0203):	8.20	0.618	1.33	15.76
ID = 3 (2200):	22.80	0.622	1.33	11.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1980	0.2314
0.0040	0.0218	0.2920	0.2621
0.0060	0.0446	0.3980	0.2937
0.0070	0.0683	0.5150	0.3261
0.0080	0.0930	0.8290	0.3592
0.0090	0.1187	1.3520	0.3930
0.0230	0.1453	2.0570	0.4275
0.0610	0.1730	2.9590	0.4629
0.1200	0.2017	0.0000	0.0000

INFLOW : ID= 2 (2200)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
OUTFLOW: ID= 1 (5200)	22.800	0.622	1.33	11.84
	22.800	0.102	4.10	11.44

PEAK FLOW REDUCTION [Qout/Qin](%)= 16.38
TIME SHIFT OF PEAK FLOW (min)=166.00
MAXIMUM STORAGE USED (ha.m.)= 0.1929

**** WARNING : SELECTED ROUTING TIME STEP DENIED.

```
-----
| CALIB |
| NASHYD ( 0205) | Area (ha)= 4.80 Curve Number (CN)= 90.0
| ID= 1 DT= 2.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
|-----|
| U.H. Tp(hrs)= 0.41
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.191 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.088
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.527
```

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

```
-----
| CALIB |
| STANDHYD ( 0206) | Area (ha)= 0.20
| ID= 1 DT= 2.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
|-----|
```

```
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)= 95.12 22.79
over (min) 5.00 14.00
Storage Coeff. (min)= 1.07 (ii) 12.29 (ii)
Unit Hyd. Tpeak (min)= 4.00 14.00
Unit Hyd. peak (cms)= 0.50 0.09
```

```
*TOTALS*
PEAK FLOW (cms)= 0.01 0.00 0.015 (iii)
TIME TO PEAK (hrs)= 1.33 1.60 1.33
RUNOFF VOLUME (mm)= 34.04 9.66 15.72
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.27 0.44
```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2201) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
|-----|
| ID1= 1 ( 0205): 4.80 0.191 1.83 19.01
+ ID2= 2 ( 0206): 0.20 0.015 1.33 15.72
|=====|
| ID = 3 ( 2201): 5.00 0.195 1.83 18.88
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2201) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
|-----|
| ID1= 3 ( 2201): 5.00 0.195 1.83 18.88
+ ID2= 2 ( 5200): 22.80 0.102 4.10 11.44
|=====|
| ID = 1 ( 2201): 27.80 0.203 1.83 12.78
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0209) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00
|-----|
```

```
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.43 2.27
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 35.00 35.00
Mannings n = 0.013 0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)= 95.12 12.09
over (min) 5.00 20.00
Storage Coeff. (min)= 1.31 (ii) 18.99 (ii)
Unit Hyd. Tpeak (min)= 4.00 20.00
Unit Hyd. peak (cms)= 0.48 0.06
```

```
*TOTALS*
PEAK FLOW (cms)= 0.06 0.04 0.065 (iii)
TIME TO PEAK (hrs)= 1.33 1.73 1.33
RUNOFF VOLUME (mm)= 34.04 7.85 9.94
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.22 0.28
```

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0207) | Area (ha)= 1.30
| ID= 1 DT= 2.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
|-----|
```

```
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.58 0.72
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)= 95.12 22.79
over (min) 5.00 14.00
Storage Coeff. (min)= 1.07 (ii) 12.29 (ii)
Unit Hyd. Tpeak (min)= 4.00 14.00
Unit Hyd. peak (cms)= 0.50 0.09
```

```
*TOTALS*
PEAK FLOW (cms)= 0.09 0.03 0.098 (iii)
TIME TO PEAK (hrs)= 1.33 1.60 1.33
RUNOFF VOLUME (mm)= 34.04 9.66 15.75
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.27 0.44
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2202)|
| 1 + 2 = 3 |
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
|-----
ID1= 1 ( 0207): 1.30 0.098 1.33 15.75
+ ID2= 2 ( 0209): 2.70 0.065 1.33 9.94
=====
ID = 3 ( 2202): 4.00 0.163 1.33 11.83
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2202)|
| 3 + 2 = 1 |
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
|-----
ID1= 3 ( 2202): 4.00 0.163 1.33 11.83
+ ID2= 2 ( 2201): 27.80 0.203 1.83 12.78
=====
ID = 1 ( 2202): 31.80 0.280 1.77 12.66
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2100)|
| 1 + 2 = 3 |
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
|-----
ID1= 1 ( 0100): 136.98 0.841 3.00 6.64
+ ID2= 2 ( 2202): 31.80 0.280 1.77 12.66
=====
ID = 3 ( 2100): 168.78 0.970 2.97 7.77
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0302)|
| ID= 1 DT= 2.0 min |
-----
| Area (ha)= 2.90 Curve Number (CN)= 74.0
| Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.45
-----
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.051 (i)
TIME TO PEAK (hrs)= 1.933
RUNOFF VOLUME (mm)= 9.637
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.267

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

```
-----
| CALIB
| STANDHYD ( 0304)|
| ID= 1 DT= 2.0 min |
-----
| Area (ha)= 4.40
| Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
-----
| IMPERVIOUS PERVIOUS (i)
|-----
```

```
Surface Area (ha)= 1.98 2.42
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250
```

```
NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.
Max.Eff.Inten.(mm/hr)= 95.12 22.79
over (min)= 5.00 14.00
Storage Coeff. (min)= 1.13 (ii) 12.98 (ii)
Unit Hyd. Tpeak (min)= 4.00 14.00
Unit Hyd. peak (cms)= 0.50 0.08
*TOTALS*
PEAK FLOW (cms)= 0.31 0.09 0.329 (iii)
TIME TO PEAK (hrs)= 1.33 1.60 1.33
RUNOFF VOLUME (mm)= 34.04 9.66 15.76
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.27 0.44
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2300)|
| 1 + 2 = 3 |
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
|-----
ID1= 1 ( 0302): 2.90 0.051 1.93 9.64
+ ID2= 2 ( 0304): 4.40 0.329 1.33 15.76
=====
ID = 3 ( 2300): 7.30 0.334 1.33 13.32
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 0308)|
| ID= 1 DT= 2.0 min |
-----
| Area (ha)= 0.20
| Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
-----
```

```
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 95.12 22.79
over (min)= 5.00 14.00
Storage Coeff. (min)= 1.13 (ii) 12.98 (ii)
Unit Hyd. Tpeak (min)= 4.00 14.00
Unit Hyd. peak (cms)= 0.50 0.08

PEAK FLOW (cms)= 0.01 0.00 0.015 (iii)
TIME TO PEAK (hrs)= 1.33 1.60 1.33
RUNOFF VOLUME (mm)= 34.04 9.66 15.72
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.27 0.44

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

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

```
-----
| CALIB |
| STANDHYD ( 0310) |
| ID= 1 DT= 2.0 min |
|-----|
| Area (ha)= 5.70 |
| Total Imp(%)= 16.00 |
| Dir. Conn.(%)= 8.00 |
|-----|
```

```

      IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250
```

```

      NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.
Max.Eff.Inten.(mm/hr)= 95.12 13.59
                    over (min) 5.00 16.00
Storage Coeff. (min)= 1.07 (ii) 14.86 (ii)
Unit Hyd. Tpeak (min)= 4.00 16.00
Unit Hyd. peak (cms)= 0.50 0.07
```

```

*TOTALS*
PEAK FLOW (cms)= 0.13 0.10 0.145 (iii)
TIME TO PEAK (hrs)= 1.33 1.63 1.33
RUNOFF VOLUME (mm)= 34.04 7.85 9.94
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.22 0.28
```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2301) |
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
|-----|
| ID1= 1 ( 2300): 7.30 0.334 1.33 13.32 |
| + ID2= 2 ( 0308): 0.20 0.015 1.33 15.72 |
|-----|
| ID = 3 ( 2301): 7.50 0.349 1.33 13.39 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2301) |
| 3 + 2 = 1 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
|-----|
| ID1= 3 ( 2301): 7.50 0.349 1.33 13.39 |
| + ID2= 2 ( 0310): 5.70 0.145 1.33 9.94 |
|-----|
| ID = 1 ( 2301): 13.20 0.494 1.33 11.90 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2302) |
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
|-----|
| ID1= 1 ( 2100): 168.78 0.970 2.97 7.77 |
| + ID2= 2 ( 2301): 13.20 0.494 1.33 11.90 |
|-----|
```

```
=====
ID = 3 ( 2302): 181.98 1.047 2.87 8.07
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0400) |
| ID= 1 DT= 2.0 min |
|-----|
| Area (ha)= 82.86 |
| Total Imp(%)= 10.00 |
| Dir. Conn.(%)= 3.00 |
|-----|
```

```

      IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```

Max.Eff.Inten.(mm/hr)= 57.01 11.22
                    over (min) 18.00 36.00
Storage Coeff. (min)= 17.62 (ii) 34.54 (ii)
Unit Hyd. Tpeak (min)= 18.00 36.00
Unit Hyd. peak (cms)= 0.06 0.03
```

```

*TOTALS*
PEAK FLOW (cms)= 0.25 0.91 1.047 (iii)
TIME TO PEAK (hrs)= 1.60 2.03 1.97
RUNOFF VOLUME (mm)= 34.04 7.45 8.24
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.94 0.21 0.23
```

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 ( 2400) |
| 1 + 2 = 3 |
|-----|
| AREA QPEAK TPEAK R.V. |
| (ha) (cms) (hrs) (mm) |
|-----|
| ID1= 1 ( 2302): 181.98 1.047 2.87 8.07 |
| + ID2= 2 ( 0400): 82.86 1.047 1.97 8.24 |
|-----|
| ID = 3 ( 2400): 264.84 1.947 2.03 8.13 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTE CHN( 4400) |
| IN= 2--> OUT= 1 |
|-----|
```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550
96.60 409.10 0.0550
115.80 408.90 0.0550
124.80 409.10 0.0550
131.00 408.90 0.0550 /0.0350 Main Channel
133.60 408.00 0.0350 Main Channel
134.40 407.60 0.0350 Main Channel
135.00 407.50 0.0350 Main Channel
135.80 407.60 0.0350 Main Channel
136.50 408.00 0.0350 Main Channel
```

139.40 408.80 0.0350 /0.0550 Main Channel
143.50 408.90 0.0550
148.50 408.70 0.0550
163.80 408.90 0.0550
183.20 408.90 0.0550
243.70 409.70 0.0550
278.70 410.20 0.0550
330.50 411.40 0.0550

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.19	407.69	.366E+03	0.1	0.51	58.83
0.37	407.87	.106E+04	0.5	0.81	37.08
0.56	408.06	.199E+04	1.1	1.00	29.93
0.74	408.24	.328E+04	2.1	1.14	26.32
0.93	408.43	.498E+04	3.6	1.28	23.32
1.11	408.61	.708E+04	5.6	1.43	20.94
1.30	408.80	.105E+05	8.5	1.45	20.61
1.49	408.99	.247E+05	14.8	1.07	27.91
1.68	409.18	.601E+05	30.4	0.91	32.97
1.87	409.37	.109E+06	58.5	0.96	31.05
2.06	409.56	.166E+06	98.3	1.06	28.11
2.25	409.75	.231E+06	150.3	1.17	25.57
2.44	409.94	.303E+06	215.4	1.28	23.46
2.64	410.14	.383E+06	293.8	1.38	21.74
2.83	410.33	.470E+06	390.1	1.49	20.10
3.02	410.52	.563E+06	502.4	1.60	18.66
3.21	410.71	.660E+06	628.8	1.71	17.48
3.40	410.90	.762E+06	769.5	1.81	16.49
3.59	411.09	.868E+06	924.9	1.91	15.65

----- hydrograph ----- <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (2400) 264.84 1.95 2.03 8.13 0.72 1.12
OUTFLOW: ID= 1 (4400) 264.84 1.70 2.67 8.12 0.67 1.08

| CALIB |
| NASHYD (0515) | Area (ha)= 5.01 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.467
PEAK FLOW (cms)= 0.067 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 6.963
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.193

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

| CALIB |
| NASHYD (0510) | Area (ha)= 91.44 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 1.09

Unit Hyd Qpeak (cms)= 3.204
PEAK FLOW (cms)= 0.784 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 8.627
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.239

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

| ROUTE CHN(4510) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.206E+02	0.0	0.19	101.61
0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

----- hydrograph ----- <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0510) 91.44 0.78 2.75 8.63 0.61 0.73
OUTFLOW: ID= 1 (4510) 91.44 0.72 3.17 8.62 0.59 0.72

| CALIB |
| NASHYD (0517) | Area (ha)= 2.14 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.32

Unit Hyd Qpeak (cms)= 0.255
PEAK FLOW (cms)= 0.042 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 8.624
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.239

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

| CALIB |
| STANDHYD (0511) | Area (ha)= 52.87
| ID= 1 DT= 5.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00
|-----|

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 26.43 26.43
Dep. Storage (mm)= 0.80 1.50

Average Slope (%)=	1.00	1.00
Length (m)=	593.69	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	76.72	25.83
over (min)	10.00	25.00
Storage Coeff. (min)=	8.27 (ii)	23.20 (ii)
Unit Hyd. Tpeak (min)=	10.00	25.00
Unit Hyd. peak (cms)=	0.13	0.05
		TOTALS
PEAK FLOW (cms)=	2.57	0.87
TIME TO PEAK (hrs)=	1.42	1.75
RUNOFF VOLUME (mm)=	35.24	11.21
TOTAL RAINFALL (mm)=	36.04	36.04
RUNOFF COEFFICIENT =	0.98	0.31
		0.51

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0516)	Area (ha)= 10.78		
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00	Dir. Conn.(%)= 45.00	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	4.85	5.93	
Dep. Storage (mm)=	0.80	1.50	
Average Slope (%)=	1.00	1.00	
Length (m)=	268.08	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	106.90	10.45	
over (min)	5.00	30.00	
Storage Coeff. (min)=	4.49 (ii)	25.94 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.23	0.04	
		TOTALS	
PEAK FLOW (cms)=	1.09	0.10	1.106 (iii)
TIME TO PEAK (hrs)=	1.33	1.83	1.33
RUNOFF VOLUME (mm)=	35.24	8.63	20.60
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.98	0.24	0.57

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2511)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0511):	52.87	2.863	1.42	18.42
+ ID2= 2 (0516):	10.78	1.106	1.33	20.60
ID = 3 (2511):	63.65	3.669	1.42	18.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(4511) OVERFLOW IS OFF

IN= 2--> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.7700	0.9000	3.2130	1.6220
	1.6000	1.1400	3.9540	1.8810
	2.2900	1.2810	4.9000	2.3000
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2511)	63.650	3.669	1.42	18.79
OUTFLOW: ID= 1 (4511)	63.650	0.614	2.67	18.78
	PEAK FLOW REDUCTION [Qout/Qin](%)= 16.74			
	TIME SHIFT OF PEAK FLOW (min)= 75.00			
	MAXIMUM STORAGE USED (ha.m.)= 0.7179			

ADD HYD (2510)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (4510):	91.44	0.725	3.17	8.62
+ ID2= 2 (4511):	63.65	0.614	2.67	18.78
ID = 3 (2510):	155.09	1.326	3.08	12.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2510)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2510):	155.09	1.326	3.08	12.79
+ ID2= 2 (0517):	2.14	0.042	1.75	8.62
ID = 1 (2510):	157.23	1.335	3.08	12.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0512)	Area (ha)= 27.13		
ID= 1 DT= 5.0 min	Total Imp(%)= 50.00	Dir. Conn.(%)= 30.00	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	13.56	13.56	
Dep. Storage (mm)=	0.80	1.50	
Average Slope (%)=	1.00	2.00	
Length (m)=	425.28	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	106.90	25.83	
over (min)	5.00	20.00	
Storage Coeff. (min)=	5.93 (ii)	18.06 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.19	0.06	
		TOTALS	
PEAK FLOW (cms)=	1.63	0.52	1.747 (iii)
TIME TO PEAK (hrs)=	1.33	1.67	1.33
RUNOFF VOLUME (mm)=	35.24	11.21	18.42
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.98	0.31	0.51

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

```
-----
| CALIB |
| STANDHYD ( 0513) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 6.44 |
| Total Imp(%)= 65.00 |
| Dir. Conn.(%)= 35.00 |
|-----|
| IMPERVIOUS |
| Surface Area (ha)= 4.19 |
| Dep. Storage (mm)= 0.80 |
| Average Slope (%)= 1.00 |
| Length (m)= 207.20 |
| Mannings n = 0.013 |
|-----|
| PERVIOUS (i) |
| 2.25 |
| 1.50 |
| 1.00 |
| 40.00 |
| 0.250 |
|-----|
| Max.Eff.Inten.(mm/hr)= 106.90 |
| over (min)= 5.00 |
| Storage Coeff. (min)= 3.85 (ii) |
| Unit Hyd. Tpeak (min)= 5.00 |
| Unit Hyd. peak (cms)= 0.25 |
|-----|
| *TOTALS* |
| PEAK FLOW (cms)= 0.54 |
| TIME TO PEAK (hrs)= 1.33 |
| RUNOFF VOLUME (mm)= 35.24 |
| TOTAL RAINFALL (mm)= 36.04 |
| RUNOFF COEFFICIENT = 0.98 |
|-----|
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| DUHYD ( 8512) |
| Inlet Cap.= 0.732 |
| #of Inlets= 1 |
| Total(cms)= 0.7 |
|-----|
| AREA | QPEAK | TPEAK | R.V. |
| (ha) | (cms) | (hrs) | (mm) |
|-----|
| TOTAL HYD.(ID= 1): 6.44 0.57 1.33 21.19 |
|-----|
| MAJOR SYS.(ID= 2): 0.00 0.00 0.00 0.00 |
| MINOR SYS.(ID= 3): 6.44 0.57 1.33 21.19 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2512) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 0512): 27.13 1.747 1.33 18.42 |
| + ID2= 2 ( 0512): 6.44 0.574 1.33 21.19 |
|-----|
| ID = 3 ( 2512): 33.57 2.321 1.33 18.95 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 5512) |
| IN= 2--> OUT= 1 |
| DT= 5.0 min |
|-----|
| OUTFLOW | STORAGE | OUTFLOW | STORAGE |
| (cms) | (ha.m.) | (cms) | (ha.m.) |
|-----|
| 0.0000 | 0.0000 | 0.6640 | 0.9151 |
| 0.0210 | 0.1601 | 0.8570 | 1.0220 |
| 0.0360 | 0.3317 | 1.0660 | 1.1320 |
| 0.0410 | 0.4218 | 1.2900 | 1.2450 |
|-----|
```

```
0.1000 0.5147 | 1.5290 1.3610
0.2030 0.6105 | 1.7810 1.4800
0.3340 0.7092 | 2.0460 1.6020
0.4890 0.8107 | 2.3220 1.7260
```

```
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 2512) 33.570 2.321 1.33 18.95
OUTFLOW: ID= 1 ( 5512) 33.570 0.129 4.00 18.89

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.54
TIME SHIFT OF PEAK FLOW (min)=160.00
MAXIMUM STORAGE USED (ha.m.)= 0.5414
```

```
-----
| ADD HYD ( 2514) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2510): 157.23 1.335 3.08 12.73 |
| + ID2= 2 ( 0515): 5.01 0.067 1.83 6.96 |
|-----|
| ID = 3 ( 2514): 162.24 1.356 3.08 12.56 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2514) |
| 3 + 2 = 1 |
|-----|
| ID1= 3 ( 2514): 162.24 1.356 3.08 12.56 |
| + ID2= 2 ( 5512): 33.57 0.129 4.00 18.89 |
|-----|
| ID = 1 ( 2514): 195.81 1.466 3.08 13.64 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0518) |
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 6.68 |
| Ia (mm)= 5.00 |
| U.H. Tp(hrs)= 0.20 |
| Curve Number (CN)= 71.0 |
| # of Linear Res.(N)= 3.00 |
|-----|
```

Unit Hyd Qpeak (cms)= 1.276

```
PEAK FLOW (cms)= 0.134 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 7.134
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.198
```

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

```
-----
| ADD HYD ( 2513) |
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 2514): 195.81 1.466 3.08 13.64 |
| + ID2= 2 ( 4400): 264.84 1.703 2.67 8.12 |
|-----|
| ID = 3 ( 2513): 460.65 3.129 2.90 10.40 |
|-----|
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2513) |
|-----|
```

```
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
-----
ID1= 3 ( 2513): 460.65 3.129 2.90 10.40
+ ID2= 2 ( 0518): 6.68 0.134 1.58 7.13
=====
ID = 1 ( 2513): 467.33 3.154 2.87 10.36
=====
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----
| CALIB |
| NASHYD ( 0520) | Area (ha)= 108.36 Curve Number (CN)= 71.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 1.20
-----
NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 0.706 (i)
TIME TO PEAK (hrs)= 3.033
RUNOFF VOLUME (mm)= 7.148
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.198

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

```
-----
| ADD HYD ( 2520) | AREA QPEAK TPEAK R.V.
| 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
-----
ID1= 1 ( 2513): 467.33 3.154 2.87 10.36
+ ID2= 2 ( 0520): 108.36 0.706 3.03 7.15
=====
ID = 3 ( 2520): 575.69 3.857 2.93 9.75
=====
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----
| ROUTE CHN( 4500) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 2.00
-----
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 / 0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 / 0.0550 Main Channel
109.70 404.30 0.0550
128.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
```

```
0.68 403.38 .304E+04 1.6 1.03 32.27
1.02 403.72 .718E+04 4.5 1.25 26.57
1.36 404.06 .122E+05 9.7 1.58 20.96
1.70 404.40 .251E+05 18.1 1.44 23.04
2.08 404.78 .650E+05 42.3 1.29 25.62
2.46 405.16 .122E+06 86.3 1.40 23.62
2.84 405.54 .192E+06 151.6 1.57 21.10
3.21 405.91 .270E+06 238.3 1.75 18.90
3.59 406.29 .357E+06 345.8 1.93 17.20
3.97 406.67 .452E+06 474.9 2.09 15.85
4.35 407.05 .554E+06 631.1 2.26 14.63
4.73 407.43 .663E+06 807.8 2.42 13.67
5.11 407.81 .779E+06 1006.4 2.57 12.89
5.49 408.19 .902E+06 1229.0 2.71 12.23
5.86 408.56 .103E+07 1476.4 2.84 11.66
6.24 408.94 .117E+07 1745.6 2.96 11.18
6.62 409.32 .132E+07 2034.5 3.07 10.79
7.00 409.70 .147E+07 2353.2 3.17 10.44

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 2520) 575.69 3.86 2.93 9.75 0.95 1.19
OUTFLOW: ID= 1 ( 4500) 575.69 3.63 3.40 9.75 0.92 1.17
```

```
-----
| CALIB |
| NASHYD ( 0610) | Area (ha)= 78.05 Curve Number (CN)= 71.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 1.00
-----
NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 0.576 (i)
TIME TO PEAK (hrs)= 2.733
RUNOFF VOLUME (mm)= 7.148
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.198

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

```
-----
| ADD HYD ( 2610) | AREA QPEAK TPEAK R.V.
| 1 + 2 = 3 | (ha) (cms) (hrs) (mm)
-----
ID1= 1 ( 4500): 575.69 3.635 3.40 9.75
+ ID2= 2 ( 0610): 78.05 0.576 2.73 7.15
=====
ID = 3 ( 2610): 653.74 4.140 3.30 9.44
=====
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----
| CALIB |
| NASHYD ( 0627) | Area (ha)= 9.39 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20
-----
Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.181 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 6.874
TOTAL RAINFALL (mm)= 36.039
```

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

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (26240)	2.750	0.431	1.33	23.41
OUTFLOW: ID= 1 (46240)	2.750	0.028	2.50	23.35

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.55
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 0.0417

```

```

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

```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
RESERVOIR( 46220)|
IN= 2---> OUT= 1 |
DT= 5.0 min |
OVERFLOW IS OFF
OUTFLOW (cms) STORAGE (ha.m.) | OUTFLOW (cms) STORAGE (ha.m.)
0.0000 0.0000 | 0.2590 0.0708
0.0050 0.0009 | 0.2910 0.0871
0.0100 0.0187 | 0.3210 0.1045
0.0130 0.0298 | 0.3720 0.1438
0.0150 0.0422 | 2.8080 0.2087
0.2220 0.0559 | 0.0000 0.0000
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 6220) 0.920 0.058 1.33 14.80
OUTFLOW: ID= 1 ( 46220) 0.920 0.005 3.08 14.32
PEAK FLOW REDUCTION [Qout/Qin](%)= 8.86
TIME SHIFT OF PEAK FLOW (min)=105.00
MAXIMUM STORAGE USED (ha.m.)= 0.0092
```

```
CALIB
STANDHYD ( 6230)|
ID= 1 DT= 5.0 min |
Area (ha)= 0.48
Total Imp(%)= 10.00 Dir. Conn.(%)= 5.00
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.05 0.43
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 20.00 20.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 106.90 11.91
over (min)= 5.00 15.00
Storage Coeff. (min)= 0.77 (ii) 11.68 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.34 0.09
*TOTALS*
PEAK FLOW (cms)= 0.01 0.01 0.010 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.58
RUNOFF VOLUME (mm)= 35.52 7.52 8.91
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.99 0.21 0.25
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 ( 26200)|
1 + 2 = 3 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 46220): 0.92 0.005 3.08 14.32
+ ID2= 2 ( 46240): 2.75 0.028 2.50 23.35
=====
ID = 3 ( 26200): 3.67 0.033 2.58 21.09
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
ADD HYD ( 26200)|
```

```
3 + 2 = 1 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 26200): 3.67 0.033 2.58 21.09
+ ID2= 2 ( 6230): 0.48 0.010 1.58 8.91
=====
ID = 1 ( 26200): 4.15 0.039 1.67 19.68
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
ROUTE CHN( 0149)|
IN= 2---> OUT= 1 |
Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08
```

```
<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 26200) 4.15 0.04 1.67 19.68 0.12 0.69
OUTFLOW: ID= 1 ( 0149) 4.15 0.04 1.83 19.67 0.12 0.69
```

```
CALIB
STANDHYD ( 96211)|
ID= 1 DT= 5.0 min |
Area (ha)= 0.61
Total Imp(%)= 58.00 Dir. Conn.(%)= 40.00
```

```
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.35 0.26
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 63.77 30.00
Mannings n = 0.013 0.250
```

```
Max.Eff.Inten.(mm/hr)= 106.90 22.50
over (min)= 5.00 15.00
Storage Coeff. (min)= 1.90 (ii) 12.68 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.32 0.08
```

```
*TOTALS*
PEAK FLOW (cms)= 0.07 0.01 0.072 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
```

RUNOFF VOLUME (mm)= 35.04 9.74 19.85
TOTAL RAINFALL (mm)= 36.04 36.04 36.04
RUNOFF COEFFICIENT = 0.97 0.27 0.55

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTE CHN(0009)|
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (96211) 0.61 0.07 1.33 19.85 0.16 0.89
OUTFLOW: ID= 1 (0009) 0.61 0.05 1.42 19.83 0.14 0.77

ADD HYD (0147)|
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0149): 4.15 0.039 1.83 19.67
+ ID2= 2 (0627): 9.39 0.181 1.58 6.87
=====

ID = 3 (0147): 13.54 0.215 1.58 10.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0147)|
3 + 2 = 1 | AREA QPEAK TPEAK R.V.

(ha) (cms) (hrs) (mm)
ID1= 3 (0147): 13.54 0.215 1.58 10.80
+ ID2= 2 (0009): 0.61 0.050 1.42 19.83
=====

ID = 1 (0147): 14.15 0.245 1.58 11.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (9621)| Area (ha)= 16.18
ID= 1 DT= 5.0 min | Total Imp(%)= 32.00 Dir. Conn.(%)= 20.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 5.18 11.00
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 328.43 30.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 106.90 18.13
over (min) 5.00 20.00
Storage Coeff. (min)= 5.08 (ii) 16.84 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.21 0.06

PEAK FLOW (cms)= 0.69 0.31 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.67 0.761 (iii)
RUNOFF VOLUME (mm)= 35.04 9.49 1.33
TOTAL RAINFALL (mm)= 36.04 36.04 14.60
RUNOFF COEFFICIENT = 0.97 0.26 36.04
0.41

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8621)| Area (ha)= 4.69
ID= 1 DT= 5.0 min | Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.69 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 176.82 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 12.22 16.14
over (min) 10.00 10.00
Storage Coeff. (min)= 8.34 (ii) 8.50 (ii)
Unit Hyd. Tpeak (min)= 10.00 10.00
Unit Hyd. peak (cms)= 0.13 0.14

PEAK FLOW (cms)= 0.12 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.83 1.50 0.116 (iii)
RUNOFF VOLUME (mm)= 11.04 8.32 1.83
TOTAL RAINFALL (mm)= 36.04 36.04 10.99
RUNOFF COEFFICIENT = 0.31 0.23 36.04
0.30

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

CALIB			
STANDHYD (8623)	Area (ha)= 2.05		
ID= 1 DT= 5.0 min	Total Imp(%)= 100.00	Dir. Conn.(%)= 100.00	

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	2.05	0.00	
Dep. Storage (mm)=	25.00	1.50	
Average Slope (%)=	1.00	2.00	
Length (m)=	116.90	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	13.52	31.35	
over (min)	5.00	10.00	
Storage Coeff. (min)=	6.25 (ii)	6.40 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.19	0.17	
			TOTALS
PEAK FLOW (cms)=	0.06	0.00	0.056 (iii)
TIME TO PEAK (hrs)=	1.75	1.42	1.75
RUNOFF VOLUME (mm)=	11.04	15.03	11.01
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.31	0.42	0.31

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 85.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

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

CALIB			
STANDHYD (9623)	Area (ha)= 4.42		
ID= 1 DT= 5.0 min	Total Imp(%)= 48.00	Dir. Conn.(%)= 35.00	

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	2.12	2.30	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	1.00	2.00	
Length (m)=	171.66	30.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	106.90	20.27	
over (min)	5.00	15.00	
Storage Coeff. (min)=	3.44 (ii)	14.68 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.26	0.08	
			TOTALS
PEAK FLOW (cms)=	0.38	0.08	0.407 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	35.04	9.96	18.73
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.97	0.28	0.52

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 70.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

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

CALIB			
STANDHYD (8624)	Area (ha)= 4.32		

ID= 1 DT= 5.0 min | Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	4.32	0.00	
Dep. Storage (mm)=	25.00	1.50	
Average Slope (%)=	1.00	2.00	
Length (m)=	169.71	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	12.22	16.14	
over (min)	10.00	10.00	
Storage Coeff. (min)=	8.14 (ii)	8.29 (ii)	
Unit Hyd. Tpeak (min)=	10.00	10.00	
Unit Hyd. peak (cms)=	0.13	0.17	
			TOTALS
PEAK FLOW (cms)=	0.11	0.00	0.108 (iii)
TIME TO PEAK (hrs)=	1.83	1.42	1.83
RUNOFF VOLUME (mm)=	11.04	8.32	10.95
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.31	0.23	0.30

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 70.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

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

CALIB			
STANDHYD (9624)	Area (ha)= 8.46		
ID= 1 DT= 5.0 min	Total Imp(%)= 51.00	Dir. Conn.(%)= 40.00	

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	4.31	4.15	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	1.00	2.00	
Length (m)=	237.49	30.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	106.90	19.52	
over (min)	5.00	20.00	
Storage Coeff. (min)=	4.18 (ii)	15.60 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.24	0.07	
			TOTALS
PEAK FLOW (cms)=	0.78	0.13	0.813 (iii)
TIME TO PEAK (hrs)=	1.33	1.67	1.33
RUNOFF VOLUME (mm)=	35.04	9.80	19.89
TOTAL RAINFALL (mm)=	36.04	36.04	36.04
RUNOFF COEFFICIENT =	0.97	0.27	0.55

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 70.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

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

CALIB			
STANDHYD (0628)	Area (ha)= 5.35		
ID= 1 DT= 5.0 min	Total Imp(%)= 60.00	Dir. Conn.(%)= 40.00	

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	3.21	2.14	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	1.00	2.00	

Length (m)= 188.86 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 106.90 28.21
over (min)= 5.00 20.00
Storage Coeff. (min)= 3.64 (ii) 15.35 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.25 0.07

PEAK FLOW (cms)= 0.52 0.10
TIME TO PEAK (hrs)= 1.33 1.67
RUNOFF VOLUME (mm)= 35.04 11.41
TOTAL RAINFALL (mm)= 36.04 36.04
RUNOFF COEFFICIENT = 0.97 0.32

TOTALS

0.543 (iii)
1.33
20.86
36.04
0.58

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8625)
ID= 1 DT= 5.0 min
Area (ha)= 4.11
Total Imp(%)= 100.00
Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.11 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 165.53 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 12.22 31.35
over (min)= 10.00 10.00
Storage Coeff. (min)= 8.02 (ii) 8.17 (ii)
Unit Hyd. Tpeak (min)= 10.00 10.00
Unit Hyd. peak (cms)= 0.13 0.17

TOTALS

PEAK FLOW (cms)= 0.10 0.00
TIME TO PEAK (hrs)= 1.83 1.42
RUNOFF VOLUME (mm)= 11.04 15.03
TOTAL RAINFALL (mm)= 36.04 36.04
RUNOFF COEFFICIENT = 0.31 0.42

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

CALIB
STANDHYD (9625)
ID= 1 DT= 5.0 min
Area (ha)= 8.07
Total Imp(%)= 55.00
Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.44 3.63
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 231.95 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 106.90 27.72
over (min)= 5.00 15.00
Storage Coeff. (min)= 4.12 (ii) 14.04 (ii)

Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.24 0.08

TOTALS

PEAK FLOW (cms)= 0.75 0.14
TIME TO PEAK (hrs)= 1.33 1.58
RUNOFF VOLUME (mm)= 35.04 10.46
TOTAL RAINFALL (mm)= 36.04 36.04
RUNOFF COEFFICIENT = 0.97 0.29

0.797 (iii)
1.33
20.29
36.04
0.56

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2621)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0628): 5.35 0.543 1.33 20.86
+ ID2= 2 (8621): 4.69 0.116 1.83 10.99
ID = 3 (2621): 10.04 0.543 1.33 16.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2621): 10.04 0.543 1.33 16.25
+ ID2= 2 (8623): 2.05 0.056 1.75 11.01
ID = 1 (2621): 12.09 0.543 1.33 15.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2621): 12.09 0.543 1.33 15.36
+ ID2= 2 (8624): 4.32 0.108 1.83 10.95
ID = 3 (2621): 16.41 0.543 1.33 14.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2621): 16.41 0.543 1.33 14.20
+ ID2= 2 (8625): 4.11 0.103 1.83 10.95
ID = 1 (2621): 20.52 0.543 1.33 13.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

ID1= 1 (2621): 20.52 0.543 1.33 13.55
+ ID2= 2 (9621): 16.18 0.761 1.33 14.60
=====

ID = 3 (2621): 36.70 1.304 1.33 14.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2621)|
| 3 + 2 = 1 |
=====

ID1= 3 (2621): 36.70 1.304 1.33 14.01
+ ID2= 2 (9623): 4.42 0.407 1.33 18.73

ID = 1 (2621): 41.12 1.711 1.33 14.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2621)|
| 1 + 2 = 3 |
=====

ID1= 1 (2621): 41.12 1.711 1.33 14.52
+ ID2= 2 (9624): 8.46 0.813 1.33 19.89

ID = 3 (2621): 49.58 2.524 1.33 15.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2621)|
| 3 + 2 = 1 |
=====

ID1= 3 (2621): 49.58 2.524 1.33 15.44
+ ID2= 2 (9625): 8.07 0.797 1.33 20.29

ID = 1 (2621): 57.65 3.321 1.33 16.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(5621)|
| 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	1.5000	2.5000
0.0010	0.0000	2.5000	3.0000
0.0100	1.0000	3.0000	3.5000
0.0500	1.5000	4.0000	4.0000
0.5000	2.0000	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2621)	57.650	3.321	1.33	16.12
OUTFLOW: ID= 1 (5621)	57.650	0.009	4.75	7.46

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.28
TIME SHIFT OF PEAK FLOW (min)=205.00
MAXIMUM STORAGE USED (ha.m.)= 0.9186

| CALIB
| STANDHYD (9622)|
| ID= 1 DT= 5.0 min |
=====

	Area (ha)	IMPERVIOUS	PERVIOUS (i)
Surface Area	6.75	2.97	3.78

Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 212.13 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 106.90 20.27
over (min)= 5.00 20.00
Storage Coeff. (min)= 3.91 (ii) 15.15 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.25 0.07

PEAK FLOW (cms)= 0.48 0.12 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.67 0.509 (iii)
RUNOFF VOLUME (mm)= 35.04 9.96 1.33
TOTAL RAINFALL (mm)= 36.04 36.04 17.48
RUNOFF COEFFICIENT = 0.97 0.28 36.04 0.48

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (8622)|
| ID= 1 DT= 5.0 min |
=====

	Area (ha)	IMPERVIOUS	PERVIOUS (i)
Surface Area	2.20	2.20	0.00
Dep. Storage	25.00	25.00	1.50
Average Slope	1.00	1.00	2.00
Length	121.11	121.11	40.00
Mannings n	0.013	0.013	0.250

Max.Eff.Inten.(mm/hr)= 13.52 31.35
over (min)= 5.00 10.00
Storage Coeff. (min)= 6.38 (ii) 6.78 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.18 0.14

PEAK FLOW (cms)= 0.06 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.75 1.42 0.060 (iii)
RUNOFF VOLUME (mm)= 11.04 15.03 1.75
TOTAL RAINFALL (mm)= 36.04 36.04 11.04
RUNOFF COEFFICIENT = 0.31 0.42 36.04 0.31

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

| ADD HYD (2622)|
| 1 + 2 = 3 |
=====

ID1= 1 (8622): 2.20 0.060 1.75 11.04
+ ID2= 2 (9622): 6.75 0.509 1.33 17.48
=====

ID = 3 (2622): 8.95 0.509 1.33 15.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
RESERVOIR( 5622)|
IN= 2---> OUT= 1 |
DT= 5.0 min      |
OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.4500 0.2500
0.0010 0.0000 | 0.6500 0.3200
0.0050 0.1200 | 0.8000 0.4000
0.1000 0.1500 | 0.9800 0.5000
0.3000 0.2000 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 2622) 8.950 0.509 1.33 15.90
OUTFLOW: ID= 1 ( 5622) 8.950 0.033 4.00 14.91

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.45
TIME SHIFT OF PEAK FLOW (min)=160.00
MAXIMUM STORAGE USED (ha.m.)= 0.1293
```

```
ADD HYD ( 2625)|
1 + 2 = 3 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 5621): 57.65 0.009 4.75 7.46
+ ID2= 2 ( 5622): 8.95 0.033 4.00 14.91
=====
ID = 3 ( 2625): 66.60 0.042 4.00 8.47
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
ADD HYD ( 0150)|
1 + 2 = 3 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0147): 14.15 0.245 1.58 11.19
+ ID2= 2 ( 2625): 66.60 0.042 4.00 8.47
=====
ID = 3 ( 0150): 80.75 0.251 1.58 8.94
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
ADD HYD ( 2620)|
1 + 2 = 3 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 0150): 80.75 0.251 1.58 8.94
+ ID2= 2 ( 2610): 653.74 4.140 3.30 9.44
=====
ID = 3 ( 2620): 734.49 4.235 3.30 8.99
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
CALIB
NASHYD ( 0637)|
ID= 1 DT= 5.0 min |
U.H. Tp(hrs)= 0.20
Area (ha)= 8.42 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
```

Unit Hyd Qpeak (cms)= 1.608

PEAK FLOW (cms)= 0.162 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 6.874
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

```
CALIB
NASHYD ( 0630)|
ID= 1 DT= 5.0 min |
U.H. Tp(hrs)= 0.38
Area (ha)= 33.04 Curve Number (CN)= 70.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
```

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 0.439 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 6.886
TOTAL RAINFALL (mm)= 36.039
RUNOFF COEFFICIENT = 0.191

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

```
ROUTE CHN( 4630)|
IN= 2---> OUT= 1 |
Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .893E+01 0.0 0.17 47.72
0.16 412.86 .357E+02 0.0 0.28 30.06
0.24 412.94 .804E+02 0.1 0.36 22.94
0.32 413.02 .143E+03 0.1 0.44 18.94
0.39 413.09 .223E+03 0.2 0.51 16.32
0.47 413.17 .322E+03 0.4 0.58 14.45
0.55 413.25 .438E+03 0.6 0.64 13.04
0.63 413.33 .572E+03 0.8 0.70 11.93
0.71 413.41 .724E+03 1.1 0.76 11.03
0.79 413.49 .893E+03 1.4 0.81 10.28
0.87 413.57 .108E+04 1.9 0.86 9.65
0.95 413.65 .129E+04 2.4 0.92 9.10
1.03 413.73 .151E+04 2.9 0.97 8.63
1.11 413.81 .175E+04 3.6 1.01 8.22
1.18 413.88 .201E+04 4.3 1.06 7.85
1.26 413.96 .229E+04 5.1 1.11 7.52
1.34 414.04 .258E+04 6.0 1.15 7.22
1.42 414.12 .289E+04 6.9 1.20 6.95
1.50 414.20 .323E+04 8.0 1.24 6.70
```

```
<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 0630) 33.04 0.44 1.83 6.89 0.50 0.60
OUTFLOW: ID= 1 ( 4630) 33.04 0.38 2.08 6.88 0.48 0.58
```

```
ADD HYD ( 2637)|
1 + 2 = 3 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2620): 734.49 4.235 3.30 8.99
+ ID2= 2 ( 4630): 33.04 0.384 2.08 6.88
=====
ID = 3 ( 2637): 767.53 4.381 3.27 8.90
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2637)|
| 3 + 2 = 1 |
-----
| AREA   QPEAK   TPEAK   R.V.
| (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2637): 767.53 4.381 3.27 8.90
+ ID2= 2 ( 0637): 8.42  0.162 1.58 6.87
=====
ID = 1 ( 2637): 775.95 4.407 3.27 8.88
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0636)|
| ID= 1 DT= 5.0 min |
-----
| Area   (ha)= 3.60   Curve Number (CN)= 70.0
| Ia     (mm)= 5.00   # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20
-----
```

Unit Hyd Qpeak (cms)= 0.688

PEAK FLOW (cms)= 0.069 (i)

TIME TO PEAK (hrs)= 1.583

RUNOFF VOLUME (mm)= 6.874

TOTAL RAINFALL (mm)= 36.039

RUNOFF COEFFICIENT = 0.191

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

```
-----
| ADD HYD ( 2636)|
| 1 + 2 = 3 |
-----
| AREA   QPEAK   TPEAK   R.V.
| (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2637): 775.95 4.407 3.27 8.88
+ ID2= 2 ( 0636): 3.60  0.069 1.58 6.87
=====
ID = 3 ( 2636): 779.55 4.418 3.27 8.87
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0638)|
| ID= 1 DT= 5.0 min |
-----
| Area   (ha)= 20.63   Curve Number (CN)= 70.0
| Ia     (mm)= 5.00   # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20
-----
```

Unit Hyd Qpeak (cms)= 3.940

PEAK FLOW (cms)= 0.398 (i)

TIME TO PEAK (hrs)= 1.583

RUNOFF VOLUME (mm)= 6.874

TOTAL RAINFALL (mm)= 36.039

RUNOFF COEFFICIENT = 0.191

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

```
-----
| CALIB
| NASHYD ( 0639)|
| ID= 1 DT= 5.0 min |
-----
| Area   (ha)= 4.47   Curve Number (CN)= 70.0
| Ia     (mm)= 5.00   # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20
-----
```

Unit Hyd Qpeak (cms)= 0.854

PEAK FLOW (cms)= 0.086 (i)

TIME TO PEAK (hrs)= 1.583

RUNOFF VOLUME (mm)= 6.874

TOTAL RAINFALL (mm)= 36.039

RUNOFF COEFFICIENT = 0.191

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

```
-----
| ADD HYD ( 2630)|
| 1 + 2 = 3 |
-----
| AREA   QPEAK   TPEAK   R.V.
| (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2636): 779.55 4.418 3.27 8.87
+ ID2= 2 ( 0638): 20.63 0.398 1.58 6.87
=====
ID = 3 ( 2630): 800.18 4.481 3.27 8.82
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2630)|
| 3 + 2 = 1 |
-----
| AREA   QPEAK   TPEAK   R.V.
| (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2630): 800.18 4.481 3.27 8.82
+ ID2= 2 ( 0639): 4.47  0.086 1.58 6.87
=====
ID = 1 ( 2630): 804.65 4.495 3.27 8.81
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 8709)|
| ID= 1 DT= 5.0 min |
-----
| Area   (ha)= 3.51
| Total Imp(%)= 100.00   Dir. Conn.(%)= 100.00
-----
```

IMPERVIOUS PERVIOUS (i)

Surface Area (ha)= 3.51 0.00

Dep. Storage (mm)= 25.00 1.50

Average Slope (%)= 1.00 2.00

Length (m)= 20.00 40.00

Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 13.52 31.35

over (min)= 5.00 5.00

Storage Coeff. (min)= 2.17 (ii) 2.32 (ii)

Unit Hyd. Tpeak (min)= 5.00 5.00

Unit Hyd. peak (cms)= 0.31 0.30

TOTALS

PEAK FLOW (cms)= 0.12 0.00 0.122 (iii)

TIME TO PEAK (hrs)= 1.67 1.33 1.67

RUNOFF VOLUME (mm)= 11.04 15.03 11.04

TOTAL RAINFALL (mm)= 36.04 36.04 36.04

RUNOFF COEFFICIENT = 0.31 0.42 0.31

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

```
-----
| CALIB
| STANDHYD ( 9709)|
| ID= 1 DT= 5.0 min |
-----
| Area   (ha)= 7.20
| Total Imp(%)= 56.00   Dir. Conn.(%)= 40.00
-----
```

IMPERVIOUS PERVIOUS (i)

Surface Area (ha)= 4.03 3.17

Dep. Storage (mm)= 1.00 1.50

Average Slope (%)= 1.00 2.00
Length (m)= 219.09 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 106.90 28.89
over (min)= 5.00 15.00
Storage Coeff. (min)= 3.98 (ii) 13.74 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.24 0.08

PEAK FLOW (cms)= 0.68 0.13
TIME TO PEAK (hrs)= 1.33 1.58
RUNOFF VOLUME (mm)= 35.04 10.64
TOTAL RAINFALL (mm)= 36.04 36.04
RUNOFF COEFFICIENT = 0.97 0.30

TOTALS
0.720 (iii)
1.33
20.40
36.04
0.57

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2709)
1 + 2 = 3

ID1= 1 (8709): 3.51 0.122 1.67 11.04
+ ID2= 2 (9709): 7.20 0.720 1.33 20.40
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5709)
IN= 2--> OUT= 1
DT= 5.0 min
OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.6000 0.3800
0.0010 0.0000 | 0.9000 0.5400
0.0100 0.1000 | 1.1000 0.7100
0.0500 0.2000 | 1.4000 0.8900
0.4000 0.2400 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2709) 10.710 0.720 1.33 17.33
OUTFLOW: ID= 1 (5709) 10.710 0.034 4.08 17.33

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.72
TIME SHIFT OF PEAK FLOW (min)=165.00
MAXIMUM STORAGE USED (ha.m.)= 0.1602

FINISH

** SIMULATION : 5 year Fergus Shand Dam Chica **

CHICAGO STORM | IDF curve parameters: A=1436.000
Ptotal= 51.35 mm | B= 11.000

C= 0.854
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	2.55	1.00	15.63	2.00	9.04	3.00	3.62
0.08	2.73	1.08	25.44	2.08	8.05	3.08	3.45
0.17	2.95	1.17	57.17	2.17	7.25	3.17	3.29
0.25	3.21	1.25	134.65	2.25	6.59	3.25	3.15
0.33	3.53	1.33	71.87	2.33	6.04	3.33	3.02
0.42	3.91	1.42	42.53	2.42	5.57	3.42	2.90
0.50	4.38	1.50	29.16	2.50	5.17	3.50	2.79
0.58	4.99	1.58	21.78	2.58	4.83	3.58	2.69
0.67	5.80	1.67	17.20	2.67	4.52	3.67	2.59
0.75	6.91	1.75	14.12	2.75	4.26	3.75	2.51
0.83	8.53	1.83	11.92	2.83	4.02	3.83	2.42
0.92	11.09	1.92	10.29	2.92	3.81	3.92	2.35

CALIB
NASHYD (0100)
ID= 1 DT= 2.0 min
Area (ha)= 136.98
Ia (mm)= 5.00
U.H. Tp(hrs)= 1.17
Curve Number (CN)= 69.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 1.784 (i)
TIME TO PEAK (hrs)= 2.900
RUNOFF VOLUME (mm)= 13.390
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.261

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

CALIB
STANDHYD (0201)
ID= 1 DT= 2.0 min
Area (ha)= 14.60
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.97
Curve Number (CN)= 74.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.297 (i)
TIME TO PEAK (hrs)= 2.600
RUNOFF VOLUME (mm)= 17.868
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.348

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

CALIB
STANDHYD (0203)
ID= 1 DT= 2.0 min
Area (ha)= 8.20
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.69 4.51
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20

Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 121.73 46.70
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.97 (ii) 8.84 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.52 0.12

PEAK FLOW (cms)= 0.74 0.40 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.50 0.889 (iii)
RUNOFF VOLUME (mm)= 49.35 18.37 26.12
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.96 0.36 0.51

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200)
1 + 2 = 3
ID1= 1 (0201): 14.60 0.297 2.60 17.87
+ ID2= 2 (0203): 8.20 0.889 1.33 26.12
ID = 3 (2200): 22.80 0.897 1.33 20.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)
IN= 2--> OUT= 1
DT= 5.0 min
OVERFLOW IS OFF
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1980 0.2314
0.0040 0.0218 | 0.2920 0.2621
0.0060 0.0446 | 0.3980 0.2937
0.0070 0.0683 | 0.5150 0.3261
0.0080 0.0930 | 0.8290 0.3592
0.0090 0.1187 | 1.3520 0.3930
0.0230 0.1453 | 2.0570 0.4275
0.0610 0.1730 | 2.9590 0.4629
0.1200 0.2017 | 0.0000 0.0000
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2200) 22.800 0.897 1.33 20.84
OUTFLOW: ID= 1 (5200) 22.800 0.275 3.43 20.41

PEAK FLOW REDUCTION [Qout/Qin](%)= 30.71
TIME SHIFT OF PEAK FLOW (min)=126.00
MAXIMUM STORAGE USED (ha.m.)= 0.2567

**** WARNING : SELECTED ROUTING TIME STEP DENIED.

CALIB
NASHYD (0205)
ID= 1 DT= 2.0 min
Area (ha)= 4.80 Curve Number (CN)= 90.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.41

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.335 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 31.834
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.620

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

CALIB
STANDHYD (0206)
ID= 1 DT= 2.0 min
Area (ha)= 0.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 121.73 46.70
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.97 (ii) 8.84 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.52 0.12
PEAK FLOW (cms)= 0.02 0.01 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.50 0.022 (iii)
RUNOFF VOLUME (mm)= 49.35 18.37 26.09
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.96 0.36 0.51

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201)
1 + 2 = 3
ID1= 1 (0205): 4.80 0.335 1.83 31.83
+ ID2= 2 (0206): 0.20 0.022 1.33 26.09
ID = 3 (2201): 5.00 0.342 1.83 31.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201)
3 + 2 = 1
ID1= 3 (2201): 5.00 0.342 1.83 31.60
+ ID2= 2 (5200): 22.80 0.275 3.43 20.41
ID = 1 (2201): 27.80 0.381 1.93 22.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0209) |
| ID= 1 DT= 2.0 min |
|-----|
Area (ha)= 2.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00
```

```

      IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)= 0.43    2.27
Dep. Storage (mm)= 2.00    5.00
Average Slope (%)= 1.20    1.20
Length (m)= 35.00    35.00
Mannings n = 0.013    0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)= 121.73    27.44
over (min)= 5.00    14.00
Storage Coeff. (min)= 1.19 (ii)    13.93 (ii)
Unit Hyd. Tpeak (min)= 4.00    14.00
Unit Hyd. peak (cms)= 0.49    0.08
```

```

      *TOTALS*
PEAK FLOW (cms)= 0.08    0.11    0.125 (iii)
TIME TO PEAK (hrs)= 1.33    1.60    1.60
RUNOFF VOLUME (mm)= 49.35    15.47    18.18
TOTAL RAINFALL (mm)= 51.35    51.35    51.35
RUNOFF COEFFICIENT = 0.96    0.30    0.35
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0207) |
| ID= 1 DT= 2.0 min |
|-----|
Area (ha)= 1.30
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
```

```

      IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)= 0.58    0.72
Dep. Storage (mm)= 2.00    5.00
Average Slope (%)= 1.20    1.20
Length (m)= 25.00    25.00
Mannings n = 0.013    0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)= 121.73    46.70
over (min)= 5.00    10.00
Storage Coeff. (min)= 0.97 (ii)    8.84 (ii)
Unit Hyd. Tpeak (min)= 4.00    10.00
Unit Hyd. peak (cms)= 0.52    0.12
```

```

      *TOTALS*
PEAK FLOW (cms)= 0.12    0.06    0.141 (iii)
TIME TO PEAK (hrs)= 1.33    1.50    1.33
RUNOFF VOLUME (mm)= 49.35    18.37    26.11
TOTAL RAINFALL (mm)= 51.35    51.35    51.35
RUNOFF COEFFICIENT = 0.96    0.36    0.51
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2202) |
| 1 + 2 = 3 |
|-----|
      AREA    QPEAK    TPEAK    R.V.
      (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0207): 1.30    0.141    1.33    26.11
+ ID2= 2 ( 0209): 2.70    0.125    1.60    18.18
=====
ID = 3 ( 2202): 4.00    0.240    1.33    20.76
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2202) |
| 3 + 2 = 1 |
|-----|
      AREA    QPEAK    TPEAK    R.V.
      (ha)    (cms)    (hrs)    (mm)
ID1= 3 ( 2202): 4.00    0.240    1.33    20.76
+ ID2= 2 ( 2201): 27.80    0.381    1.93    22.43
=====
ID = 1 ( 2202): 31.80    0.517    1.77    22.22
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2100) |
| 1 + 2 = 3 |
|-----|
      AREA    QPEAK    TPEAK    R.V.
      (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0100): 136.98    1.784    2.90    13.39
+ ID2= 2 ( 2202): 31.80    0.517    1.77    22.22
=====
ID = 3 ( 2100): 168.78    2.160    2.90    15.05
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0302) |
| ID= 1 DT= 2.0 min |
|-----|
Area (ha)= 2.90 Curve Number (CN)= 74.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.45
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Unit Hyd Qpeak (cms)= 0.246
PEAK FLOW (cms)= 0.101 (i)
TIME TO PEAK (hrs)= 1.933
RUNOFF VOLUME (mm)= 17.868
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.348
```

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

```
-----
| CALIB |
| STANDHYD ( 0304) |
| ID= 1 DT= 2.0 min |
|-----|
Area (ha)= 4.40
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
```

```

      IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)= 1.98    2.42
Dep. Storage (mm)= 2.00    5.00
Average Slope (%)= 1.00    1.00
Length (m)= 25.00    25.00
Mannings n = 0.013    0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)= 121.73    46.70
```


over (min)	5.00	10.00	
Storage Coeff. (min)=	1.03 (ii)	9.92 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.51	0.11	
TOTALS			
PEAK FLOW (cms)=	0.40	0.21	0.470 (iii)
TIME TO PEAK (hrs)=	1.33	1.53	1.33
RUNOFF VOLUME (mm)=	49.35	18.37	26.12
TOTAL RAINFALL (mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT =	0.96	0.36	0.51

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0302):	2.90	0.101	1.93	17.87
+ ID2= 2 (0304):	4.40	0.470	1.33	26.12
=====				
ID = 3 (2300):	7.30	0.480	1.33	22.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0308)				
ID= 1 DT= 2.0 min				
	Area	(ha)=	0.20	
	Total Imp(%)=	45.00	Dir. Conn.(%)=	25.00
	IMPERVIOUS	PERVIOUS (i)		
Surface Area (ha)=	0.09	0.11		
Dep. Storage (mm)=	2.00	5.00		
Average Slope (%)=	1.00	1.00		
Length (m)=	25.00	25.00		
Mannings n =	0.013	0.250		

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	121.73	46.70	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.03 (ii)	9.92 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.51	0.11	
TOTALS			
PEAK FLOW (cms)=	0.02	0.01	0.021 (iii)
TIME TO PEAK (hrs)=	1.33	1.53	1.33
RUNOFF VOLUME (mm)=	49.35	18.37	26.09
TOTAL RAINFALL (mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT =	0.96	0.36	0.51

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD (0310)				
ID= 1 DT= 2.0 min				
	Area	(ha)=	5.70	
	Total Imp(%)=	16.00	Dir. Conn.(%)=	8.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.91	4.79	
Dep. Storage (mm)=	2.00	5.00	
Average Slope (%)=	1.20	1.20	
Length (m)=	25.00	25.00	
Mannings n =	0.013	0.250	
NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.			
Max.Eff.Inten.(mm/hr)=	121.73	30.89	
over (min)	5.00	12.00	
Storage Coeff. (min)=	0.97 (ii)	10.90 (ii)	
Unit Hyd. Tpeak (min)=	4.00	12.00	
Unit Hyd. peak (cms)=	0.52	0.10	
TOTALS			
PEAK FLOW (cms)=	0.17	0.26	0.301 (iii)
TIME TO PEAK (hrs)=	1.33	1.57	1.53
RUNOFF VOLUME (mm)=	49.35	15.47	18.18
TOTAL RAINFALL (mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT =	0.96	0.30	0.35

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2300):	7.30	0.480	1.33	22.84
+ ID2= 2 (0308):	0.20	0.021	1.33	26.09
=====				
ID = 3 (2301):	7.50	0.502	1.33	22.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2301):	7.50	0.502	1.33	22.93
+ ID2= 2 (0310):	5.70	0.301	1.53	18.18
=====				
ID = 1 (2301):	13.20	0.738	1.37	20.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2302)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2100):	168.78	2.160	2.90	15.05
+ ID2= 2 (2301):	13.20	0.738	1.37	20.88
=====				
ID = 3 (2302):	181.98	2.289	2.80	15.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0400)				
	Area	(ha)=	82.86	

|ID= 1 DT= 2.0 min | Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	8.29	74.57
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	0.70	2.00
Length (m)=	1437.00	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	85.06	26.95
over (min)	16.00	28.00
Storage Coeff. (min)=	15.01 (ii)	26.94 (ii)
Unit Hyd. Tpeak (min)=	16.00	28.00
Unit Hyd. peak (cms)=	0.07	0.04

		TOTALS
PEAK FLOW (cms)=	0.39	2.28 2.526 (iii)
TIME TO PEAK (hrs)=	1.57	1.87
RUNOFF VOLUME (mm)=	49.35	14.77 15.81
TOTAL RAINFALL (mm)=	51.35	51.35
RUNOFF COEFFICIENT =	0.96	0.29 0.31

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2302):	181.98	2.289	2.80	15.48
+ ID2= 2 (0400):	82.86	2.526	1.87	15.81
=====				
ID = 3 (2400):	264.84	4.230	1.93	15.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4400)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 2.00

Distance	Elevation	Manning	
0.00	411.10	0.0550	
27.30	410.20	0.0550	
77.50	409.10	0.0550	
96.60	409.10	0.0550	
115.80	408.90	0.0550	
124.80	409.10	0.0550	
131.00	408.90	0.0550 / 0.0350	Main Channel
133.60	408.00	0.0350	Main Channel
134.40	407.60	0.0350	Main Channel
135.00	407.50	0.0350	Main Channel
135.80	407.60	0.0350	Main Channel
136.50	408.00	0.0350	Main Channel
139.40	408.80	0.0350 / 0.0550	Main Channel
143.50	408.90	0.0550	
148.50	408.70	0.0550	
163.80	408.90	0.0550	
183.20	408.90	0.0550	
243.70	409.70	0.0550	
278.70	410.20	0.0550	
330.50	411.40	0.0550	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.19	407.69	.366E+03	0.1	0.51	58.83
0.37	407.87	.106E+04	0.5	0.81	37.08
0.56	408.06	.199E+04	1.1	1.00	29.93
0.74	408.24	.328E+04	2.1	1.14	26.32
0.93	408.43	.498E+04	3.6	1.28	23.32
1.11	408.61	.708E+04	5.6	1.43	20.94
1.30	408.80	.105E+05	8.5	1.45	20.61
1.49	408.99	.247E+05	14.8	1.07	27.91
1.68	409.18	.601E+05	30.4	0.91	32.97
1.87	409.37	.109E+06	58.5	0.96	31.05
2.06	409.56	.166E+06	98.3	1.06	28.11
2.25	409.75	.231E+06	150.3	1.17	25.57
2.44	409.94	.303E+06	215.4	1.28	23.46
2.64	410.14	.383E+06	293.8	1.38	21.74
2.83	410.33	.470E+06	390.1	1.49	20.10
3.02	410.52	.563E+06	502.4	1.60	18.66
3.21	410.71	.660E+06	628.8	1.71	17.48
3.40	410.90	.762E+06	769.5	1.81	16.49
3.59	411.09	.868E+06	924.9	1.91	15.65

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (2400)	264.84	4.23	1.93	15.58	0.99	1.33
OUTFLOW: ID= 1 (4400)	264.84	3.70	2.47	15.58	0.94	1.29

CALIB	Area (ha)=	Curve Number (CN)=
NASHYD (0515)	5.01	65.0
ID= 1 DT= 5.0 min	Ia (mm)= 1.50	# of Linear Res.(N)= 3.00
U.H. Tp(hrs)=	0.41	

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW (cms)=	0.135 (i)
TIME TO PEAK (hrs)=	1.833
RUNOFF VOLUME (mm)=	13.316
TOTAL RAINFALL (mm)=	51.355
RUNOFF COEFFICIENT =	0.259

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

CALIB	Area (ha)=	Curve Number (CN)=
NASHYD (0510)	91.44	71.0
ID= 1 DT= 5.0 min	Ia (mm)= 1.50	# of Linear Res.(N)= 3.00
U.H. Tp(hrs)=	1.09	

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)=	1.537 (i)
TIME TO PEAK (hrs)=	2.750
RUNOFF VOLUME (mm)=	16.181
TOTAL RAINFALL (mm)=	51.355
RUNOFF COEFFICIENT =	0.315

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

| ROUTE CHN(4510)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV. TIME (min)
0.08	412.78	.206E+02	0.0	0.19	101.61
0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

<---- hydrograph ---->

<-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0510)	91.44	1.54	2.75	16.18	0.78	0.87
OUTFLOW: ID= 1 (4510)	91.44	1.44	3.08	16.18	0.76	0.86

Unit Hyd. peak (cms)=	0.18	0.06	*TOTALS*
PEAK FLOW (cms)=	3.97	1.90	4.399 (iii)
TIME TO PEAK (hrs)=	1.33	1.67	1.33
RUNOFF VOLUME (mm)=	50.55	20.33	29.39
TOTAL RAINFALL (mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT =	0.98	0.40	0.57

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)=	10.78	Dir. Conn.(%)=	45.00
STANDHYD (0516)	Total Imp(%)=	45.00		
ID= 1 DT= 5.0 min				

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.85	5.93
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	268.08	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	134.65	26.22
over (min)	5.00	20.00
Storage Coeff. (min)=	4.10 (ii)	18.94 (ii)
Unit Hyd. Tpeak (min)=	5.00	20.00
Unit Hyd. peak (cms)=	0.24	0.06

PEAK FLOW (cms)=	1.46	0.23	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.67	1.514 (iii)
RUNOFF VOLUME (mm)=	50.55	16.18	1.33
TOTAL RAINFALL (mm)=	51.35	51.35	31.65
RUNOFF COEFFICIENT =	0.98	0.32	51.35
			0.62

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2511)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0511):	52.87	4.399	1.33	29.39
+ ID2= 2 (0516):	10.78	1.514	1.33	31.65
ID = 3 (2511):	63.65	5.914	1.33	29.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(4511)	OUTFLOW IS OFF		
IN= 2--> OUT= 1			
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)
*** WARNING : FIRST OUTFLOW IS NOT ZERO.			STORAGE (ha.m.)
	0.7700	0.9000	3.2130
	1.6000	1.1400	3.9540
	2.2900	1.2810	4.9000
			2.3000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2511)	63.650	5.914	1.33	29.78
OUTFLOW: ID= 1 (4511)	63.650	1.450	2.25	29.77

PEAK FLOW REDUCTION [Qout/Qin](%)=	24.52
TIME SHIFT OF PEAK FLOW (min)=	55.00
MAXIMUM STORAGE USED (ha.m.)=	1.0976

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (4510):	91.44	1.444	3.08	16.18
+ ID2= 2 (4511):	63.65	1.450	2.25	29.77
=====				
ID = 3 (2510):	155.09	2.645	2.75	21.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2510):	155.09	2.645	2.75	21.76
+ ID2= 2 (0517):	2.14	0.082	1.75	16.18
=====				
ID = 1 (2510):	157.23	2.667	2.75	21.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	Area (ha)	Imp(%)	Dir. Conn.(%)
CALIB STANDHYD (0512)	27.13	50.00	30.00
ID= 1 DT= 5.0 min	Total		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	13.56	13.56
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	425.28	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	134.65	55.63
over (min)=	5.00	15.00
Storage Coeff. (min)=	5.41 (ii)	14.33 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.21	0.08

TOTALS

PEAK FLOW (cms)=	2.22	1.12	2.578 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	50.55	20.33	29.39
TOTAL RAINFALL (mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT =	0.98	0.40	0.57

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	Area (ha)	Imp(%)	Dir. Conn.(%)
CALIB STANDHYD (0513)	6.44	65.00	35.00
ID= 1 DT= 5.0 min	Total		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.19	2.25
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	207.20	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	134.65	89.28
over (min)=	5.00	15.00
Storage Coeff. (min)=	3.51 (ii)	12.60 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.26	0.08

TOTALS

PEAK FLOW (cms)=	0.71	0.31	0.822 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	50.55	24.01	33.30
TOTAL RAINFALL (mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT =	0.98	0.47	0.65

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
DUHYD (8512)				
Inlet Cap.= 0.732				
#of Inlets= 1				
Total(cms)= 0.7				
=====				
TOTAL HYD.(ID= 1):	6.44	0.82	1.33	33.30
=====				
MAJOR SYS.(ID= 2):	0.08	0.09	1.33	33.30
MINOR SYS.(ID= 3):	6.36	0.73	1.33	33.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0512):	27.13	2.578	1.33	29.39
+ ID2= 2 (8512):	6.36	0.732	1.33	33.30
=====				
ID = 3 (2512):	33.49	3.310	1.33	30.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.6640	0.9151	
0.0210	0.1601	0.8570	1.0220	
0.0360	0.3317	1.0660	1.1320	
0.0410	0.4218	1.2900	1.2450	
0.1000	0.5147	1.5290	1.3610	
0.2030	0.6105	1.7810	1.4800	
0.3340	0.7092	2.0460	1.6020	
0.4890	0.8107	2.3220	1.7260	

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2512)	33.489	3.310	1.33	30.14

OUTFLOW: ID= 1 (5512) 33.489 0.395 2.75 30.08

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.92
TIME SHIFT OF PEAK FLOW (min)= 85.00
MAXIMUM STORAGE USED (ha.m.)= 0.7490

ADD HYD (2514)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2510):	157.23	2.667	2.75	21.68
+ ID2= 2 (0515):	5.01	0.135	1.83	13.32
=====				
ID = 3 (2514):	162.24	2.725	2.67	21.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2514)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (2514):	162.24	2.725	2.67	21.42
+ ID2= 2 (5512):	33.49	0.395	2.75	30.08
=====				
ID = 1 (2514):	195.73	3.119	2.67	22.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)	Curve Number (CN)
NASHYD (0518)	6.68	71.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.20	

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.288 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 14.288
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.278

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

ADD HYD (2513)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2514):	195.73	3.119	2.67	22.90
+ ID2= 2 (4400):	264.84	3.699	2.47	15.58
=====				
ID = 3 (2513):	460.57	6.781	2.57	18.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2513)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (2513):	460.57	6.781	2.57	18.62
+ ID2= 2 (0518):	6.68	0.288	1.58	14.29
=====				
ID = 1 (2513):	467.25	6.841	2.57	18.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)	Curve Number (CN)
NASHYD (0520)	108.36	71.0
ID= 1 DT= 2.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.20	

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 1.486 (i)
TIME TO PEAK (hrs)= 2.933
RUNOFF VOLUME (mm)= 14.315
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.279

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

ADD HYD (2520)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2513):	467.25	6.841	2.57	18.56
+ ID2= 2 (0520):	108.36	1.486	2.93	14.32
=====				
ID = 3 (2520):	575.61	8.252	2.67	17.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4500)	Routing time step (min)'
IN= 2---> OUT= 1	2.00

Distance	Elevation	Manning
0.00	409.70	0.0550
19.70	408.80	0.0550
41.70	407.20	0.0550
60.50	405.30	0.0550
80.00	404.50	0.0550
95.70	404.60	0.0550 /0.0350
98.60	403.40	0.0350
100.40	403.40	0.0350
100.80	402.90	0.0350
101.50	402.70	0.0350
102.30	402.80	0.0350
103.30	403.20	0.0350
104.00	403.20	0.0350
105.60	404.40	0.0350 /0.0550
109.70	404.30	0.0550
128.60	404.20	0.0550
154.10	405.40	0.0550
179.10	406.70	0.0550
201.90	408.60	0.0550
224.20	410.60	0.0550

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.34	403.04	.954E+03	0.3	0.70	47.40
0.68	403.38	.304E+04	1.6	1.03	32.27
1.02	403.72	.718E+04	4.5	1.25	26.57
1.36	404.06	.122E+05	9.7	1.58	20.96
1.70	404.40	.251E+05	18.1	1.44	23.04
2.08	404.78	.650E+05	42.3	1.29	25.62
2.46	405.16	.122E+06	86.3	1.40	23.62
2.84	405.54	.192E+06	151.6	1.57	21.10
3.21	405.91	.270E+06	238.3	1.75	18.90

3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

<---- hydrograph <----> <-pipe / channel->

AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2520)	575.61	8.25	2.67	17.76	1.26
OUTFLOW: ID= 1 (4500)	575.61	7.79	3.00	17.76	1.23

CALIB
NASHYD (0610)
ID= 1 DT= 2.0 min
Area (ha)= 78.05
Ia (mm)= 5.00
U.H. Tp(hrs)= 1.00
Curve Number (CN)= 71.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 1.222 (i)
TIME TO PEAK (hrs)= 2.700
RUNOFF VOLUME (mm)= 14.315
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.279

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

ADD HYD (2610)
1 + 2 = 3
ID1= 1 (4500): 575.61 7.786 3.00 17.76
+ ID2= 2 (0610): 78.05 1.222 2.70 14.32
=====

ID = 3 (2610):	653.66	8.957	2.97	17.34
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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0627)
ID= 1 DT= 5.0 min
Area (ha)= 9.39
Ia (mm)= 5.00
U.H. Tp(hrs)= 0.20
Curve Number (CN)= 70.0
of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.391 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 13.818
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.269

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

CALIB
STANDHYD (6240)
Area (ha)= 0.79

ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 70.00

IMPERVIOUS PERVIOUS (i)

Surface Area (ha)= 0.71 0.08
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 20.00 20.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 192.97
over (min)= 5.00 5.00
Storage Coeff. (min)= 0.70 (ii) 2.60 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.29

PEAK FLOW (cms)= 0.21 0.05 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.33 0.253 (iii)
RUNOFF VOLUME (mm)= 50.83 30.46 1.33
TOTAL RAINFALL (mm)= 51.35 51.35 44.72
RUNOFF COEFFICIENT = 0.99 0.59 51.35
0.87

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (6210)
ID= 1 DT= 5.0 min | Area (ha)= 1.96
Total Imp(%)= 60.00 Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)

Surface Area (ha)= 1.18 0.78
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 60.16
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.06 (ii) 9.71 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.11

PEAK FLOW (cms)= 0.29 0.08 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.50 0.329 (iii)
RUNOFF VOLUME (mm)= 50.83 20.46 1.33
TOTAL RAINFALL (mm)= 51.35 51.35 32.60
RUNOFF COEFFICIENT = 0.99 0.40 51.35
0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26240)
1 + 2 = 3
ID1= 1 (6210): 1.96 0.329 1.33 32.60
+ ID2= 2 (6240): 0.79 0.253 1.33 44.72
=====

ID = 3 (26240): 2.75 0.582 1.33 36.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

OVERFLOW IS OFF				
RESERVOIR(46240)				
IN= 2--> OUT= 1				
DT= 5.0 min				
OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
0.0000	0.0000	0.1390	0.0686	
0.0060	0.0042	0.1510	0.0822	
0.0130	0.0130	0.1630	0.0967	
0.0200	0.0250	0.1730	0.1121	
0.0250	0.0328	0.1780	0.1202	
0.0290	0.0439	2.5750	0.1742	
0.1260	0.0558	0.0000	0.0000	

INFLOW : ID= 2 (26240)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
OUTFLOW: ID= 1 (46240)	2.750	0.582	1.33	36.09
	2.750	0.118	1.75	36.02

PEAK FLOW REDUCTION [Qout/Qin](%)= 20.32
TIME SHIFT OF PEAK FLOW (min)= 25.00
MAXIMUM STORAGE USED (ha.m.)= 0.0550

CALIB				
STANDHYD (6220)	Area (ha)=	0.92		
ID= 1 DT= 5.0 min	Total Imp(%)=	40.00	Dir. Conn.(%)=	20.00

Surface Area (ha)=	0.37	0.55
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	134.65	48.06
over (min)	5.00	15.00
Storage Coeff. (min)=	1.06 (ii)	10.52 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.34	0.09

PEAK FLOW (cms)=	0.07	0.04	0.080 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	50.83	18.73	25.14
TOTAL RAINFALL (mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT =	0.99	0.36	0.49

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

OVERFLOW IS OFF				
RESERVOIR(46220)				
IN= 2--> OUT= 1				
DT= 5.0 min				
OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
0.0000	0.0000	0.2590	0.0708	
0.0050	0.0089	0.2910	0.0871	
0.0100	0.0187	0.3210	0.1045	
0.0130	0.0298	0.3720	0.1438	

0.0150	0.0422	2.8080	0.2087
0.2220	0.0559	0.0000	0.0000

INFLOW : ID= 2 (6220)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
OUTFLOW: ID= 1 (46220)	0.920	0.080	1.33	25.14
	0.920	0.009	2.83	24.65
PEAK FLOW REDUCTION [Qout/Qin](%)= 10.87				
TIME SHIFT OF PEAK FLOW (min)= 90.00				
MAXIMUM STORAGE USED (ha.m.)= 0.0162				

CALIB				
STANDHYD (6230)		Area (ha)=	0.48	
ID= 1 DT= 5.0 min		Total Imp(%)=	10.00	Dir. Conn.(%)= 5.00

Surface Area (ha)=	0.05	0.43
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	20.00	20.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	134.65	29.87
over (min)	5.00	10.00
Storage Coeff. (min)=	0.70 (ii)	8.25 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

PEAK FLOW (cms)=	0.01	0.02	0.028 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.50
RUNOFF VOLUME (mm)=	50.83	15.39	17.15
TOTAL RAINFALL (mm)=	51.35	51.35	51.35
RUNOFF COEFFICIENT =	0.99	0.30	0.33

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26200)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	0.92	0.009	2.83	24.65
ID1= 1 (46220):	0.92	0.009	2.83	24.65
+ ID2= 2 (46240):	2.75	0.118	1.75	36.02
ID = 3 (26200):	3.67	0.125	1.83	33.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (26200)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	0.48	0.028	1.50	17.15
ID1= 3 (26200):	3.67	0.125	1.83	33.17
+ ID2= 2 (6230):	0.48	0.028	1.50	17.15
ID = 1 (26200):	4.15	0.142	1.75	31.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0149)|
IN= 2---> OUT= 1
Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (26200) 4.15 0.14 1.75 31.32 0.21 1.04
OUTFLOW: ID= 1 (0149) 4.15 0.14 1.83 31.32 0.21 1.03

| CALIB |
| STANDHYD (96211)|
ID= 1 DT= 5.0 min
Area (ha)= 0.61
Total Imp(%)= 58.00 Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.35 0.25
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 63.77 30.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 134.65 50.88
over (min) 5.00 10.00
Storage Coeff. (min)= 1.73 (ii) 9.51 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.32 0.12

TOTALS
PEAK FLOW (cms)= 0.09 0.02 0.099 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 50.35 18.46 31.21
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.98 0.36 0.61

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ROUTE CHN(0009)|
IN= 2---> OUT= 1
Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (96211) 0.61 0.10 1.33 31.21 0.18 0.94
OUTFLOW: ID= 1 (0009) 0.61 0.08 1.42 31.18 0.17 0.91

| ADD HYD (0147)|
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0149): 4.15 0.141 1.83 31.32
+ ID2= 2 (0627): 9.39 0.391 1.58 13.82
=====

ID = 3 (0147): 13.54 0.495 1.67 19.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0147)|
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (0147): 13.54 0.495 1.67 19.18
+ ID2= 2 (0009): 0.61 0.083 1.42 31.18
=====

ID = 1 (0147): 14.15 0.539 1.58 19.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (9621)
ID= 1 DT= 5.0 min | Area (ha)= 16.18
Total Imp(%)= 32.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	5.18	11.00
Dep. Storage (mm)=	1.50	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	328.43	30.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	134.65	39.69
over (min)	5.00	15.00
Storage Coeff. (min)=	4.63 (ii)	13.22 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.22	0.08
PEAK FLOW (cms)=	0.94	0.67
TIME TO PEAK (hrs)=	1.33	1.58
RUNOFF VOLUME (mm)=	50.35	17.59
TOTAL RAINFALL (mm)=	51.35	51.35
RUNOFF COEFFICIENT =	0.98	0.34

TOTALS
1.166 (iii)
1.42
24.14
51.35
0.47

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8621)
ID= 1 DT= 5.0 min | Area (ha)= 4.69
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.69	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	20.00	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	65.35	29.63
over (min)	5.00	5.00
Storage Coeff. (min)=	1.15 (ii)	1.24 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.33

TOTALS
0.84
0.00
1.42
26.35
51.35
0.51

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8623)
ID= 1 DT= 5.0 min | Area (ha)= 2.05

ID= 1 DT= 5.0 min | Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.05	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	20.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	65.35	53.54
over (min)	5.00	5.00
Storage Coeff. (min)=	1.15 (ii)	1.24 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.33

PEAK FLOW (cms)=	0.37	0.00	*TOTALS*
TIME TO PEAK (hrs)=	1.42	1.33	0.367 (iii)
RUNOFF VOLUME (mm)=	26.35	26.25	1.42
TOTAL RAINFALL (mm)=	51.35	51.35	26.35
RUNOFF COEFFICIENT =	0.51	0.51	51.35

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

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

CALIB
STANDHYD (9623)
ID= 1 DT= 5.0 min | Area (ha)= 4.42
Total Imp(%)= 48.00 Dir. Conn.(%)= 35.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.12	2.30
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	171.66	30.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	134.65	44.18
over (min)	5.00	15.00
Storage Coeff. (min)=	3.14 (ii)	11.37 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.27	0.09

PEAK FLOW (cms)=	0.50	0.17	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.58	0.559 (iii)
RUNOFF VOLUME (mm)=	50.35	18.33	1.33
TOTAL RAINFALL (mm)=	51.35	51.35	29.54
RUNOFF COEFFICIENT =	0.98	0.36	51.35

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8624)
ID= 1 DT= 5.0 min | Area (ha)= 4.32
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.32	0.00
Dep. Storage (mm)=	25.00	1.50

Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 65.35 29.63
over (min)= 5.00 5.00
Storage Coeff. (min)= 1.15 (ii) 1.24 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.33

TOTALS
PEAK FLOW (cms)= 0.77 0.00 0.774 (iii)
TIME TO PEAK (hrs)= 1.42 1.33 1.42
RUNOFF VOLUME (mm)= 26.35 15.66 26.35
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.51 0.30 0.51

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (9624)
ID= 1 DT= 5.0 min
Area (ha)= 8.46
Total Imp(%)= 51.00 Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.31 4.15
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 237.49 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 42.61
over (min)= 5.00 5.00
Storage Coeff. (min)= 3.81 (ii) 12.17 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.25 0.09

TOTALS
PEAK FLOW (cms)= 1.05 0.28 1.136 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 50.35 18.08 30.99
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.98 0.35 0.60

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0628)
ID= 1 DT= 5.0 min
Area (ha)= 5.35
Total Imp(%)= 60.00 Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.21 2.14
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 188.86 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 60.60

over (min)= 5.00 15.00
Storage Coeff. (min)= 3.32 (ii) 11.94 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.26 0.09

TOTALS
PEAK FLOW (cms)= 0.69 0.21 0.757 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 50.35 20.63 32.52
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.98 0.40 0.63

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8625)
ID= 1 DT= 5.0 min
Area (ha)= 4.11
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.11 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 65.35 53.54
over (min)= 5.00 5.00
Storage Coeff. (min)= 1.15 (ii) 1.24 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.33

TOTALS
PEAK FLOW (cms)= 0.74 0.00 0.736 (iii)
TIME TO PEAK (hrs)= 1.42 1.33 1.42
RUNOFF VOLUME (mm)= 26.35 26.25 26.35
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.51 0.51 0.51

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

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

CALIB
STANDHYD (9625)
ID= 1 DT= 5.0 min
Area (ha)= 8.07
Total Imp(%)= 55.00 Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.44 3.63
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 231.95 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 49.47
over (min)= 5.00 15.00
Storage Coeff. (min)= 3.76 (ii) 11.63 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.25 0.09

TOTALS

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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PEAK FLOW REDUCTION [Qout/Qin](%)= 1.53
TIME SHIFT OF PEAK FLOW (min)=165.00
MAXIMUM STORAGE USED (ha.m.)= 1.5607

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CALIB			
STANDHYD (9622)	Area	(ha)= 6.75	
ID= 1 DT= 5.0 min	Total Imp(%)=	44.00	Dir. Conn.(%)= 30.00
	IMPERVIOUS		PERVIOUS (i)
Surface Area	(ha)=	2.97	3.78
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	212.13	30.00

Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 134.65 44.18
over (min) 5.00 15.00
Storage Coeff. (min)= 3.56 (ii) 11.80 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.26 0.09
TOTALS
PEAK FLOW (cms)= 0.64 0.27 0.726 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 50.35 18.33 27.94
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.98 0.36 0.54

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8622) | Area (ha)= 2.20
ID= 1 DT= 5.0 min | Total Imp(%)= 99.99 Dir. Conn.(%)= 99.99

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.20 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 65.35 53.54
over (min) 5.00 5.00
Storage Coeff. (min)= 1.15 (ii) 1.36 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.33

TOTALS
PEAK FLOW (cms)= 0.39 0.00 0.394 (iii)
TIME TO PEAK (hrs)= 1.42 1.33 1.42
RUNOFF VOLUME (mm)= 26.35 26.25 26.35
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.51 0.51 0.51

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

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

ADD HYD (2622) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (8622): 2.20 0.394 1.42 26.35
+ ID2= 2 (9622): 6.75 0.726 1.33 27.94
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5622) | 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 | 0.4500 0.2500
0.0010 0.0000 | 0.6500 0.3200
0.0030 0.1200 | 0.8000 0.4000
0.1000 0.1500 | 0.9800 0.5000
0.3000 0.2000 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2622) 8.950 1.029 1.42 27.55
OUTFLOW: ID= 1 (5622) 8.950 0.160 2.33 26.54

PEAK FLOW REDUCTION [Qout/Qin](%)= 15.56
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.1652

ADD HYD (2625) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (5621): 57.65 0.104 4.17 16.14
+ ID2= 2 (5622): 8.95 0.160 2.33 26.54
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0150) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0147): 14.15 0.539 1.58 19.70
+ ID2= 2 (2625): 66.60 0.192 2.42 17.54
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2620) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0150): 80.75 0.574 1.75 17.91
+ ID2= 2 (2610): 653.66 8.957 2.97 17.34
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0637) | Area (ha)= 8.42 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.608

PEAK FLOW (cms)= 0.350 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 13.818
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.269

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

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-----
| CALIB |
| NASHYD ( 0630) | Area (ha)= 33.04 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----|
| U.H. Tp(hrs)= 0.38
```

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 0.956 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 13.842
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.270

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

```
-----
| ROUTE CHN( 4630) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .893E+01 0.0 0.17 47.72
0.16 412.86 .357E+02 0.0 0.28 30.06
0.24 412.94 .804E+02 0.1 0.36 22.94
0.32 413.02 .143E+03 0.1 0.44 18.94
0.39 413.09 .223E+03 0.2 0.51 16.32
0.47 413.17 .322E+03 0.4 0.58 14.45
0.55 413.25 .438E+03 0.6 0.64 13.04
0.63 413.33 .572E+03 0.8 0.70 11.93
0.71 413.41 .724E+03 1.1 0.76 11.03
0.79 413.49 .893E+03 1.4 0.81 10.28
0.87 413.57 .108E+04 1.9 0.86 9.65
0.95 413.65 .129E+04 2.4 0.92 9.10
1.03 413.73 .151E+04 2.9 0.97 8.63
1.11 413.81 .175E+04 3.6 1.01 8.22
1.18 413.88 .201E+04 4.3 1.06 7.85
1.26 413.96 .229E+04 5.1 1.11 7.52
1.34 414.04 .258E+04 6.0 1.15 7.22
1.42 414.12 .289E+04 6.9 1.20 6.95
1.50 414.20 .323E+04 8.0 1.24 6.70
```

```
<----- hydrograph -----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 0630) 33.04 0.96 1.83 13.84 0.67 0.73
OUTFLOW: ID= 1 ( 4630) 33.04 0.87 2.00 13.83 0.65 0.71
```

```
-----
| ADD HYD ( 2637) |
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 2637): 767.45 9.625 2.90 16.78
+ ID2= 2 ( 0637): 8.42 0.350 1.58 13.82
=====
ID = 1 ( 2637): 775.87 9.680 2.90 16.75
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0636) | Area (ha)= 3.60 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----|
| U.H. Tp(hrs)= 0.20
```

Unit Hyd Qpeak (cms)= 0.688

PEAK FLOW (cms)= 0.150 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 13.818
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.269

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

```
-----
| ADD HYD ( 2636) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 2637): 775.87 9.680 2.90 16.75
+ ID2= 2 ( 0636): 3.60 0.150 1.58 13.82
=====
ID = 3 ( 2636): 779.47 9.703 2.90 16.74
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0638) | Area (ha)= 20.63 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----|
| U.H. Tp(hrs)= 0.20
```

Unit Hyd Qpeak (cms)= 3.940

PEAK FLOW (cms)= 0.859 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 13.818
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.269

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

```
-----
| CALIB |
| NASHYD ( 0639) | Area (ha)= 4.47 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----|
| U.H. Tp(hrs)= 0.20
```

Unit Hyd Qpeak (cms)= 0.854

PEAK FLOW (cms)= 0.186 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 13.818
TOTAL RAINFALL (mm)= 51.355
RUNOFF COEFFICIENT = 0.269

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

```
-----
| ADD HYD ( 2630)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2630):  779.47  9.783   2.90  16.74
+ ID2= 2 ( 0630):   20.63  0.859   1.58  13.82
=====
ID = 3 ( 2630):  800.10  9.839   2.87  16.66
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2630)|
| 3 + 2 = 1 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2630):  800.10  9.839   2.87  16.66
+ ID2= 2 ( 0630):   4.47  0.186   1.58  13.82
=====
ID = 1 ( 2630):  804.57  9.869   2.87  16.65
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 8709)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 3.51
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00
```

```

          IMPERVIOUS   PERVIOUS (i)
Surface Area (ha)= 3.51 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 65.35 53.54
over (min)= 5.00 5.00
Storage Coeff. (min)= 1.15 (ii) 1.24 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.33
```

```

          *TOTALS*
PEAK FLOW (cms)= 0.63 0.00 0.629 (iii)
TIME TO PEAK (hrs)= 1.42 1.33 1.42
RUNOFF VOLUME (mm)= 26.35 26.25 26.35
TOTAL RAINFALL (mm)= 51.35 51.35 51.35
RUNOFF COEFFICIENT = 0.51 0.51 0.51
```

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

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

```
-----
| CALIB
| STANDHYD ( 9709)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 7.20
Total Imp(%)= 56.00 Dir. Conn.(%)= 40.00
```

```

          IMPERVIOUS   PERVIOUS (i)
Surface Area (ha)= 4.03 3.17
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 219.09 30.00
```

```

Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 134.65 51.44
over (min)= 5.00 15.00
Storage Coeff. (min)= 3.63 (ii) 11.38 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.25 0.09

PEAK FLOW (cms)= 0.90 0.27 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.58 0.991 (iii)
RUNOFF VOLUME (mm)= 50.35 19.41 1.33
TOTAL RAINFALL (mm)= 51.35 51.35 31.79
RUNOFF COEFFICIENT = 0.98 0.38 0.62
```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 ( 2709)|
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 8709):  3.51 0.629 1.42 26.35
+ ID2= 2 ( 9709):  7.20 0.991 1.33 31.79
=====
ID = 3 ( 2709):  10.71 1.460 1.42 30.01
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 5709)|
| IN= 2--> OUT= 1 |
| DT= 5.0 min |
-----
OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.6000 0.3800
0.0010 0.0000 | 0.9000 0.5400
0.0100 0.1000 | 1.1000 0.7100
0.0500 0.2000 | 1.4000 0.8900
0.4000 0.2400 | 0.0000 0.0000
```

```

          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
INFLOW : ID= 2 ( 2709) 10.710 1.460 1.42 30.01
OUTFLOW: ID= 1 ( 5709) 10.710 0.220 2.25 30.01
```

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 15.00
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 0.2196
```

FINISH

```
-----
*****
** SIMULATION : 10 year Fergus Shand Dam Chic **
*****
```

```
-----
| CHICAGO STORM | IDF curve parameters: A=2126.000
| Ptotal= 61.34 mm | B= 15.000
| | C= 0.890
| | used in: INTENSITY = A / (t + B)^C
| | Duration of storm = 4.00 hrs
```


Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	'	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	'	hrs	mm/hr	hrs	mm/hr
0.00	2.71	1.00	19.98	2.00	11.15	3.00	4.04	
0.00	2.94	1.00	32.79	2.00	9.83	3.00	3.82	
0.17	3.21	1.17	70.46	2.17	8.76	3.17	3.63	
0.25	3.53	1.25	147.79	2.25	7.89	3.25	3.45	
0.33	3.92	1.33	87.01	2.33	7.16	3.33	3.29	
0.42	4.40	1.42	53.99	2.42	6.55	3.42	3.14	
0.50	5.01	1.50	37.57	2.50	6.03	3.50	3.01	
0.58	5.79	1.58	28.09	2.58	5.58	3.58	2.89	
0.67	6.84	1.67	22.06	2.67	5.19	3.67	2.77	
0.75	8.31	1.75	17.96	2.75	4.84	3.75	2.67	
0.83	10.47	1.83	15.02	2.83	4.54	3.83	2.57	
0.92	13.90	1.92	12.83	2.92	4.27	3.92	2.48	

Max.Eff.Inten.(mm/hr)= 134.90 61.46
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.93 (ii) 8.48 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.52 0.13

PEAK FLOW (cms)= 0.82 0.55 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.33 1.033 (iii)
RUNOFF VOLUME (mm)= 59.34 24.87 33.49
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.41 0.55

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0100) | Area (ha)= 136.98 Curve Number (CN)= 69.0
ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.17

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 2.537 (i)
TIME TO PEAK (hrs)= 2.900
RUNOFF VOLUME (mm)= 18.624
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.304

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

CALIB
NASHYD (0201) | Area (ha)= 14.60 Curve Number (CN)= 74.0
ID= 1 DT= 2.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.97

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.407 (i)
TIME TO PEAK (hrs)= 2.600
RUNOFF VOLUME (mm)= 24.021
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.392

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

CALIB
STANDHYD (0203) | Area (ha)= 8.20
ID= 1 DT= 2.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

ADD HYD (2200) |
1 + 2 = 3 |

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0201): 14.60 0.407 2.60 24.02
+ ID2= 2 (0203): 8.20 1.033 1.33 33.49
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200) |
IN= 2--> OUT= 1 |
DT= 5.0 min |

OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1980 0.2314
0.0040 0.0218 | 0.2920 0.2621
0.0060 0.0446 | 0.3980 0.2937
0.0070 0.0683 | 0.5150 0.3261
0.0080 0.0930 | 0.8290 0.3592
0.0090 0.1187 | 1.3520 0.3930
0.0230 0.1453 | 2.0570 0.4275
0.0610 0.1730 | 2.9590 0.4629
0.1200 0.2017 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2200) 22.800 1.049 1.37 27.43
OUTFLOW: ID= 1 (5200) 22.800 0.410 3.20 27.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 39.04
TIME SHIFT OF PEAK FLOW (min)=110.00
MAXIMUM STORAGE USED (ha.m.)= 0.2969

**** WARNING : SELECTED ROUTING TIME STEP DENIED.

CALIB
NASHYD (0205) | Area (ha)= 4.80 Curve Number (CN)= 90.0
ID= 1 DT= 2.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.41

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.433 (i)

TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.665
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.663

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

CALIB
STANDHYD (0206) | Area (ha)= 0.20
ID= 1 DT= 2.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	134.90	61.46
over (min)	5.00	10.00
Storage Coeff. (min)=	0.93 (ii)	8.48 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.52	0.13

			TOTALS
PEAK FLOW (cms)=	0.02	0.01	0.025 (iii)
TIME TO PEAK (hrs)=	1.33	1.53	1.33
RUNOFF VOLUME (mm)=	59.34	24.87	33.46
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.97	0.41	0.55

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201) |
1 + 2 = 3 |
ID1= 1 (0205): AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
4.00 0.433 1.83 40.67
+ ID2= 2 (0206): 0.20 0.025 1.33 33.46
=====

ID = 3 (2201): 5.00 0.443 1.83 40.38

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201) |
3 + 2 = 1 |
ID1= 3 (2201): AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
5.00 0.443 1.83 40.38
+ ID2= 2 (5200): 22.00 0.410 3.20 27.00
=====

ID = 1 (2201): 27.00 0.579 2.03 29.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB

STANDHYD (0209) | Area (ha)= 2.70
ID= 1 DT= 2.0 min | Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.43	2.27
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	35.00	35.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	134.90	38.92
over (min)	5.00	14.00
Storage Coeff. (min)=	1.14 (ii)	12.22 (ii)
Unit Hyd. Tpeak (min)=	4.00	14.00
Unit Hyd. peak (cms)=	0.50	0.09

			TOTALS
PEAK FLOW (cms)=	0.09	0.16	0.180 (iii)
TIME TO PEAK (hrs)=	1.33	1.60	1.60
RUNOFF VOLUME (mm)=	59.34	21.28	24.32
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.97	0.35	0.40

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0207) | Area (ha)= 1.30
ID= 1 DT= 2.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.58	0.72
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	134.90	61.46
over (min)	5.00	10.00
Storage Coeff. (min)=	0.93 (ii)	8.48 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.52	0.13

			TOTALS
PEAK FLOW (cms)=	0.13	0.09	0.164 (iii)
TIME TO PEAK (hrs)=	1.33	1.53	1.33
RUNOFF VOLUME (mm)=	59.34	24.87	33.48
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.97	0.41	0.55

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0207):	1.30	0.164	1.33	33.48
+ ID2= 2 (0209):	2.70	0.180	1.60	24.32
ID = 3 (2202):	4.00	0.310	1.53	27.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2202):	4.00	0.310	1.53	27.30
+ ID2= 2 (2201):	27.80	0.579	2.03	29.40
ID = 1 (2202):	31.80	0.738	1.83	29.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2100)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0100):	136.98	2.537	2.90	18.62
+ ID2= 2 (2202):	31.80	0.738	1.83	29.14
ID = 3 (2100):	168.78	3.098	2.83	20.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0302)	Area	(ha)=	2.90	Curve Number (CN)= 74.0
ID= 1 DT= 2.0 min	Ia	(mm)=	1.50	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.45		

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak	(cms)=	0.246
PEAK FLOW	(cms)=	0.138 (i)
TIME TO PEAK	(hrs)=	1.933
RUNOFF VOLUME	(mm)=	24.021
TOTAL RAINFALL	(mm)=	61.344
RUNOFF COEFFICIENT	=	0.392

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

CALIB				
STANDHYD (0304)	Area	(ha)=	4.40	
ID= 1 DT= 2.0 min	Total Imp(%)=	45.00	Dir. Conn.(%)=	25.00
	IMPERVIOUS		PERVIOUS (i)	
Surface Area	(ha)=	1.98	2.42	
Dep. Storage	(mm)=	2.00	5.00	
Average Slope	(%)=	1.00	1.00	
Length	(m)=	25.00	25.00	
Mannings n	=	0.013	0.250	

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	134.90	61.46
over (min)	5.00	10.00
Storage Coeff. (min)=	0.99 (ii)	8.96 (ii)

Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.51	0.12	
PEAK FLOW (cms)=	0.44	0.29	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.53	0.549 (iii)
RUNOFF VOLUME (mm)=	59.34	24.87	1.33
TOTAL RAINFALL (mm)=	61.34	61.34	33.49
RUNOFF COEFFICIENT =	0.97	0.41	61.34
			0.55

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0302):	2.90	0.138	1.93	24.02
+ ID2= 2 (0304):	4.40	0.549	1.33	33.49
ID = 3 (2300):	7.30	0.570	1.37	29.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0308)	Area	(ha)=	0.20	
ID= 1 DT= 2.0 min	Total Imp(%)=	45.00	Dir. Conn.(%)=	25.00
	IMPERVIOUS		PERVIOUS (i)	
Surface Area	(ha)=	0.09	0.11	
Dep. Storage	(mm)=	2.00	5.00	
Average Slope	(%)=	1.00	1.00	
Length	(m)=	25.00	25.00	
Mannings n	=	0.013	0.250	

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	134.90	61.46	
over (min)	5.00	10.00	
Storage Coeff. (min)=	0.99 (ii)	8.96 (ii)	
Unit Hyd. Tpeak (min)=	4.00	10.00	
Unit Hyd. peak (cms)=	0.51	0.12	
PEAK FLOW (cms)=	0.02	0.01	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.53	0.025 (iii)
RUNOFF VOLUME (mm)=	59.34	24.87	1.33
TOTAL RAINFALL (mm)=	61.34	61.34	33.46
RUNOFF COEFFICIENT =	0.97	0.41	61.34
			0.55

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD (0310)	Area	(ha)=	5.70	
ID= 1 DT= 2.0 min	Total Imp(%)=	16.00	Dir. Conn.(%)=	8.00
	IMPERVIOUS		PERVIOUS (i)	

Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 134.90 41.38
over (min) 5.00 10.00
Storage Coeff. (min)= 0.93 (ii) 9.77 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.52 0.11

PEAK FLOW (cms)= 0.18 0.37 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.53 0.435 (iii)
RUNOFF VOLUME (mm)= 59.34 21.28 24.32
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.35 0.40

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)|
1 + 2 = 3
ID1= 1 (2300): 7.30 0.570 1.37 29.73
+ ID2= 2 (0308): 0.20 0.025 1.33 33.46
=====

ID = 3 (2301): 7.50 0.595 1.37 29.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2301)|
3 + 2 = 1
ID1= 3 (2301): 7.50 0.595 1.37 29.83
+ ID2= 2 (0310): 5.70 0.435 1.50 24.32
=====

ID = 1 (2301): 13.20 0.984 1.47 27.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2302)|
1 + 2 = 3
ID1= 1 (2100): 168.78 3.098 2.83 20.60
+ ID2= 2 (2301): 13.20 0.984 1.47 27.45
=====

ID = 3 (2302): 181.98 3.268 2.77 21.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| STANDHYD (0400)|
ID= 1 DT= 2.0 min | Area (ha)= 82.86
Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 102.81 36.51
over (min) 14.00 26.00
Storage Coeff. (min)= 13.91 (ii) 24.48 (ii)
Unit Hyd. Tpeak (min)= 14.00 26.00
Unit Hyd. peak (cms)= 0.08 0.05

PEAK FLOW (cms)= 0.48 3.40 *TOTALS*
TIME TO PEAK (hrs)= 1.53 1.83 3.702 (iii)
RUNOFF VOLUME (mm)= 59.34 20.39 21.83
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.97 0.33 0.35

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2400)|
1 + 2 = 3
ID1= 1 (2302): 181.98 3.268 2.77 21.10
+ ID2= 2 (0400): 82.86 3.702 1.83 21.56
=====

ID = 3 (2400): 264.84 6.064 1.90 21.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4400)|
IN= 2---> OUT= 1
Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550
96.60 409.10 0.0550
115.00 408.90 0.0550
124.80 409.10 0.0550
131.00 408.90 0.0550 /0.0350 Main Channel
133.60 408.00 0.0350 Main Channel
134.40 407.60 0.0350 Main Channel
135.00 407.50 0.0350 Main Channel
135.80 407.60 0.0350 Main Channel
136.50 408.00 0.0350 Main Channel
139.40 408.80 0.0350 /0.0550 Main Channel
143.50 408.90 0.0550
148.50 408.70 0.0550
163.80 408.90 0.0550
183.20 408.90 0.0550
243.70 409.70 0.0550
278.70 410.20 0.0550
330.50 411.40 0.0550

<----- TRAVEL TIME TABLE ----->						
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)	
0.19	407.69	.366E+03	0.1	0.51	58.83	
0.37	407.87	.106E+04	0.5	0.81	37.08	
0.56	408.06	.199E+04	1.1	1.00	29.93	
0.74	408.24	.329E+04	2.1	1.14	26.32	
0.93	408.43	.498E+04	3.6	1.28	23.32	
1.11	408.61	.708E+04	5.6	1.43	20.94	
1.30	408.80	.105E+05	8.5	1.45	20.61	
1.49	408.99	.247E+05	14.8	1.07	27.91	
1.68	409.18	.601E+05	30.4	0.91	32.97	
1.87	409.37	.109E+06	58.5	0.96	31.05	
2.06	409.56	.166E+06	98.3	1.06	28.11	
2.25	409.75	.231E+06	150.3	1.17	25.57	
2.44	409.94	.303E+06	215.4	1.28	23.46	
2.64	410.14	.383E+06	293.8	1.38	21.74	
2.83	410.33	.470E+06	390.1	1.49	20.10	
3.02	410.52	.563E+06	502.4	1.60	18.66	
3.21	410.71	.660E+06	628.8	1.71	17.48	
3.40	410.90	.762E+06	769.5	1.81	16.49	
3.59	411.09	.868E+06	924.9	1.91	15.65	
<---- hydrograph ----> <-pipe / channel->						
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2400)	264.84	6.06	1.90	21.24	1.14	1.43
OUTFLOW: ID= 1 (4400)	264.84	5.33	2.33	21.24	1.08	1.40

CALIB						
NASHYD (0515)	Area (ha)=	5.01	Curve Number (CN)=	65.0		
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00		
	U.H. Tp(hrs)=	0.41				

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW (cms)= 0.187 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 18.213
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.297

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

CALIB						
NASHYD (0510)	Area (ha)=	91.44	Curve Number (CN)=	71.0		
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00		
	U.H. Tp(hrs)=	1.09				

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)= 2.120 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 21.892
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.357

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

ROUTE CHN(4510)						
IN= 2--> OUT= 1	Routing time step (min)'=	5.00				

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->						
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)	
0.00	412.78	.206E+02	0.0	0.19	101.61	
0.16	412.86	.822E+02	0.0	0.30	64.01	
0.24	412.94	.185E+03	0.1	0.39	48.85	
0.32	413.02	.329E+03	0.1	0.48	40.33	
0.39	413.09	.514E+03	0.2	0.55	34.75	
0.47	413.17	.740E+03	0.4	0.62	30.77	
0.55	413.25	.101E+04	0.6	0.69	27.77	
0.63	413.33	.132E+04	0.9	0.75	25.40	
0.71	413.41	.166E+04	1.2	0.82	23.48	
0.79	413.49	.206E+04	1.6	0.88	21.89	
0.87	413.57	.249E+04	2.0	0.93	20.54	
0.95	413.65	.296E+04	2.5	0.99	19.39	
1.03	413.73	.347E+04	3.1	1.04	18.38	
1.11	413.81	.403E+04	3.8	1.10	17.49	
1.18	413.88	.462E+04	4.6	1.15	16.71	
1.26	413.96	.526E+04	5.5	1.20	16.00	
1.34	414.04	.594E+04	6.4	1.25	15.37	
1.42	414.12	.666E+04	7.5	1.30	14.79	
1.50	414.20	.742E+04	8.7	1.34	14.27	

<---- hydrograph ----> <-pipe / channel->						
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0510)	91.44	2.12	2.75	21.89	0.88	0.94
OUTFLOW: ID= 1 (4510)	91.44	2.01	3.00	21.89	0.86	0.93

CALIB						
NASHYD (0517)	Area (ha)=	2.14	Curve Number (CN)=	71.0		
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00		
	U.H. Tp(hrs)=	0.32				

Unit Hyd Qpeak (cms)= 0.255

PEAK FLOW (cms)= 0.113 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 21.885
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.357

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

CALIB						
STANDHYD (0511)	Area (ha)=	52.87				
ID= 1 DT= 5.0 min	Total Imp(%)=	50.00	Dir. Conn.(%)=	30.00		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	26.43	26.43
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	593.69	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	147.79	71.37
over (min)	5.00	20.00
Storage Coeff. (min)=	6.36 (ii)	16.31 (ii)
Unit Hyd. Tpeak (min)=	5.00	20.00
Unit Hyd. peak (cms)=	0.18	0.06

TOTALS
PEAK FLOW (cms)= 4.54 2.68 5.388 (iii)
TIME TO PEAK (hrs)= 1.33 1.67 1.42
RUNOFF VOLUME (mm)= 60.54 27.03 37.09
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.44 0.60

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0516) | Area (ha)= 10.78
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.85 5.93
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 1.00
Length (m)= 268.08 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 147.79 34.87
over (min) 5.00 20.00
Storage Coeff. (min)= 3.95 (ii) 17.19 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00
Unit Hyd. peak (cms)= 0.24 0.06

TOTALS
PEAK FLOW (cms)= 1.65 0.33 1.726 (iii)
TIME TO PEAK (hrs)= 1.33 1.67 1.33
RUNOFF VOLUME (mm)= 60.54 21.89 39.28
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.36 0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2511) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0511): 52.87 5.388 1.42 37.09
+ ID2= 2 (0516): 10.78 1.726 1.33 39.28
===== ID = 3 (2511): 63.65 6.912 1.33 37.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(4511) | OVERFLOW IS OFF
IN= 2--> OUT= 1 |
DT= 5.0 min |
***** WARNING : FIRST OUTFLOW IS NOT ZERO.
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
0.7700 0.9000 | 3.2130 1.6220
1.6000 1.1400 | 3.9540 1.8810
2.2900 1.2810 | 4.9000 2.3000
AREA QPEAK TPEAK R.V.

(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2511) 63.650 6.912 1.33 37.46
OUTFLOW: ID= 1 (4511) 63.650 2.331 2.17 37.45

PEAK FLOW REDUCTION [Qout/Qin](%)= 33.73
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 1.2977

ADD HYD (2510) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (4510): 91.44 2.008 3.00 21.89
+ ID2= 2 (4511): 63.65 2.331 2.17 21.45
===== ID = 3 (2510): 155.09 3.740 2.50 28.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2510) |
3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2510): 155.09 3.740 2.50 28.27
+ ID2= 2 (0517): 2.14 0.113 1.75 21.88
===== ID = 1 (2510): 157.23 3.782 2.50 28.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0512) | Area (ha)= 27.13
ID= 1 DT= 5.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 13.56 13.56
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 425.28 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 147.79 71.37
over (min) 5.00 15.00
Storage Coeff. (min)= 5.21 (ii) 13.29 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.21 0.08

TOTALS
PEAK FLOW (cms)= 2.53 1.54 3.164 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.42
RUNOFF VOLUME (mm)= 60.54 27.03 37.09
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.44 0.60

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0513) | Area (ha)= 6.44
ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 35.00
IMPERVIOUS PERVIOUS (i)

Surface Area (ha)= 4.19 2.25
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 1.00
Length (m)= 207.20 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 112.86
over (min)= 5.00 15.00
Storage Coeff. (min)= 3.38 (ii) 11.66 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.26 0.09

TOTALS
PEAK FLOW (cms)= 0.80 0.43 0.953 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 60.54 31.48 41.65
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.51 0.68

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

DUHYD (8512)|
Inlet Cap.= 0.732|
#of Inlets= 1|
Total(cms)= 0.7|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
TOTAL HYD.(ID= 1): 6.44 0.95 1.33 41.65
MAJOR SYS.(ID= 2): 0.33 0.22 1.33 41.65
MINOR SYS.(ID= 3): 6.11 0.73 1.33 41.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)|
1 + 2 = 3|
ID1= 1 (0512): 27.13 3.164 1.42 37.09
+ ID2= 2 (0512): 6.11 0.732 1.33 41.65
ID = 3 (2512): 33.24 3.896 1.42 37.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5512)|
IN= 2--> OUT= 1|
DT= 5.0 min|
OVERFLOW IS OFF
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
0.0000 0.0000 0.6640 0.9151
0.0210 0.1601 0.8570 1.0220
0.0360 0.3317 1.0660 1.1320
0.0410 0.4218 1.2900 1.2450
0.1000 0.5147 1.5290 1.3610
0.2030 0.6105 1.7810 1.4800
0.3340 0.7092 2.0460 1.6020
0.4890 0.8107 2.3220 1.7260

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2512) 33.244 3.896 1.42 37.93
OUTFLOW: ID= 1 (5512) 33.244 0.628 2.50 37.87

PEAK FLOW REDUCTION [Qout/Qin](%)= 16.12
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.8939

ADD HYD (2514)|
1 + 2 = 3|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2510): 157.23 3.782 2.50 28.19
+ ID2= 2 (0515): 5.01 0.187 1.83 18.21
ID = 3 (2514): 162.24 3.886 2.50 27.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2514)|
3 + 2 = 1|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2514): 162.24 3.886 2.50 27.88
+ ID2= 2 (5512): 33.24 0.628 2.50 37.87
ID = 1 (2514): 195.48 4.515 2.50 29.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0518)|
ID= 1 DT= 5.0 min|
Area (ha)= 6.68 Curve Number (CN)= 71.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.405 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 19.792
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

ADD HYD (2513)|
1 + 2 = 3|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2514): 195.48 4.515 2.50 29.58
+ ID2= 2 (4400): 264.84 5.328 2.33 21.24
ID = 3 (2513): 460.32 9.819 2.43 24.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2513)|
3 + 2 = 1|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2513): 460.32 9.819 2.43 24.71
+ ID2= 2 (0518): 6.68 0.405 1.58 19.79
ID = 1 (2513): 467.00 9.921 2.40 24.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.


```
-----
| CALIB |
| NASHYD ( 0520) | Area (ha)= 108.36 Curve Number (CN)= 71.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 1.20
-----
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 2.104 (i)
TIME TO PEAK (hrs)= 2.933
RUNOFF VOLUME (mm)= 19.830
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

```
-----
| ADD HYD ( 2520) |
| 1 + 2 = 3 |
-----
ID1= 1 ( 2513): 467.00 9.921 2.40 24.64
+ ID2= 2 ( 0520): 108.36 2.104 2.93 19.83
=====
ID = 3 ( 2520): 575.36 11.801 2.50 23.73
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTE CHN( 4500) |
| IN= 2---> OUT= 1 | Routing time step (min)'= 2.00
-----
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 /0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 /0.0550 Main Channel
109.70 404.30 0.0550
128.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
0.68 403.38 .304E+04 1.6 1.03 32.27
1.02 403.72 .718E+04 4.5 1.25 26.57
1.36 404.06 .122E+05 9.7 1.58 20.96
1.70 404.40 .251E+05 18.1 1.44 23.04
2.08 404.78 .650E+05 42.3 1.29 25.62
2.46 405.16 .122E+06 86.3 1.40 23.62
2.84 405.54 .192E+06 151.6 1.57 21.10
3.21 405.91 .270E+06 238.3 1.75 18.90
3.59 406.29 .357E+06 345.8 1.93 17.20
```

3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

```
<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 2520) 575.36 11.80 2.50 23.73 1.44 1.54
OUTFLOW: ID= 1 ( 4500) 575.36 11.12 2.97 23.73 1.41 1.56
```

```
-----
| CALIB |
| NASHYD ( 0610) | Area (ha)= 78.05 Curve Number (CN)= 71.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 1.00
-----
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 1.734 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 19.830
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.323

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

```
-----
| ADD HYD ( 2610) |
| 1 + 2 = 3 |
-----
ID1= 1 ( 4500): 575.36 11.124 2.97 23.73
+ ID2= 2 ( 0610): 78.05 1.734 2.67 19.83
=====
ID = 3 ( 2610): 653.41 12.794 2.93 23.26
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| NASHYD ( 0627) | Area (ha)= 9.39 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20
-----
```

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.550 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 19.180
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| CALIB |
| STANDHYD ( 6240) | Area (ha)= 0.79
| ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 70.00
-----
```

```

-----
Surface Area (ha)= 0.71 0.08
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 20.00 20.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 238.82
over (min) 5.00 5.00
Storage Coeff. (min)= 0.68 (ii) 2.50 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.29

*TOTALS*
PEAK FLOW (cms)= 0.23 0.06 0.283 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 60.82 39.18 54.33
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.64 0.89

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 6210) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 1.96
Total Imp(%)= 60.00 Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.18 0.78
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 78.95
over (min) 5.00 10.00
Storage Coeff. (min)= 1.02 (ii) 8.78 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

*TOTALS*
PEAK FLOW (cms)= 0.32 0.12 0.377 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 60.82 27.57 40.87
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.45 0.67

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 ( 26240) |
| 1 + 2 = 3 |
-----
ID1= 1 ( 6210): 1.96 0.377 1.33 40.87
+ ID2= 2 ( 6240): 0.79 0.283 1.33 54.33
=====
ID = 3 ( 26240): 2.75 0.660 1.33 44.74

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| RESERVOIR( 46240) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1390 0.0686
0.0060 0.0042 | 0.1510 0.0822
0.0130 0.0130 | 0.1630 0.0967
0.0200 0.0250 | 0.1730 0.1121
0.0250 0.0328 | 0.1780 0.1202
0.0290 0.0439 | 2.5750 0.1742
0.1260 0.0558 | 0.0000 0.0000

```

```

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 26240) 2.750 0.660 1.33 44.74
OUTFLOW: ID= 1 ( 46240) 2.750 0.137 1.83 44.68

```

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 20.75
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= 0.0667

```

```

-----
| CALIB |
| STANDHYD ( 6220) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 0.92
Total Imp(%)= 40.00 Dir. Conn.(%)= 20.00

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.37 0.55
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 63.86
over (min) 5.00 10.00
Storage Coeff. (min)= 1.02 (ii) 9.47 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

*TOTALS*
PEAK FLOW (cms)= 0.08 0.07 0.105 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 60.82 25.49 32.55
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.99 0.42 0.53

```

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

***** WARNING: FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| RESERVOIR( 46220) |
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.2590 0.0708
0.0050 0.0089 | 0.2910 0.0871
0.0100 0.0187 | 0.3210 0.1045
0.0130 0.0298 | 0.3720 0.1438
0.0150 0.0422 | 2.8080 0.2087

```

0.2220 0.0559 | 0.0000 0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (6220)	0.920	0.105	1.33	32.55
OUTFLOW: ID= 1 (46220)	0.920	0.011	2.83	32.07

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.23
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.0215

CALIB
STANDHYD (6230)
ID= 1 DT= 5.0 min

Area (ha)=	0.48	Dir. Conn.(%)=	5.00
Total Imp(%)=	10.00		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.05	0.43
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	20.00	20.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	147.79	40.87
over (min)=	5.00	10.00
Storage Coeff. (min)=	0.68 (ii)	7.34 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

		TOTALS
PEAK FLOW (cms)=	0.01	0.04 (iii)
TIME TO PEAK (hrs)=	1.33	1.50
RUNOFF VOLUME (mm)=	60.82	23.36
TOTAL RAINFALL (mm)=	61.34	61.34
RUNOFF COEFFICIENT =	0.99	0.38

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26200)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (46220):	0.92	0.011	2.83	32.07
+ ID2= 2 (46240):	2.75	0.137	1.83	44.68
=====				
ID = 3 (26200):	3.67	0.147	1.92	41.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (26200)
3 + 2 = 1

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (26200):	3.67	0.147	1.92	41.51
+ ID2= 2 (6230):	0.48	0.040	1.50	23.36
=====				
ID = 1 (26200):	4.15	0.174	1.58	39.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0149)
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

TRAVEL TIME TABLE ----->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.456E+01	0.0	0.55	7.70
0.16	412.86	.182E+02	0.1	0.88	4.85
0.24	412.94	.410E+02	0.2	1.15	3.70
0.32	413.02	.729E+02	0.4	1.39	3.05
0.39	413.09	.114E+03	0.7	1.61	2.63
0.47	413.17	.164E+03	1.2	1.82	2.33
0.55	413.25	.223E+03	1.8	2.02	2.10
0.63	413.33	.292E+03	2.5	2.21	1.92
0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

hydrograph -----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (26200)	4.15	0.17	1.58	39.42	0.23	1.12
OUTFLOW: ID= 1 (0149)	4.15	0.18	1.67	39.41	0.23	1.12

CALIB
STANDHYD (96211)
ID= 1 DT= 5.0 min

Area (ha)=	0.61	Dir. Conn.(%)=	40.00
Total Imp(%)=	58.00		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.35	0.26
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	63.77	30.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	147.79	66.70
over (min)=	5.00	10.00
Storage Coeff. (min)=	1.67 (ii)	8.65 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.32	0.12

		TOTALS
PEAK FLOW (cms)=	0.10	0.03 (iii)
TIME TO PEAK (hrs)=	1.33	1.33
RUNOFF VOLUME (mm)=	60.34	39.10
TOTAL RAINFALL (mm)=	61.34	61.34
RUNOFF COEFFICIENT =	0.98	0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

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

```
-----
| ROUTE CHN( 0009)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----
<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          414.20        0.0350    Main Channel
4.30          412.70        0.0350    Main Channel
8.60          414.20        0.0350    Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH    ELEV    VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
(m)      (m)      (cu.m.)    (cms)        (m/s)       (min)
0.08     412.78    .456E+01    0.0          0.55        7.70
0.16     412.86    .182E+02    0.1          0.88        4.85
0.24     412.94    .410E+02    0.2          1.15        3.70
0.32     413.02    .729E+02    0.4          1.39        3.05
0.39     413.09    .114E+03    0.7          1.61        2.63
0.47     413.17    .164E+03    1.2          1.82        2.33
0.55     413.25    .223E+03    1.8          2.02        2.10
0.63     413.33    .292E+03    2.5          2.21        1.92
0.71     413.41    .369E+03    3.5          2.39        1.78
0.79     413.49    .456E+03    4.6          2.56        1.66
0.87     413.57    .551E+03    5.9          2.73        1.56
0.95     413.65    .656E+03    7.4          2.89        1.47
1.03     413.73    .770E+03    9.2          3.05        1.39
1.11     413.81    .893E+03    11.2         3.21        1.32
1.18     413.88    .103E+04    13.5         3.36        1.27
1.26     413.96    .117E+04    16.0         3.51        1.21
1.34     414.04    .132E+04    18.9         3.65        1.16
1.42     414.12    .148E+04    22.0         3.79        1.12
1.50     414.20    .165E+04    25.4         3.93        1.08
```

```
-----
<---- hydrograph ----> <-pipe / channel->
AREA      QPEAK    TPEAK    R.V.    MAX DEPTH    MAX VEL
(ha)      (cms)     (hrs)    (mm)    (m)          (m/s)
INFLOW : ID= 2 ( 96211) 0.61    0.11    1.33    39.10    0.19    0.97
OUTFLOW: ID= 1 ( 0009) 0.61    0.10    1.42    39.07    0.18    0.94
-----
```

```
-----
| ADD HYD ( 0147)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0149): 4.15    0.175    1.67    39.41
+ ID2= 2 ( 0627): 9.39    0.550    1.58    19.18
=====
ID = 3 ( 0147): 13.54    0.719    1.58    25.38
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0147)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 0147): 13.54    0.719    1.58    25.38
+ ID2= 2 ( 0009): 0.61    0.100    1.42    39.07
=====
ID = 1 ( 0147): 14.15    0.787    1.58    25.97
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 9621)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 16.18
Total Imp(%)= 32.00 Dir. Conn.(%)= 20.00
```

```
-----
IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)= 5.18    11.00
Dep. Storage (mm)= 1.00    1.50
Average Slope (%)= 1.00    2.00
Length (m)= 328.43    30.00
Mannings n = 0.013    0.250

Max.Eff.Inten.(mm/hr)= 147.79    51.46
over (min)= 5.00    15.00
Storage Coeff. (min)= 4.46 (ii)    12.21 (ii)
Unit Hyd. Tpeak (min)= 5.00    15.00
Unit Hyd. peak (cms)= 0.23    0.09

PEAK FLOW (cms)= 1.06    0.94    *TOTALS*
TIME TO PEAK (hrs)= 1.33    1.58    1.487 (iii)
RUNOFF VOLUME (mm)= 60.34    23.65    30.98
TOTAL RAINFALL (mm)= 61.34    61.34    61.34
RUNOFF COEFFICIENT = 0.98    0.39    0.51
```

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 8621)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 4.69
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00
```

```
-----
IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)= 4.69    0.00
Dep. Storage (mm)= 25.00    1.50
Average Slope (%)= 1.00    2.00
Length (m)= 176.82    40.00
Mannings n = 0.013    0.250

Max.Eff.Inten.(mm/hr)= 87.01    38.72
over (min)= 5.00    5.00
Storage Coeff. (min)= 3.80 (ii)    3.88 (ii)
Unit Hyd. Tpeak (min)= 5.00    5.00
Unit Hyd. peak (cms)= 0.25    0.25

PEAK FLOW (cms)= 0.94    0.00    *TOTALS*
TIME TO PEAK (hrs)= 1.42    1.33    1.42
RUNOFF VOLUME (mm)= 36.34    21.23    36.34
TOTAL RAINFALL (mm)= 61.34    61.34    61.34
RUNOFF COEFFICIENT = 0.59    0.35    0.59
```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 8623)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 2.05
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00
```

```

-----
Surface Area      (ha)= 2.05      0.00
Dep. Storage     (mm)= 25.00     1.50
Average Slope    (%)= 1.00      2.00
Length           (m)= 116.90    40.00
Mannings n       = 0.013      0.250

Max.Eff.Inten.(mm/hr)= 87.01    67.28
over (min)       = 5.00      5.00
Storage Coeff.  (min)= 2.97 (ii) 3.04 (ii)
Unit Hyd. Tpeak (min)= 5.00      5.00
Unit Hyd. peak  (cms)= 0.28      0.28

PEAK FLOW        (cms)= 0.44      0.00      *TOTALS*
TIME TO PEAK     (hrs)= 1.42      1.33      0.440 (iii)
RUNOFF VOLUME    (mm)= 36.34     34.22     36.33
TOTAL RAINFALL   (mm)= 61.34     61.34     61.34
RUNOFF COEFFICIENT = 0.59      0.56      0.59

```

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

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

```

-----
| CALIB |
| STANDHYD ( 9623) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 4.42
Total Imp(%)= 48.00 Dir. Conn.(%)= 35.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.12 2.30
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 171.66 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 57.12
over (min) = 5.00 15.00
Storage Coeff. (min)= 3.02 (ii) 10.45 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.27 0.09

PEAK FLOW (cms)= 0.57 0.23 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.58 0.643 (iii)
RUNOFF VOLUME (mm)= 60.34 24.57 37.09
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.98 0.40 0.60

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 8624) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 4.32
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.32 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00

```

```

Length (m)= 169.71 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 87.01 38.72
over (min) = 5.00 5.00
Storage Coeff. (min)= 3.71 (ii) 3.78 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.25 0.25

PEAK FLOW (cms)= 0.87 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.42 1.33 0.870 (iii)
RUNOFF VOLUME (mm)= 36.34 21.23 1.42
TOTAL RAINFALL (mm)= 61.34 61.34 36.34
RUNOFF COEFFICIENT = 0.59 0.35 61.34

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 9624) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 8.46
Total Imp(%)= 51.00 Dir. Conn.(%)= 40.00

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.31 4.15
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 237.49 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 55.13
over (min) = 5.00 15.00
Storage Coeff. (min)= 3.67 (ii) 11.21 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.25 0.09

PEAK FLOW (cms)= 1.18 0.39 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.58 1.307 (iii)
RUNOFF VOLUME (mm)= 60.34 24.25 1.33
TOTAL RAINFALL (mm)= 61.34 61.34 38.69
RUNOFF COEFFICIENT = 0.98 0.40 61.34

```

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0628) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 5.35
Total Imp(%)= 60.00 Dir. Conn.(%)= 40.00

```

```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.21 2.14
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 188.86 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 77.64
over (min) = 5.00 15.00

```

Storage Coeff. (min)= 3.20 (ii) 11.01 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.27 0.09

PEAK FLOW (cms)= 0.77 0.28
TIME TO PEAK (hrs)= 1.33 1.58
RUNOFF VOLUME (mm)= 60.34 27.40
TOTAL RAINFALL (mm)= 61.34 61.34
RUNOFF COEFFICIENT = 0.98 0.45

TOTALS
0.870 (iii)
1.33
40.57
61.34
0.66

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8625)
ID= 1 DT= 5.0 min
Area (ha)= 4.11
Total Imp(%)= 100.00
Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.11 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 165.53 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 87.01 67.28
over (min) 5.00 5.00
Storage Coeff. (min)= 3.65 (ii) 3.73 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.25 0.26

TOTALS
PEAK FLOW (cms)= 0.83 0.00
TIME TO PEAK (hrs)= 1.42 1.33
RUNOFF VOLUME (mm)= 36.34 34.22
TOTAL RAINFALL (mm)= 61.34 61.34
RUNOFF COEFFICIENT = 0.59 0.56

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

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

CALIB
STANDHYD (9625)
ID= 1 DT= 5.0 min
Area (ha)= 8.07
Total Imp(%)= 55.00
Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.44 3.63
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 231.95 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 147.79 63.74
over (min) 5.00 15.00
Storage Coeff. (min)= 3.62 (ii) 10.73 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.25 0.09

TOTALS
PEAK FLOW (cms)= 1.13 0.40
1.264 (iii)

TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 60.34 25.56 39.47
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.98 0.42 0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2621)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0628): 5.35 0.870 1.33 40.57
+ ID2= 2 (8621): 4.69 0.937 1.42 36.34
ID = 3 (2621): 10.04 1.695 1.42 38.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2621): 10.04 1.695 1.42 38.60
+ ID2= 2 (8623): 2.05 0.440 1.42 36.33
ID = 1 (2621): 12.09 2.135 1.42 38.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2621): 12.09 2.135 1.42 38.21
+ ID2= 2 (8624): 4.32 0.870 1.42 36.34
ID = 3 (2621): 16.41 3.005 1.42 37.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2621): 16.41 3.005 1.42 37.72
+ ID2= 2 (8625): 4.11 0.832 1.42 36.34
ID = 1 (2621): 20.52 3.836 1.42 37.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2621): 20.52 3.836 1.42 37.44
+ ID2= 2 (9621): 16.18 1.487 1.50 30.98
ID = 3 (2621): 36.70 5.302 1.42 34.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2621)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2621):  AREA   QPEAK   TPEAK   R.V.
                  (ha)   (cms)   (hrs)   (mm)
+ ID2= 2 ( 9623):  4.42  0.643  1.33   37.09
=====
ID = 1 ( 2621):  41.12  5.863  1.42   34.86
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2621)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 2621):  AREA   QPEAK   TPEAK   R.V.
                  (ha)   (cms)   (hrs)   (mm)
+ ID2= 2 ( 9624):  8.46  1.307  1.33   38.69
=====
ID = 3 ( 2621):  49.58  7.025  1.42   35.52
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2621)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2621):  AREA   QPEAK   TPEAK   R.V.
                  (ha)   (cms)   (hrs)   (mm)
+ ID2= 2 ( 9625):  8.07  1.264  1.33   39.47
=====
ID = 1 ( 2621):  57.65  8.155  1.42   36.07
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 5621)|
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
OVERFLOW IS OFF
OUTFLOW   STORAGE   |   OUTFLOW   STORAGE
(cms)     (ha.m.)   |   (cms)     (ha.m.)
0.0000    0.0000   |   1.5000    2.5000
0.0010    0.0000   |   2.5000    3.0000
0.0100    1.0000   |   3.0000    3.5000
0.0500    1.5000   |   4.0000    4.0000
0.5000    2.0000   |   0.0000    0.0000

          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
INFLOW : ID= 2 ( 2621)  57.650  8.155  1.42   36.07
OUTFLOW: ID= 1 ( 5621)  57.650  0.361  3.92   24.08
-----
```

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.43
TIME SHIFT OF PEAK FLOW (min)=150.00
MAXIMUM STORAGE USED (ha.m.)= 1.8461

```
-----
| CALIB
| STANDHYD ( 9622)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 6.75
Total Imp(%)= 44.00 Dir. Conn.(%)= 30.00
-----
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.97	3.78
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	212.13	30.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	147.79	57.12	
over (min)	5.00	15.00	
Storage Coeff. (min)=	3.43 (ii)	10.86 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.26	0.09	
PEAK FLOW (cms)=	0.72	0.37	0.843 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.33
RUNOFF VOLUME (mm)=	60.34	24.57	35.30
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.98	0.40	0.58

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 8622)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 2.20
Total Imp(%)= 99.99 Dir. Conn.(%)= 99.99
-----
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.20	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	121.11	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	87.01	67.28	
over (min)	5.00	5.00	
Storage Coeff. (min)=	3.03 (ii)	3.22 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.27	0.27	
PEAK FLOW (cms)=	0.47	0.00	0.470 (iii)
TIME TO PEAK (hrs)=	1.42	1.33	1.42
RUNOFF VOLUME (mm)=	36.34	34.22	36.34
TOTAL RAINFALL (mm)=	61.34	61.34	61.34
RUNOFF COEFFICIENT =	0.59	0.56	0.59

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

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

```
-----
| ADD HYD ( 2622)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 8622):  AREA   QPEAK   TPEAK   R.V.
                  (ha)   (cms)   (hrs)   (mm)
+ ID2= 2 ( 9622):  6.75  0.843  1.33   35.30
=====
ID = 3 ( 2622):  8.95  1.254  1.42   35.56
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 5622)|
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
OVERFLOW IS OFF
OUTFLOW   STORAGE   |   OUTFLOW   STORAGE
(cms)     (ha.m.)   |   (cms)     (ha.m.)
-----
```


(cms)	(ha.m.)	(cms)	(ha.m.)
0.0000	0.0000	0.4500	0.2500
0.0010	0.0000	0.6500	0.3200
0.0030	0.1200	0.8000	0.4000
0.1000	0.1500	0.9800	0.5000
0.3000	0.2000	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2622)	8.950	1.254	1.42	35.56
OUTFLOW: ID= 1 (5622)	8.950	0.281	2.08	34.54

PEAK FLOW REDUCTION [Qout/Qin](%)= 22.44
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 0.1954

ADD HYD (2625)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (5621):	57.65	0.361	3.92	24.08
+ ID2= 2 (5622):	8.95	0.281	2.08	34.54
=====				
ID = 3 (2625):	66.60	0.509	2.83	25.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0150)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0147):	14.15	0.787	1.58	25.97
+ ID2= 2 (2625):	66.60	0.509	2.83	25.49
=====				
ID = 3 (0150):	80.75	0.924	1.67	25.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2620)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0150):	80.75	0.924	1.67	25.57
+ ID2= 2 (2610):	653.41	12.794	2.93	23.26
=====				
ID = 3 (2620):	734.16	13.472	2.90	23.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	Curve Number (CN)=
NASHYD (0637)	8.42	70.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.20	

Unit Hyd Qpeak (cms)= 1.608

PEAK FLOW (cms)= 0.493 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 19.180
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

CALIB	Area (ha)=	Curve Number (CN)=
NASHYD (0630)	33.04	70.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.38	

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 1.360 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 19.214
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

ROUTE CHN(4630)	Routing time step (min)'=
IN= 2---> OUT= 1	5.00

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0630)	33.04	1.36	1.83	19.21	0.77	0.80
OUTFLOW: ID= 1 (4630)	33.04	1.25	2.00	19.21	0.75	0.78

ADD HYD (2637)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (2620):	734.16	13.472	2.90	23.02
+ ID2= 2 (4630):	33.04	1.251	2.00	19.21
=====				
ID = 3 (2637):	767.20	14.028	2.80	22.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2637)|
| 3 + 2 = 1 |
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 3 ( 2637): 767.20 14.028 2.80 22.86
+ ID2= 2 ( 0637): 8.42 0.493 1.58 19.18
=====
ID = 1 ( 2637): 775.62 14.106 2.80 22.82
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0636)|
| ID= 1 DT= 5.0 min |
-----
| Area (ha)= 3.60 Curve Number (CN)= 70.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20
-----
```

Unit Hyd Qpeak (cms)= 0.688

PEAK FLOW (cms)= 0.211 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 19.180
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| ADD HYD ( 2636)|
| 1 + 2 = 3 |
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 1 ( 2637): 775.62 14.106 2.80 22.82
+ ID2= 2 ( 0636): 3.60 0.211 1.58 19.18
=====
ID = 3 ( 2636): 779.22 14.140 2.80 22.80
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0638)|
| ID= 1 DT= 5.0 min |
-----
| Area (ha)= 20.63 Curve Number (CN)= 70.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20
-----
```

Unit Hyd Qpeak (cms)= 3.940

PEAK FLOW (cms)= 1.208 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 19.180
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| CALIB
| NASHYD ( 0639)|
| ID= 1 DT= 5.0 min |
-----
| Area (ha)= 4.47 Curve Number (CN)= 70.0
| Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20
-----
```

Unit Hyd Qpeak (cms)= 0.854

PEAK FLOW (cms)= 0.262 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 19.180
TOTAL RAINFALL (mm)= 61.344
RUNOFF COEFFICIENT = 0.313

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

```
-----
| ADD HYD ( 2630)|
| 1 + 2 = 3 |
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 1 ( 2636): 779.22 14.140 2.80 22.80
+ ID2= 2 ( 0630): 20.63 1.208 1.58 19.18
=====
ID = 3 ( 2630): 799.85 14.330 2.80 22.71
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2630)|
| 3 + 2 = 1 |
-----
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 3 ( 2630): 799.85 14.330 2.80 22.71
+ ID2= 2 ( 0639): 4.47 0.262 1.58 19.18
=====
ID = 1 ( 2630): 804.32 14.372 2.80 22.69
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 8709)|
| ID= 1 DT= 5.0 min |
-----
| Area (ha)= 3.51
| Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00
-----
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.51	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	20.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	87.01	67.28
over (min)	5.00	5.00
Storage Coeff. (min)=	1.03 (ii)	1.10 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.34

PEAK FLOW (cms)=	0.84	0.00	*TOTALS*
TIME TO PEAK (hrs)=	1.42	1.33	0.845 (iii)
RUNOFF VOLUME (mm)=	36.34	34.22	1.42
TOTAL RAINFALL (mm)=	61.34	61.34	36.34
RUNOFF COEFFICIENT =	0.59	0.56	61.34
			0.59

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

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

```
-----
| CALIB
| STANDHYD ( 9709)|
| ID= 1 DT= 5.0 min |
-----
| Area (ha)= 7.20
| Total Imp(%)= 56.00 Dir. Conn.(%)= 40.00
-----
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.03	3.17
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	219.09	30.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)= 147.79 66.21
over (min)= 5.00 15.00
Storage Coeff. (min)= 3.50 (ii) 10.50 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.26 0.09

PEAK FLOW (cms)= 1.02 0.37 *TOTALS* 1.141 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 60.34 25.91 39.68
TOTAL RAINFALL (mm)= 61.34 61.34 61.34
RUNOFF COEFFICIENT = 0.98 0.42 0.65

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2709)
1 + 2 = 3
ID1= 1 (8709): 3.51 0.845 1.42 36.34
+ ID2= 2 (9709): 7.20 1.141 1.33 39.68
ID = 3 (2709): 10.71 1.858 1.42 38.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5709)
IN= 2--> OUT= 1
DT= 5.0 min
OVERFLOW IS OFF
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.6000 0.3800
0.0010 0.0000 | 0.9000 0.5400
0.0100 0.1000 | 1.1000 0.7100
0.0500 0.2000 | 1.4000 0.8900
0.4000 0.2400 | 0.0000 0.0000

INFLOW : ID= 2 (2709) 10.710 1.858 1.42 38.59
OUTFLOW: ID= 1 (5709) 10.710 0.413 2.00 38.59

PEAK FLOW REDUCTION [Qout/Qin](%)= 22.22
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= 0.2492

FINISH

** SIMULATION : 25 year Fergus Shand Dam Chic **

CHICAGO STORM | IDF curve parameters: A=3023.000
| Ptotal= 74.68 mm | B= 18.000
C= 0.916
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	3.03	1.00	25.41	2.00	13.91	3.00	4.68
0.00	3.31	1.00	41.74	2.00	12.18	3.00	4.41
0.17	3.65	1.17	86.90	2.17	10.79	3.17	4.17
0.25	4.05	1.25	170.99	2.25	9.65	3.25	3.95
0.33	4.54	1.33	106.07	2.33	8.70	3.33	3.75
0.42	5.15	1.42	67.82	2.42	7.91	3.42	3.56
0.50	5.92	1.50	47.76	2.50	7.23	3.50	3.40
0.58	6.93	1.58	35.82	2.58	6.65	3.58	3.24
0.67	8.29	1.67	28.10	2.67	6.15	3.67	3.10
0.75	10.20	1.75	22.79	2.75	5.71	3.75	2.97
0.83	13.02	1.83	18.97	2.83	5.33	3.83	2.85
0.92	17.51	1.92	16.11	2.92	4.99	3.92	2.74

CALIB
NASHYD (0100)
ID= 1 DT= 2.0 min
Area (ha)= 136.98
Ia (mm)= 5.00
U.H. Tp(hrs)= 1.17
Curve Number (CN)= 69.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 3.657 (i)
TIME TO PEAK (hrs)= 2.867
RUNOFF VOLUME (mm)= 26.414
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.354

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

CALIB
STANDHYD (0201)
ID= 1 DT= 2.0 min
Area (ha)= 14.60
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.97
Curve Number (CN)= 74.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.567 (i)
TIME TO PEAK (hrs)= 2.600
RUNOFF VOLUME (mm)= 32.968
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.441

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

CALIB
STANDHYD (0203)
ID= 1 DT= 2.0 min
Area (ha)= 8.20
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 156.97 83.70
over (min) 5.00 8.00
Storage Coeff. (min)= 0.88 (ii) 7.98 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.53 0.14

PEAK FLOW (cms)= 0.95 0.78
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 72.68 34.28
TOTAL RAINFALL (mm)= 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.46

TOTALS
1.387 (iii)
1.37
43.88
74.68
0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200)|
1 + 2 = 3
ID1= 1 (0201): 14.60 0.567 2.60 32.97
+ ID2= 2 (0203): 8.20 1.387 1.37 43.88
=====

ID = 3 (2200): 22.80 1.414 1.37 36.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)|
| IN= 2--> OUT= 1 |
DT= 5.0 min
OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1980 0.2314
0.0040 0.0218 | 0.2920 0.2621
0.0060 0.0446 | 0.3980 0.2937
0.0070 0.0683 | 0.5150 0.3261
0.0080 0.0930 | 0.8290 0.3592
0.0090 0.1187 | 1.3520 0.3930
0.0230 0.1453 | 2.0570 0.4275
0.0610 0.1730 | 2.9590 0.4629
0.1200 0.2017 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2200) 22.800 1.414 1.37 36.89
OUTFLOW: ID= 1 (5200) 22.800 0.650 2.87 36.46

PEAK FLOW REDUCTION [Qout/Qin](%)= 45.99
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.3404

**** WARNING : SELECTED ROUTING TIME STEP DENIED.

CALIB
NASHYD (0205)|
ID= 1 DT= 2.0 min | Area (ha)= 4.80 Curve Number (CN)= 90.0
U.H. Tp(hrs)= 0.41 # of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.447
PEAK FLOW (cms)= 0.568 (i)

TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 52.808
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.707

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

CALIB
STANDHYD (0206)|
ID= 1 DT= 2.0 min | Area (ha)= 0.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 156.97 83.70
over (min) 5.00 8.00
Storage Coeff. (min)= 0.88 (ii) 7.98 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.53 0.14

PEAK FLOW (cms)= 0.02 0.02
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 72.68 34.28
TOTAL RAINFALL (mm)= 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.46

TOTALS
0.034 (iii)
1.37
43.86
74.68
0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201)|
1 + 2 = 3
ID1= 1 (0205): 4.80 0.568 1.83 52.81
+ ID2= 2 (0206): 0.20 0.034 1.37 43.86
=====

ID = 3 (2201): 5.00 0.581 1.83 52.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201)|
3 + 2 = 1
ID1= 3 (2201): 5.00 0.581 1.83 52.45
+ ID2= 2 (5200): 22.80 0.650 2.87 36.46
=====

ID = 1 (2201): 27.80 0.889 2.03 39.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0209)|
ID= 1 DT= 2.0 min | Area (ha)= 2.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.43	2.27
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	35.00	35.00
Mannings n	= 0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	156.97	57.41
over (min)	5.00	12.00
Storage Coeff. (min)=	1.08 (ii)	10.56 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.50	0.10
PEAK FLOW (cms)=	0.10	0.24
TIME TO PEAK (hrs)=	1.33	1.57
RUNOFF VOLUME (mm)=	72.68	29.82
TOTAL RAINFALL (mm)=	74.68	74.68
RUNOFF COEFFICIENT	= 0.97	0.40

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.58	0.72
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n	= 0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	156.97	83.70
over (min)	5.00	8.00
Storage Coeff. (min)=	0.88 (ii)	7.98 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.53	0.14
PEAK FLOW (cms)=	0.15	0.12
TIME TO PEAK (hrs)=	1.33	1.37
RUNOFF VOLUME (mm)=	72.68	34.28
TOTAL RAINFALL (mm)=	74.68	74.68
RUNOFF COEFFICIENT	= 0.97	0.46

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)|

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0207):	1.30	0.220	1.37	43.88
+ ID2= 2 (0209):	2.70	0.273	1.53	33.25
ID = 3 (2202):	4.00	0.455	1.50	36.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2202):	4.00	0.455	1.50	36.70
+ ID2= 2 (2201):	27.80	0.889	2.03	39.33
ID = 1 (2202):	31.80	1.095	1.87	39.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0100):	136.98	3.657	2.87	26.41
+ ID2= 2 (2202):	31.80	1.095	1.87	39.00
ID = 3 (2100):	168.78	4.530	2.80	28.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

	Area (ha)=	Curve Number (CN)=
CALIB	2.90	74.0
NASHYD (0302):	Ia (mm)= 1.50	# of Linear Res.(N)= 3.00
ID= 1 DT= 2.0 min	U.H. Tp(hrs)= 0.45	

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.192 (i)
TIME TO PEAK (hrs)= 1.933
RUNOFF VOLUME (mm)= 32.968
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.441

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

	Area (ha)=	Dir. Conn.(%)=
CALIB	4.40	25.00
STANDHYD (0304):	Total Imp(%)= 45.00	
ID= 1 DT= 2.0 min		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.98	2.42
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n	= 0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 156.97 83.70
over (min) 5.00 10.00
Storage Coeff. (min)= 0.93 (ii) 8.43 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.52 0.13

TOTALS
PEAK FLOW (cms)= 0.51 0.41 0.690 (iii)
TIME TO PEAK (hrs)= 1.33 1.53 1.37
RUNOFF VOLUME (mm)= 72.68 34.28 43.88
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.46 0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2300)|
1 + 2 = 3
ID1= 1 (0302): 2.90 0.192 1.93 32.97
+ ID2= 2 (0304): 4.40 0.690 1.37 43.88
=====
ID = 3 (2300): 7.30 0.722 1.37 39.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| STANDHYD (0308)|
ID= 1 DT= 2.0 min
Area (ha)= 0.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 156.97 83.70
over (min) 5.00 10.00
Storage Coeff. (min)= 0.93 (ii) 8.43 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.52 0.13

TOTALS
PEAK FLOW (cms)= 0.02 0.02 0.031 (iii)
TIME TO PEAK (hrs)= 1.33 1.53 1.37
RUNOFF VOLUME (mm)= 72.68 34.28 43.85
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.46 0.59

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (0310)|
ID= 1 DT= 2.0 min
Area (ha)= 5.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00

Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 156.97 57.41
over (min) 5.00 10.00
Storage Coeff. (min)= 0.88 (ii) 8.63 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.53 0.12

TOTALS
PEAK FLOW (cms)= 0.21 0.55 0.630 (iii)
TIME TO PEAK (hrs)= 1.33 1.53 1.50
RUNOFF VOLUME (mm)= 72.68 29.82 33.25
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.40 0.45

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)|
1 + 2 = 3
ID1= 1 (2300): 7.30 0.722 1.37 39.54
+ ID2= 2 (0308): 0.20 0.031 1.37 43.85
=====
ID = 3 (2301): 7.50 0.753 1.37 39.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2301)|
3 + 2 = 1
ID1= 3 (2301): 7.50 0.753 1.37 39.66
+ ID2= 2 (0310): 5.70 0.630 1.50 33.25
=====
ID = 1 (2301): 13.20 1.371 1.47 36.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2302)|
1 + 2 = 3
ID1= 1 (2100): 168.78 4.530 2.80 28.79
+ ID2= 2 (2301): 13.20 1.371 1.47 36.89
=====
ID = 3 (2302): 181.98 4.761 2.73 29.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| STANDHYD (0400)|
ID= 1 DT= 2.0 min
Area (ha)= 82.86
Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00

IMPERVIOUS PERVIOUS (i)

Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 122.41 54.03
over (min) 12.00 24.00
Storage Coeff. (min)= 12.98 (ii) 22.00 (ii)
Unit Hyd. Tpeak (min)= 12.00 24.00
Unit Hyd. peak (cms)= 0.09 0.05

PEAK FLOW (cms)= 0.60 5.15 5.539 (iii)
TIME TO PEAK (hrs)= 1.50 1.80 1.80
RUNOFF VOLUME (mm)= 72.67 28.68 30.00
TOTAL RAINFALL (mm)= 74.68 74.68 74.68
RUNOFF COEFFICIENT = 0.97 0.38 0.40

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2400)|
1 + 2 = 3 |
ID1= 1 (2302): 181.98 4.761 2.73 29.37
+ ID2= 2 (0400): 82.86 5.539 1.80 30.00
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4400)|
IN= 2---> OUT= 1 | Routing time step (min)'= 2.00

----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550
96.00 409.10 0.0550
115.00 408.90 0.0550
124.00 409.10 0.0550
131.00 408.90 0.0550 /0.0350 Main Channel
133.60 408.00 0.0350 Main Channel
134.40 407.60 0.0350 Main Channel
135.00 407.50 0.0350 Main Channel
135.80 407.60 0.0350 Main Channel
136.50 408.00 0.0350 Main Channel
139.40 408.80 0.0350 /0.0550 Main Channel
143.50 408.90 0.0550
148.50 408.70 0.0550
163.80 408.90 0.0550
183.20 408.90 0.0550
243.70 409.70 0.0550
278.70 410.20 0.0550
330.50 411.40 0.0550

----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME

(m) (m) (cu.m.) (cms) (m/s) (min)
0.19 407.69 .366E+03 0.1 0.51 58.83
0.37 407.87 .106E+04 0.5 0.81 37.08
0.56 408.06 .199E+04 1.1 1.00 29.93
0.74 408.24 .328E+04 2.1 1.14 26.32
0.93 408.43 .498E+04 3.6 1.28 23.32
1.11 408.61 .708E+04 5.6 1.43 20.94
1.30 408.80 .105E+05 8.5 1.45 20.61
1.49 408.99 .247E+05 14.8 1.07 27.91
1.68 409.18 .601E+05 30.4 0.91 32.97
1.87 409.37 .109E+06 58.5 0.96 31.05
2.06 409.56 .166E+06 98.3 1.06 28.11
2.25 409.75 .231E+06 150.3 1.17 25.57
2.44 409.94 .303E+06 215.4 1.28 23.46
2.64 410.14 .383E+06 293.8 1.38 21.74
2.83 410.33 .470E+06 390.1 1.49 20.10
3.02 410.52 .563E+06 502.4 1.60 18.66
3.21 410.71 .660E+06 628.8 1.71 17.48
3.40 410.90 .762E+06 769.5 1.81 16.49
3.59 411.09 .868E+06 924.9 1.91 15.65

----- hydrograph -----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (2400) 264.84 8.87 1.87 29.57 1.31 1.42
OUTFLOW: ID= 1 (4400) 264.84 7.67 2.33 29.57 1.25 1.45

CALIB
NASHYD (0515)| Area (ha)= 5.01 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW (cms)= 0.265 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 25.502
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.342

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

CALIB
NASHYD (0510)| Area (ha)= 91.44 Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.09

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)= 2.973 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 30.266
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.405

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

ROUTE CHN(4510)|
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel

4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.206E+02	0.0	0.19	101.61
0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0510)	91.44	2.97	2.75	30.27	1.00	1.03
OUTFLOW: ID= 1 (4510)	91.44	2.84	3.00	30.26	0.98	1.01

<---- hydrograph ---->

<-pipe / channel->

TIME TO PEAK (hrs)=	1.33	1.58	1.42
RUNOFF VOLUME (mm)=	73.88	36.68	47.84
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.99	0.49	0.64

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)=	10.78
STANDHYD (0516)	Total Imp(%)=	45.00
ID= 1 DT= 5.0 min	Dir. Conn.(%)=	45.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.85	5.93
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	268.08	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	47.89
over (min)	5.00	20.00
Storage Coeff. (min)=	3.72 (ii)	15.39 (ii)
Unit Hyd. Tpeak (min)=	5.00	20.00
Unit Hyd. peak (cms)=	0.25	0.07

PEAK FLOW (cms)=	1.96	0.49	2.076 (iii)
TIME TO PEAK (hrs)=	1.33	1.67	1.33
RUNOFF VOLUME (mm)=	73.88	30.27	49.89
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.99	0.41	0.67

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2511)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
TD1= 1 (0511):	52.87	7.494	1.42	47.84
+ ID2= 2 (0516):	10.78	2.076	1.33	49.89
ID = 3 (2511):	63.65	9.282	1.42	48.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(4511)	OUTFLOW	STORAGE	OUTFLOW	STORAGE
IN= 2--> OUT= 1	(cms)	(ha.m.)	(cms)	(ha.m.)
DT= 5.0 min				
***** WARNING : FIRST OUTFLOW IS NOT ZERO.				
	0.7700	0.9000	3.2130	1.6220
	1.6000	1.1400	3.9540	1.8810
	2.2900	1.2810	4.9000	2.3000

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (2511)	63.650	9.282	1.42	48.18

OUTFLOW: ID= 1 (4511) 63.650 3.199 2.08 48.18

PEAK FLOW REDUCTION [Qout/Qin](%)= 34.46
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 1.6168

```
-----
| ADD HYD ( 2510)|
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 4510): 91.44 2.836 3.00 30.26
| + ID2= 2 ( 4511): 63.65 3.199 2.08 48.18
|=====|
| ID = 3 ( 2510): 155.09 5.325 2.67 37.61
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2510)|
| 3 + 2 = 1 |
|-----|
| ID1= 3 ( 2510): 155.09 5.325 2.67 37.61
| + ID2= 2 ( 0517): 2.14 0.158 1.75 30.26
|=====|
| ID = 1 ( 2510): 157.23 5.372 2.58 37.51
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0512)|
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 27.13
| Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	13.56	13.56
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	425.28	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	95.30
over (min)	5.00	15.00
Storage Coeff. (min)=	4.91 (ii)	12.11 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.22	0.09

PEAK FLOW (cms)=	3.02	2.18	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.58	4.053 (iii)
RUNOFF VOLUME (mm)=	73.88	36.68	1.42
TOTAL RAINFALL (mm)=	74.68	74.68	47.84
RUNOFF COEFFICIENT =	0.99	0.49	74.68
			0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0513)|
| ID= 1 DT= 5.0 min |
|-----|
| Area (ha)= 6.44
| Total Imp(%)= 65.00 Dir. Conn.(%)= 35.00
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.19	2.25

Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	207.20	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	148.20
over (min)	5.00	15.00
Storage Coeff. (min)=	3.19 (ii)	10.62 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.27	0.09

PEAK FLOW (cms)=	0.95	0.59	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.58	1.170 (iii)
RUNOFF VOLUME (mm)=	73.88	42.06	1.33
TOTAL RAINFALL (mm)=	74.68	74.68	53.19
RUNOFF COEFFICIENT =	0.99	0.56	74.68
			0.71

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| DUHYD ( 8512)|
| Inlet Cap.= 0.732|
| #of Inlets= 1|
| Total(cms)= 0.7|
|-----|
| AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
|-----|
| TOTAL HYD.(ID= 1): 6.44 1.17 1.33 53.19
|=====|
| MAJOR SYS.(ID= 2): 0.79 0.44 1.33 53.19
| MINOR SYS.(ID= 3): 5.65 0.73 1.33 53.19
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2512)|
| 1 + 2 = 3 |
|-----|
| ID1= 1 ( 0512): 27.13 4.053 1.42 47.84
| + ID2= 2 ( 8512): 5.65 0.732 1.33 53.19
|=====|
| ID = 3 ( 2512): 32.78 4.785 1.42 48.76
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 5512)|
| IN= 2--> OUT= 1 |
| DT= 5.0 min |
|-----|
| OVERFLOW IS OFF
|-----|
| OUTFLOW STORAGE OUTFLOW STORAGE
| (cms) (ha.m.) | (cms) (ha.m.)
|-----|
| 0.0000 0.0000 | 0.6640 0.9151
| 0.0210 0.1601 | 0.8570 1.0220
| 0.0360 0.3317 | 1.0660 1.1320
| 0.0410 0.4218 | 1.2900 1.2450
| 0.1000 0.5147 | 1.5290 1.3610
| 0.2030 0.6105 | 1.7810 1.4800
| 0.3340 0.7092 | 2.0460 1.6020
| 0.4890 0.8107 | 2.3220 1.7260
```

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (2512)	32.777	4.785	1.42	48.76
OUTFLOW: ID= 1 (5512)	32.777	0.972	2.42	48.70

PEAK FLOW REDUCTION [Qout/Qin](%)= 20.31
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 1.0834

CALIB
NASHYD (0520) | Area (ha)= 108.36 Curve Number (CN)= 71.0
ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.20

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 3.017 (i)
TIME TO PEAK (hrs)= 2.900
RUNOFF VOLUME (mm)= 27.994
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.375

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

ADD HYD (2514) |
1 + 2 = 3 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (2510): 157.23 5.372 2.58 37.51
+ ID2= 2 (0515): 5.01 0.265 1.83 25.50
=====

ID = 3 (2514): 162.24 5.504 2.58 37.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2520) |
1 + 2 = 3 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (2513): 466.54 14.190 2.40 33.45
+ ID2= 2 (0520): 108.36 3.017 2.90 27.99
=====

ID = 3 (2520): 574.90 16.922 2.53 32.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4500) |
IN= 2---> OUT= 1 | Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 /0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 /0.0550 Main Channel
109.70 404.30 0.0550
128.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
0.68 403.38 .304E+04 1.6 1.03 32.27
1.02 403.72 .718E+04 4.5 1.25 26.57
1.36 404.06 .122E+05 9.7 1.58 20.96
1.70 404.40 .251E+05 18.1 1.44 23.04
2.08 404.78 .650E+05 42.3 1.29 25.62
2.46 405.16 .122E+06 86.3 1.40 23.62
2.84 405.54 .192E+06 151.6 1.57 21.10
3.21 405.91 .270E+06 238.3 1.75 18.90
3.59 406.29 .357E+06 345.8 1.93 17.20
3.97 406.67 .452E+06 474.9 2.09 15.85

ADD HYD (2514) |
1 + 2 = 3 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (2510): 157.23 5.372 2.58 37.51
+ ID2= 2 (0515): 5.01 0.265 1.83 25.50
=====

ID = 3 (2514): 162.24 5.504 2.58 37.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2514) |
3 + 2 = 1 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 3 (2514): 162.24 5.504 2.58 37.14
+ ID2= 2 (5512): 32.78 0.972 2.42 48.70
=====

ID = 1 (2514): 195.02 6.459 2.58 39.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0518) | Area (ha)= 6.68 Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.579 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 27.940
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.374

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

ADD HYD (2513) |
1 + 2 = 3 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (2514): 195.02 6.459 2.58 39.09
+ ID2= 2 (4400): 264.84 7.668 2.33 29.57
=====

ID = 3 (2513): 459.86 14.052 2.43 33.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2513) |
3 + 2 = 1 | AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 3 (2513): 459.86 14.052 2.43 33.53
+ ID2= 2 (0518): 6.68 0.579 1.58 27.94
=====

ID = 1 (2513): 466.54 14.190 2.40 33.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

<---- hydrograph <----> <-pipe / channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2520)	574.90	16.92	2.53	32.42	1.65	1.46
OUTFLOW: ID= 1 (4500)	574.90	15.82	3.03	32.42	1.61	1.47

CALIB					
NASHYD (0610)	Area (ha)=	78.05	Curve Number (CN)=	71.0	
ID= 1 DT= 2.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	1.00			

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak	(cms)=	2.981
PEAK FLOW	(cms)=	2.491 (i)
TIME TO PEAK	(hrs)=	2.667
RUNOFF VOLUME	(mm)=	27.994
TOTAL RAINFALL	(mm)=	74.676
RUNOFF COEFFICIENT	=	0.375

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

ADD HYD (2610)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (4500):	574.90	15.824	3.03	32.42	
+ ID2= 2 (0610):	78.05	2.491	2.67	27.99	
ID = 3 (2610):	652.95	18.198	2.93	31.89	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0627)	Area (ha)=	9.39	Curve Number (CN)=	70.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.20			

Unit Hyd Qpeak	(cms)=	1.793
PEAK FLOW	(cms)=	0.788 (i)
TIME TO PEAK	(hrs)=	1.583
RUNOFF VOLUME	(mm)=	27.140
TOTAL RAINFALL	(mm)=	74.676
RUNOFF COEFFICIENT	=	0.363

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

CALIB					
STANDHYD (6240)	Area (ha)=	0.79			
ID= 1 DT= 5.0 min	Total Imp(%)=	90.00	Dir. Conn.(%)=	70.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.71	0.08
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	20.00	20.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	305.25
over (min)	5.00	5.00
Storage Coeff. (min)=	0.64 (ii)	2.36 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.30

PEAK FLOW (cms)=	0.26	0.07	0.335 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	74.16	51.21	67.27
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.99	0.69	0.90

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (6210)	Area (ha)=	1.96			
ID= 1 DT= 5.0 min	Total Imp(%)=	60.00	Dir. Conn.(%)=	40.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.18	0.78
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	170.99	107.08
over (min)	5.00	10.00
Storage Coeff. (min)=	0.97 (ii)	7.83 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.13

PEAK FLOW (cms)=	0.37	0.17	0.459 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	74.16	37.76	52.32
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.99	0.51	0.70

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26240)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (6210):	1.96	0.459	1.33	52.32	
+ ID2= 2 (6240):	0.79	0.335	1.33	67.27	
ID = 3 (26240):	2.75	0.794	1.33	56.61	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

OVERFLOW IS OFF				
RESERVOIR(46240)				
IN= 2--> OUT= 1				
DT= 5.0 min				
OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
0.0000	0.0000	0.1390	0.0686	
0.0060	0.0042	0.1510	0.0822	
0.0130	0.0130	0.1630	0.0967	
0.0200	0.0250	0.1730	0.1121	
0.0250	0.0328	0.1780	0.1202	
0.0290	0.0439	2.5750	0.1742	
0.1260	0.0558	0.0000	0.0000	
AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
2.750	0.794	1.33	56.61	
INFLOW : ID= 2 (26240)	2.750	0.155	1.92	56.55
OUTFLOW: ID= 1 (46240)				
PEAK FLOW REDUCTION [Qout/Qin](%)=	19.45			
TIME SHIFT OF PEAK FLOW (min)=	35.00			
MAXIMUM STORAGE USED (ha.m.)=	0.0865			

CALIB	Area (ha)=	0.92	Dir. Conn.(%)=	20.00
STANDHYD (6220)	Total Imp(%)=	40.00		
ID= 1 DT= 5.0 min				
IMPERVIOUS	PERVIOUS (i)			
Surface Area (ha)=	0.37	0.55		
Dep. Storage (mm)=	0.52	7.16		
Average Slope (%)=	2.00	2.00		
Length (m)=	40.00	40.00		
Mannings n =	0.013	0.250		
Max.Eff.Inten.(mm/hr)=	170.99	87.70		
over (min)	5.00	10.00		
Storage Coeff. (min)=	0.97 (ii)	8.40 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.34	0.12		
TOTALS				
PEAK FLOW (cms)=	0.09	0.10	0.142 (iii)	
TIME TO PEAK (hrs)=	1.33	1.50	1.42	
RUNOFF VOLUME (mm)=	74.16	35.26	43.03	
TOTAL RAINFALL (mm)=	74.68	74.68	74.68	
RUNOFF COEFFICIENT =	0.99	0.47	0.58	

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

OVERFLOW IS OFF				
RESERVOIR(46220)				
IN= 2--> OUT= 1				
DT= 5.0 min				
OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
0.0000	0.0000	0.2590	0.0708	
0.0050	0.0089	0.2910	0.0871	
0.0100	0.0187	0.3210	0.1045	
0.0130	0.0298	0.3720	0.1438	
0.0150	0.0422	2.8080	0.2087	
0.2220	0.0559	0.0000	0.0000	

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
0.920	0.142	1.42	43.03
OUTFLOW: ID= 1 (46220)	0.920	0.013	2.83
42.55			
PEAK FLOW REDUCTION [Qout/Qin](%)=	9.06		
TIME SHIFT OF PEAK FLOW (min)=	85.00		
MAXIMUM STORAGE USED (ha.m.)=	0.0294		

CALIB	Area (ha)=	0.48	Dir. Conn.(%)=	5.00
STANDHYD (6230)	Total Imp(%)=	10.00		
ID= 1 DT= 5.0 min				
IMPERVIOUS	PERVIOUS (i)			
Surface Area (ha)=	0.05	0.43		
Dep. Storage (mm)=	0.52	7.16		
Average Slope (%)=	2.00	2.00		
Length (m)=	20.00	20.00		
Mannings n =	0.013	0.250		
Max.Eff.Inten.(mm/hr)=	170.99	57.71		
over (min)	5.00	10.00		
Storage Coeff. (min)=	0.64 (ii)	6.44 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.34	0.14		
TOTALS				
PEAK FLOW (cms)=	0.01	0.05	0.058 (iii)	
TIME TO PEAK (hrs)=	1.33	1.50	1.50	
RUNOFF VOLUME (mm)=	74.16	30.24	32.42	
TOTAL RAINFALL (mm)=	74.68	74.68	74.68	
RUNOFF COEFFICIENT =	0.99	0.40	0.43	

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26200)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (46220):	0.92	0.013	2.83	42.55
+ ID2= 2 (46240):	2.75	0.155	1.92	56.55
=====				
ID = 3 (26200):	3.67	0.166	1.92	53.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (26200)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (26200):	3.67	0.166	1.92	53.04
+ ID2= 2 (6230):	0.48	0.058	1.50	32.42
=====				
ID = 1 (26200):	4.15	0.205	1.58	50.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ROUTE CHN( 0149)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----
<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          414.20        0.0350    Main Channel
4.30          412.70        0.0350    Main Channel
8.60          414.20        0.0350    Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH    ELEV    VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
(m)      (m)      (cu.m.)    (cms)        (m/s)       (min)
0.08     412.78    .456E+01    0.0           0.55        7.70
0.16     412.86    .182E+02    0.1           0.88        4.85
0.24     412.94    .410E+02    0.2           1.15        3.70
0.32     413.02    .729E+02    0.4           1.39        3.05
0.39     413.09    .114E+03    0.7           1.61        2.63
0.47     413.17    .164E+03    1.2           1.82        2.33
0.55     413.25    .223E+03    1.8           2.02        2.10
0.63     413.33    .292E+03    2.5           2.21        1.92
0.71     413.41    .369E+03    3.5           2.39        1.78
0.79     413.49    .456E+03    4.6           2.56        1.66
0.87     413.57    .551E+03    5.9           2.73        1.56
0.95     413.65    .656E+03    7.4           2.89        1.47
1.03     413.73    .770E+03    9.2           3.05        1.39
1.11     413.81    .893E+03    11.2          3.21        1.32
1.18     413.88    .103E+04    13.5          3.36        1.27
1.26     413.96    .117E+04    16.0          3.51        1.21
1.34     414.04    .132E+04    18.9          3.65        1.16
1.42     414.12    .148E+04    22.0          3.79        1.12
1.50     414.20    .165E+04    25.4          3.93        1.08

<---- hydrograph ----> <-pipe / channel->
AREA      QPEAK      TPEAK      R.V.      MAX DEPTH  MAX VEL
(ha)      (cms)      (hrs)      (mm)      (m)         (m/s)
INFLOW : ID= 2 ( 26200) 4.15      0.21      1.58      50.66      0.24      1.17
OUTFLOW: ID= 1 ( 0149) 4.15      0.21      1.58      50.65      0.25      1.17

-----
| CALIB |
| STANHYD ( 96211) | Area (ha)= 0.61
| ID= 1 DT= 5.0 min | Total Imp(%)= 58.00 Dir. Conn.(%)= 40.00
-----

IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)= 0.35      0.26
Dep. Storage (mm)= 1.00      5.00
Average Slope (%)= 1.00      2.00
Length (m)= 63.77      30.00
Mannings n = 0.013      0.250

Max.Eff.Inten.(mm/hr)= 170.99      90.78
over (min)= 5.00      10.00
Storage Coeff. (min)= 1.57 (ii)      6.46 (ii)
Unit Hyd. Tpeak (min)= 5.00      10.00
Unit Hyd. peak (cms)= 0.33      0.14

*TOTALS*
PEAK FLOW (cms)= 0.11      0.05      0.140 (iii)
TIME TO PEAK (hrs)= 1.33      1.50      1.33
RUNOFF VOLUME (mm)= 73.68      34.37      50.09
TOTAL RAINFALL (mm)= 74.68      74.68      74.68
RUNOFF COEFFICIENT = 0.99      0.46      0.67

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

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-----
| ROUTE CHN( 0009)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----
<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          414.20        0.0350    Main Channel
4.30          412.70        0.0350    Main Channel
8.60          414.20        0.0350    Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH    ELEV    VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
(m)      (m)      (cu.m.)    (cms)        (m/s)       (min)
0.08     412.78    .456E+01    0.0           0.55        7.70
0.16     412.86    .182E+02    0.1           0.88        4.85
0.24     412.94    .410E+02    0.2           1.15        3.70
0.32     413.02    .729E+02    0.4           1.39        3.05
0.39     413.09    .114E+03    0.7           1.61        2.63
0.47     413.17    .164E+03    1.2           1.82        2.33
0.55     413.25    .223E+03    1.8           2.02        2.10
0.63     413.33    .292E+03    2.5           2.21        1.92
0.71     413.41    .369E+03    3.5           2.39        1.78
0.79     413.49    .456E+03    4.6           2.56        1.66
0.87     413.57    .551E+03    5.9           2.73        1.56
0.95     413.65    .656E+03    7.4           2.89        1.47
1.03     413.73    .770E+03    9.2           3.05        1.39
1.11     413.81    .893E+03    11.2          3.21        1.32
1.18     413.88    .103E+04    13.5          3.36        1.27
1.26     413.96    .117E+04    16.0          3.51        1.21
1.34     414.04    .132E+04    18.9          3.65        1.16
1.42     414.12    .148E+04    22.0          3.79        1.12
1.50     414.20    .165E+04    25.4          3.93        1.08

<---- hydrograph ----> <-pipe / channel->
AREA      QPEAK      TPEAK      R.V.      MAX DEPTH  MAX VEL
(ha)      (cms)      (hrs)      (mm)      (m)         (m/s)
INFLOW : ID= 2 ( 96211) 0.61      0.14      1.33      50.09      0.21      1.03
OUTFLOW: ID= 1 ( 0009) 0.61      0.13      1.42      50.04      0.20      1.00

-----
| ADD HYD ( 0147) |
| 1 + 2 = 3 | AREA      QPEAK      TPEAK      R.V.
(ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0149): 4.15      0.209      1.58      50.65
+ ID2= 2 ( 0627): 9.39      0.788      1.58      27.14
=====
ID = 3 ( 0147): 13.54      0.998      1.58      34.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----
| ADD HYD ( 0147) |
| 3 + 2 = 1 | AREA      QPEAK      TPEAK      R.V.
(ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0147): 13.54      0.998      1.58      34.35
+ ID2= 2 ( 0009): 0.61      0.128      1.42      50.04
=====
ID = 1 ( 0147): 14.15      1.088      1.58      35.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB |

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| STANDHYD (9621)| Area (ha)= 16.18
|ID= 1 DT= 5.0 min | Total Imp(%)= 32.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	5.18	11.00	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	1.00	2.00	
Length (m)=	328.43	30.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	170.99	69.57	
over (min)	5.00	15.00	
Storage Coeff. (min)=	4.21 (ii)	11.07 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.24	0.09	
			TOTALS
PEAK FLOW (cms)=	1.26	1.34	2.008 (iii)
TIME TO PEAK (hrs)=	1.33	1.58	1.50
RUNOFF VOLUME (mm)=	73.68	32.47	40.71
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.99	0.43	0.55

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

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (8621)| Area (ha)= 4.69
|ID= 1 DT= 5.0 min | Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	4.69	0.00	
Dep. Storage (mm)=	25.00	1.50	
Average Slope (%)=	1.00	2.00	
Length (m)=	176.82	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	110.63	52.82	
over (min)	5.00	5.00	
Storage Coeff. (min)=	3.45 (ii)	3.52 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.26	0.26	
			TOTALS
PEAK FLOW (cms)=	1.32	0.00	1.316 (iii)
TIME TO PEAK (hrs)=	1.42	1.33	1.42
RUNOFF VOLUME (mm)=	49.68	29.42	49.67
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.67	0.39	0.67

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (8623)| Area (ha)= 2.05
|ID= 1 DT= 5.0 min | Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.05	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	116.90	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	110.63	87.62	
over (min)	5.00	5.00	
Storage Coeff. (min)=	2.69 (ii)	2.76 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.29	0.29	
			TOTALS
PEAK FLOW (cms)=	0.59	0.00	0.593 (iii)
TIME TO PEAK (hrs)=	1.42	1.33	1.42
RUNOFF VOLUME (mm)=	49.68	45.38	49.67
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.67	0.61	0.67

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

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

| CALIB
| STANDHYD (9623)| Area (ha)= 4.42
|ID= 1 DT= 5.0 min | Total Imp(%)= 48.00 Dir. Conn.(%)= 35.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	2.12	2.30	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	1.00	2.00	
Length (m)=	171.66	30.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	170.99	76.95	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.85 (ii)	9.45 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.12	
			TOTALS
PEAK FLOW (cms)=	0.67	0.34	0.842 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	73.68	33.62	47.64
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.99	0.45	0.64

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| STANDHYD (8624)| Area (ha)= 4.32
|ID= 1 DT= 5.0 min | Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.32	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	169.71	40.00

Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 110.63 52.82
over (min)= 5.00 5.00
Storage Coeff. (min)= 3.37 (ii) 3.44 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.26 0.26
PEAK FLOW (cms)= 1.22 0.00
TIME TO PEAK (hrs)= 1.42 1.33
RUNOFF VOLUME (mm)= 49.68 29.42
TOTAL RAINFALL (mm)= 74.68 74.68
RUNOFF COEFFICIENT = 0.67 0.39

TOTALS
1.217 (iii)
1.42
49.67
74.68
0.67

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (9624)
ID= 1 DT= 5.0 min
Area (ha)= 8.46
Total Imp(%)= 51.00
Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.31 4.15
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 237.49 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 170.99 74.37
over (min)= 5.00 15.00
Storage Coeff. (min)= 3.46 (ii) 10.15 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.26 0.10

PEAK FLOW (cms)= 1.39 0.56
TIME TO PEAK (hrs)= 1.33 1.58
RUNOFF VOLUME (mm)= 73.68 33.23
TOTAL RAINFALL (mm)= 74.68 74.68
RUNOFF COEFFICIENT = 0.99 0.44

TOTALS
1.590 (iii)
1.33
49.41
74.68
0.66

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0628)
ID= 1 DT= 5.0 min
Area (ha)= 5.35
Total Imp(%)= 60.00
Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.21 2.14
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 188.86 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 170.99 103.50
over (min)= 5.00 10.00
Storage Coeff. (min)= 3.02 (ii) 9.98 (ii)

Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.27 0.11

PEAK FLOW (cms)= 0.91 0.41
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 73.68 37.12
TOTAL RAINFALL (mm)= 74.68 74.68
RUNOFF COEFFICIENT = 0.99 0.50

TOTALS
1.130 (iii)
1.33
51.74
74.68
0.69

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8625)
ID= 1 DT= 5.0 min
Area (ha)= 4.11
Total Imp(%)= 100.00
Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.11 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 165.53 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 110.63 87.62
over (min)= 5.00 5.00
Storage Coeff. (min)= 3.32 (ii) 3.39 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.26 0.27

PEAK FLOW (cms)= 1.16 0.00
TIME TO PEAK (hrs)= 1.42 1.33
RUNOFF VOLUME (mm)= 49.68 45.38
TOTAL RAINFALL (mm)= 74.68 74.68
RUNOFF COEFFICIENT = 0.67 0.61

TOTALS
1.160 (iii)
1.42
49.67
74.68
0.67

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

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

CALIB
STANDHYD (9625)
ID= 1 DT= 5.0 min
Area (ha)= 8.07
Total Imp(%)= 55.00
Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.44 3.63
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 231.95 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 170.99 85.56
over (min)= 5.00 10.00
Storage Coeff. (min)= 3.42 (ii) 9.74 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.26 0.11

PEAK FLOW (cms)= 1.34 0.59
TIME TO PEAK (hrs)= 1.33 1.50

TOTALS
1.642 (iii)
1.33

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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PEAK FLOW REDUCTION [Qout/Qin](%)= 7.99
TIME SHIFT OF PEAK FLOW (min)= 85.00
MAXIMUM STORAGE USED (ha.m.)= 2.1941

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.97	3.78
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	212.13	30.00
Mannings n	=	0.013	0.250

Max.Eff.Inten.(mm/hr)= 170.99 76.95
over (min) 5.00 10.00
Storage Coeff. (min)= 3.24 (ii) 9.83 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.27 0.11

TOTALS
(cms)= 0.85 0.55 1.150 (iii)
(hrs)= 1.33 1.50 1.42
(mm)= 73.68 33.62 45.64
(mm)= 74.68 74.68 74.68
= 0.99 0.45 0.61

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8622) | Area (ha)= 2.20
ID= 1 DT= 5.0 min | Total Imp(%)= 99.99 Dir. Conn.(%)= 99.99

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.20 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 121.11 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 110.63 87.62
over (min) 5.00 5.00
Storage Coeff. (min)= 2.75 (ii) 2.92 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.28 0.28

TOTALS
(cms)= 0.63 0.00 0.635 (iii)
(hrs)= 1.42 1.33 1.42
(mm)= 49.68 45.38 49.67
(mm)= 74.68 74.68 74.68
= 0.67 0.61 0.67

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

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

ADD HYD (2622) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (8622): 2.20 0.635 1.42 49.67
+ ID2= 2 (9622): 6.75 1.150 1.42 45.64
=====

ID = 3 (2622): 8.95 1.784 1.42 46.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5622) | 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 | 0.4500 0.2500
0.0010 0.0000 | 0.6500 0.3200
0.0030 0.1200 | 0.8000 0.4000
0.1000 0.1500 | 0.9800 0.5000
0.3000 0.2000 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2622) 8.950 1.784 1.42 46.63
OUTFLOW: ID= 1 (5622) 8.950 0.426 2.00 45.61

PEAK FLOW REDUCTION [Qout/Qin](%)= 23.89
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= 0.2423

ADD HYD (2625) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (5621): 57.65 0.888 2.83 35.20
+ ID2= 2 (5622): 8.95 0.426 2.00 45.61
=====

ID = 3 (2625): 66.60 1.212 2.58 36.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0150) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0147): 14.15 1.088 1.58 35.02
+ ID2= 2 (2625): 66.60 1.212 2.58 36.60
=====

ID = 3 (0150): 80.75 1.574 2.33 36.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2620) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0150): 80.75 1.574 2.33 36.32
+ ID2= 2 (2610): 652.95 18.198 2.93 31.89
=====

ID = 3 (2620): 733.70 19.617 2.93 31.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0637) | Area (ha)= 8.42 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.608

PEAK FLOW (cms)= 0.707 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 27.140
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.363

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

CALIB

| NASHYD (0630)| Area (ha)= 33.04 Curve Number (CN)= 70.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.38

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 1.963 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 27.188
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.364

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

| ROUTE CHN(4630)|
| IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .893E+01 0.0 0.17 47.72
0.16 412.86 .357E+02 0.0 0.28 30.06
0.24 412.94 .804E+02 0.1 0.36 22.94
0.32 413.02 .143E+03 0.1 0.44 18.94
0.39 413.09 .223E+03 0.2 0.51 16.32
0.47 413.17 .322E+03 0.4 0.58 14.45
0.55 413.25 .438E+03 0.6 0.64 13.04
0.63 413.33 .572E+03 0.8 0.70 11.93
0.71 413.41 .724E+03 1.1 0.76 11.03
0.79 413.49 .893E+03 1.4 0.81 10.28
0.87 413.57 .108E+04 1.9 0.86 9.65
0.95 413.65 .129E+04 2.4 0.92 9.10
1.03 413.73 .151E+04 2.9 0.97 8.63
1.11 413.81 .175E+04 3.6 1.01 8.22
1.18 413.88 .201E+04 4.3 1.06 7.85
1.26 413.96 .229E+04 5.1 1.11 7.52
1.34 414.04 .258E+04 6.0 1.15 7.22
1.42 414.12 .289E+04 6.9 1.20 6.95
1.50 414.20 .323E+04 8.0 1.24 6.70

<----- hydrograph -----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0630) 33.04 1.96 1.83 27.19 0.88 0.87
OUTFLOW: ID= 1 (4630) 33.04 1.83 2.00 27.18 0.86 0.86

| ADD HYD (2637)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2637): 766.74 20.334 2.83 31.68
+ ID2= 2 (0637): 8.42 0.707 1.58 27.14
=====

ID = 1 (2637): 775.16 20.436 2.83 31.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0636)| Area (ha)= 3.60 Curve Number (CN)= 70.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 0.688

PEAK FLOW (cms)= 0.302 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 27.140
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.363

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

| ADD HYD (2636)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2637): 775.16 20.436 2.83 31.63
+ ID2= 2 (0636): 3.60 0.302 1.58 27.14
=====

ID = 3 (2636): 778.76 20.479 2.83 31.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0638)| Area (ha)= 20.63 Curve Number (CN)= 70.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 3.940

PEAK FLOW (cms)= 1.732 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 27.140
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.363

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

| CALIB
| NASHYD (0639)| Area (ha)= 4.47 Curve Number (CN)= 70.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 0.854

PEAK FLOW (cms)= 0.375 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 27.140
TOTAL RAINFALL (mm)= 74.676
RUNOFF COEFFICIENT = 0.363

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

ADD HYD (2630)				
1 + 2 = 3				

ID1= 1 (2630):	776.76	20.479	2.83	31.61
+ ID2= 2 (0630):	20.63	1.732	1.58	27.14
=====				
ID = 3 (2630):	799.39	20.728	2.80	31.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2630)				
3 + 2 = 1				

ID1= 3 (2630):	799.39	20.728	2.80	31.49
+ ID2= 2 (0630):	4.47	0.375	1.58	27.14
=====				
ID = 1 (2630):	803.86	20.784	2.80	31.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (8709)				
ID= 1 DT= 5.0 min				

Area (ha)=	3.51			
Total Imp(%)=	100.00	Dir. Conn.(%)=	100.00	

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	3.51	0.00	
Dep. Storage (mm)=	25.00	1.50	
Average Slope (%)=	1.00	2.00	
Length (m)=	20.00	40.00	
Mannings n =	0.013	0.250	
Max.Eff.Inten.(mm/hr)=	110.63	87.62	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.93 (ii)	1.00 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.34	

			TOTALS
PEAK FLOW (cms)=	1.07	0.00	1.074 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	49.68	45.38	49.68
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.67	0.61	0.67

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

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

CALIB				
STANDHYD (9709)				
ID= 1 DT= 5.0 min				

Area (ha)=	7.20			
Total Imp(%)=	56.00	Dir. Conn.(%)=	40.00	

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	4.03	3.17	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	1.00	2.00	
Length (m)=	219.09	30.00	
Mannings n =	0.013	0.250	

Max.Eff.Inten.(mm/hr)=	170.99	88.75	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.30 (ii)	8.28 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.27	0.13	
			TOTALS
PEAK FLOW (cms)=	1.20	0.56	1.505 (iii)
TIME TO PEAK (hrs)=	1.33	1.50	1.33
RUNOFF VOLUME (mm)=	73.68	35.29	50.64
TOTAL RAINFALL (mm)=	74.68	74.68	74.68
RUNOFF COEFFICIENT =	0.99	0.47	0.68

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2709)				
1 + 2 = 3				

ID1= 1 (8709):	3.51	1.074	1.33	49.68
+ ID2= 2 (9709):	7.20	1.505	1.33	50.64
=====				
ID = 3 (2709):	10.71	2.579	1.33	50.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5709)				
IN= 2--> OUT= 1				
DT= 5.0 min				

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.6000	0.3800
	0.0010	0.0000	0.9000	0.5400
	0.0100	0.1000	1.1000	0.7100
	0.0500	0.2000	1.4000	0.8900
	0.4000	0.2400	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2709)	10.710	2.579	1.33	50.33
OUTFLOW: ID= 1 (5709)	10.710	0.512	2.00	50.33

PEAK FLOW REDUCTION [Qout/Qin](%)= 19.84
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 0.3185

FINISH

** SIMULATION : 50 year Fergus Shand Dam Chic **

CHICAGO STORM	IDF curve parameters: A=3574.000	
Ptotal= 84.43 mm	B= 19.000	
-----		C= 0.924
used in: INTENSITY =		A / (t + B)^C
Duration of storm =		4.00 hrs
Storm time step =		5.00 min
Time to peak ratio =		0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	3.36	1.00	29.13	2.00	15.89	3.00	5.24
0.08	3.68	1.08	47.79	2.08	13.89	3.08	4.93
0.17	4.06	1.17	98.38	2.17	12.28	3.17	4.65
0.25	4.51	1.25	189.90	2.25	10.96	3.25	4.40
0.33	5.08	1.33	119.63	2.33	9.87	3.33	4.17
0.42	5.77	1.42	77.23	2.42	8.95	3.42	3.96
0.50	6.66	1.50	54.63	2.50	8.18	3.50	3.77
0.58	7.83	1.58	41.06	2.58	7.51	3.58	3.60
0.67	9.40	1.67	32.23	2.67	6.93	3.67	3.44
0.75	11.60	1.75	26.13	2.75	6.42	3.75	3.29
0.83	14.86	1.83	21.72	2.83	5.98	3.83	3.15
0.92	20.04	1.92	18.43	2.92	5.59	3.92	3.03

CALIB
NASHYD (0100)
ID= 1 DT= 2.0 min
Area (ha)= 136.98
Ia (mm)= 5.00
U.H. Tp(hrs)= 1.17
Curve Number (CN)= 69.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 4.464
PEAK FLOW (cms)= 4.538 (i)
TIME TO PEAK (hrs)= 2.867
RUNOFF VOLUME (mm)= 32.598
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.386

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

CALIB
NASHYD (0201)
ID= 1 DT= 2.0 min
Area (ha)= 14.60
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.97
Curve Number (CN)= 74.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.575
PEAK FLOW (cms)= 0.690 (i)
TIME TO PEAK (hrs)= 2.567
RUNOFF VOLUME (mm)= 39.945
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.473

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

CALIB
STANDHYD (0203)
ID= 1 DT= 2.0 min
Area (ha)= 8.20
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 174.65 101.33

over (min)	5.00	8.00	
Storage Coeff. (min)=	0.84 (ii)	7.65 (ii)	
Unit Hyd. Tpeak (min)=	4.00	8.00	
Unit Hyd. peak (cms)=	0.53	0.15	
PEAK FLOW (cms)=	1.06	0.97	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	1.627 (iii)
RUNOFF VOLUME (mm)=	82.43	41.59	51.80
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.98	0.49	0.61

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200)
1 + 2 = 3
ID1= 1 (0201): 14.60 0.690 2.57 39.94
+ ID2= 2 (0203): 8.20 1.627 1.37 51.80
ID = 3 (2200): 22.80 1.661 1.37 44.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)
IN= 2--> OUT= 1
DT= 5.0 min
OVERFLOW IS OFF
OUTFLOW (cms) STORAGE (ha.m.)
0.0000 0.0000 0.1980 0.2314
0.0040 0.0218 0.2920 0.2621
0.0060 0.0446 0.3980 0.2937
0.0070 0.0683 0.5150 0.3261
0.0080 0.0930 0.8290 0.3592
0.0090 0.1187 1.3520 0.3930
0.0230 0.1453 2.0570 0.4275
0.0610 0.1730 2.9590 0.4629
0.1200 0.2017 0.0000 0.0000
INFLOW : ID= 2 (2200) 22.800 1.661 1.37 44.21
OUTFLOW: ID= 1 (5200) 22.800 0.836 2.70 43.77

PEAK FLOW REDUCTION [Qout/Qin](%)= 50.33
TIME SHIFT OF PEAK FLOW (min)= 80.00
MAXIMUM STORAGE USED (ha.m.)= 0.3597

**** WARNING : SELECTED ROUTING TIME STEP DENIED.

CALIB
NASHYD (0205)
ID= 1 DT= 2.0 min
Area (ha)= 4.80
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.41
Curve Number (CN)= 90.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.447
PEAK FLOW (cms)= 0.668 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 61.874

TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.733

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

```
-----
| CALIB |
| STANDHYD ( 0206) |
| ID= 1 DT= 2.0 min |
|-----|
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	174.65	101.33
over (min)	5.00	8.00
Storage Coeff. (min)=	0.84 (ii)	7.65 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.53	0.15

		TOTALS
PEAK FLOW (cms)=	0.03	0.02
TIME TO PEAK (hrs)=	1.33	1.50
RUNOFF VOLUME (mm)=	82.43	41.59
TOTAL RAINFALL (mm)=	84.43	84.43
RUNOFF COEFFICIENT =	0.98	0.49

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2201) |
| 1 + 2 = 3 |
|-----|
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0205):	4.00	0.668	1.83	61.87
+ ID2= 2 (0206):	0.20	0.040	1.37	51.77
=====				
ID = 3 (2201):	5.00	0.683	1.83	61.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2201) |
| 3 + 2 = 1 |
|-----|
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2201):	5.00	0.683	1.83	61.47
+ ID2= 2 (5200):	22.80	0.836	2.70	43.77
=====				
ID = 1 (2201):	27.80	1.192	2.23	46.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0209) |
| ID= 1 DT= 2.0 min |
|-----|
```

	IMPERVIOUS	PERVIOUS (i)
Area (ha)=	2.70	
Total Imp(%)=	16.00	
Dir. Conn.(%)=	8.00	

Surface Area (ha)=	0.43	2.27
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	35.00	35.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	174.65	70.28
over (min)	5.00	10.00
Storage Coeff. (min)=	1.03 (ii)	9.77 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.51	0.11

		TOTALS
PEAK FLOW (cms)=	0.11	0.31
TIME TO PEAK (hrs)=	1.33	1.53
RUNOFF VOLUME (mm)=	82.43	36.53
TOTAL RAINFALL (mm)=	84.43	84.43
RUNOFF COEFFICIENT =	0.98	0.43

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING: FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0207) |
| ID= 1 DT= 2.0 min |
|-----|
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.58	0.72
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	174.65	101.33
over (min)	5.00	8.00
Storage Coeff. (min)=	0.84 (ii)	7.65 (ii)
Unit Hyd. Tpeak (min)=	4.00	8.00
Unit Hyd. peak (cms)=	0.53	0.15

		TOTALS
PEAK FLOW (cms)=	0.17	0.15
TIME TO PEAK (hrs)=	1.33	1.50
RUNOFF VOLUME (mm)=	82.43	41.59
TOTAL RAINFALL (mm)=	84.43	84.43
RUNOFF COEFFICIENT =	0.98	0.49

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2202) |
| 1 + 2 = 3 |
|-----|
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
--	--------------	----------------	----------------	--------------


```
ID1= 1 ( 0207):    1.30    0.258    1.37    51.79
+ ID2= 2 ( 0209):    2.70    0.349    1.53    40.20
=====
ID = 3 ( 2202):    4.00    0.500    1.47    43.97
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2202)|
| 3 + 2 = 1 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 3 ( 2202):    4.00    0.500    1.47    43.97
+ ID2= 2 ( 2201):   27.80    1.192    2.23    46.95
=====
ID = 1 ( 2202):   31.80    1.368    1.87    46.58
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2100)|
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0100):   136.98    4.538    2.87    32.60
+ ID2= 2 ( 2202):    31.80    1.368    1.87    46.58
=====
ID = 3 ( 2100):   168.78    5.635    2.77    35.23
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0302)|
| ID= 1 DT= 2.0 min |
-----
          Area    (ha)=    2.90    Curve Number (CN)= 74.0
          Ia      (mm)=    1.50    # of Linear Res.(N)= 3.00
          U.H. Tp(hrs)=    0.45
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Unit Hyd Qpeak (cms)=    0.246

PEAK FLOW      (cms)=    0.234 (i)
TIME TO PEAK   (hrs)=    1.933
RUNOFF VOLUME  (mm)=   39.944
TOTAL RAINFALL (mm)=   84.430
RUNOFF COEFFICIENT =    0.473
```

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 0304)|
| ID= 1 DT= 2.0 min |
-----
          Area    (ha)=    4.40
          Total Imp(%)=  45.00    Dir. Conn.(%)=  25.00
```

```
          IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)=    1.98    2.42
Dep. Storage (mm)=    2.00    5.00
Average Slope (%)=    1.00    1.00
Length (m)=    25.00    25.00
Mannings n =    0.013    0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)=   174.65   101.33
over (min)           5.00   10.00
Storage Coeff. (min)=  0.89 (ii)  8.08 (ii)
Unit Hyd. Tpeak (min)=  4.00   10.00
Unit Hyd. peak (cms)=  0.53    0.13

          *TOTALS*
PEAK FLOW      (cms)=    0.57    0.50    0.806 (iii)
```

```
TIME TO PEAK (hrs)=    1.33    1.50    1.37
RUNOFF VOLUME (mm)=    82.43   41.59   51.80
TOTAL RAINFALL (mm)=    84.43   84.43   84.43
RUNOFF COEFFICIENT =    0.98    0.49    0.61
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2300)|
| 1 + 2 = 3 |
-----
          AREA    QPEAK    TPEAK    R.V.
          (ha)    (cms)    (hrs)    (mm)
ID1= 1 ( 0302):    2.90    0.234    1.93    39.94
+ ID2= 2 ( 0304):    4.40    0.806    1.37    51.80
=====
ID = 3 ( 2300):    7.30    0.863    1.43    47.09
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 0308)|
| ID= 1 DT= 2.0 min |
-----
          Area    (ha)=    0.20
          Total Imp(%)=  45.00    Dir. Conn.(%)=  25.00
```

```
          IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)=    0.09    0.11
Dep. Storage (mm)=    2.00    5.00
Average Slope (%)=    1.00    1.00
Length (m)=    25.00    25.00
Mannings n =    0.013    0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)=   174.65   101.33
over (min)           5.00   10.00
Storage Coeff. (min)=  0.89 (ii)  8.08 (ii)
Unit Hyd. Tpeak (min)=  4.00   10.00
Unit Hyd. peak (cms)=  0.53    0.13

          *TOTALS*
PEAK FLOW      (cms)=    0.03    0.02    0.037 (iii)
TIME TO PEAK   (hrs)=    1.33    1.50    1.37
RUNOFF VOLUME  (mm)=    82.43   41.59   51.77
TOTAL RAINFALL (mm)=    84.43   84.43   84.43
RUNOFF COEFFICIENT =    0.98    0.49    0.61
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 0310)|
| ID= 1 DT= 2.0 min |
-----
          Area    (ha)=    5.70
          Total Imp(%)=  16.00    Dir. Conn.(%)=  8.00
```

```
          IMPERVIOUS    PERVIOUS (i)
Surface Area (ha)=    0.91    4.79
Dep. Storage (mm)=    2.00    5.00
Average Slope (%)=    1.20    1.20
Length (m)=    25.00    25.00
```

Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 174.65 70.28
over (min)= 5.00 8.00
Storage Coeff. (min)= 0.84 (ii) 7.99 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.53 0.14

TOTALS
PEAK FLOW (cms)= 0.24 0.70 0.807 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.47
RUNOFF VOLUME (mm)= 82.43 36.53 40.20
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.43 0.48

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2301)|
1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2300):	7.30	0.863	1.43	47.09
+ ID2= 2 (0308):	0.20	0.037	1.37	51.77
=====				
ID = 3 (2301):	7.50	0.899	1.43	47.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2301)|
3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2301):	7.50	0.899	1.43	47.21
+ ID2= 2 (0310):	5.70	0.807	1.47	40.20
=====				
ID = 1 (2301):	13.20	1.704	1.47	44.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2302)|
1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2100):	168.78	5.635	2.77	35.23
+ ID2= 2 (2301):	13.20	1.704	1.47	44.19
=====				
ID = 3 (2302):	181.98	5.922	2.70	35.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0400)|
ID= 1 DT= 2.0 min |

	Area (ha)=	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)= 8.29		74.57
Dep. Storage	(mm)= 2.00		5.00

Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 137.14 66.30
over (min)= 12.00 22.00
Storage Coeff. (min)= 12.40 (ii) 20.72 (ii)
Unit Hyd. Tpeak (min)= 12.00 22.00
Unit Hyd. peak (cms)= 0.09 0.05

TOTALS
PEAK FLOW (cms)= 0.69 6.61 7.075 (iii)
TIME TO PEAK (hrs)= 1.50 1.77 1.77
RUNOFF VOLUME (mm)= 82.43 35.21 36.63
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.98 0.42 0.43

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2400)|
1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2302):	181.98	5.922	2.70	35.88
+ ID2= 2 (0400):	82.86	7.075	1.77	36.63
=====				
ID = 3 (2400):	264.84	11.058	1.83	36.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4400)|
IN= 2---> OUT= 1 |

Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning
0.00	411.10	0.0550
27.30	410.20	0.0550
77.50	409.10	0.0550
90.60	409.10	0.0550
115.80	408.90	0.0550
124.80	408.10	0.0550
131.00	408.90	0.0550 /0.0350
133.60	408.00	0.0350
134.40	407.60	0.0350
135.00	407.50	0.0350
135.80	407.60	0.0350
136.50	408.00	0.0350
139.40	408.80	0.0350 /0.0550
143.50	408.90	0.0550
148.50	408.70	0.0550
163.80	408.90	0.0550
183.20	408.90	0.0550
243.70	409.70	0.0550
278.70	410.20	0.0550
330.50	411.40	0.0550

----- TRAVEL TIME TABLE ----->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.19	407.69	.366E+03	0.1	0.51	58.83

0.37	407.87	.106E+04	0.5	0.81	37.08
0.56	408.06	.199E+04	1.1	1.00	29.93
0.74	408.24	.328E+04	2.1	1.14	26.32
0.93	408.43	.498E+04	3.6	1.28	23.32
1.11	408.61	.708E+04	5.6	1.43	20.94
1.30	408.80	.105E+05	8.5	1.45	20.61
1.49	408.99	.247E+05	14.8	1.07	27.91
1.68	409.18	.601E+05	30.4	0.91	32.97
1.87	409.37	.109E+06	58.5	0.96	31.05
2.06	409.56	.166E+06	98.3	1.06	28.11
2.25	409.75	.231E+06	150.3	1.17	25.57
2.44	409.94	.303E+06	215.4	1.28	23.46
2.64	410.14	.383E+06	293.8	1.38	21.74
2.83	410.33	.470E+06	390.1	1.49	20.10
3.02	410.52	.563E+06	502.4	1.60	18.66
3.21	410.71	.660E+06	628.8	1.71	17.48
3.40	410.90	.762E+06	769.5	1.81	16.49
3.59	411.09	.868E+06	924.9	1.91	15.65

<---- hydrograph ---->			<-pipe / channel->		
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (2400)	264.84	11.06	1.83	36.12	1.38
OUTFLOW: ID= 1 (4400)	264.84	9.46	2.37	36.11	1.33

CALIB					
NASHYD (0515)	Area (ha)=	5.01	Curve Number (CN)=	65.0	
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.41			

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW	(cms)=	0.328 (i)
TIME TO PEAK	(hrs)=	1.833
RUNOFF VOLUME	(mm)=	31.300
TOTAL RAINFALL	(mm)=	84.430
RUNOFF COEFFICIENT	=	0.371

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0510)	Area (ha)=	91.44	Curve Number (CN)=	71.0	
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	1.09			

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW	(cms)=	3.635 (i)
TIME TO PEAK	(hrs)=	2.750
RUNOFF VOLUME	(mm)=	36.841
TOTAL RAINFALL	(mm)=	84.430
RUNOFF COEFFICIENT	=	0.436

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTE CHN(4510)		
IN= 2--> OUT= 1	Routing time step (min)'=	5.00

<----- DATA FOR SECTION (1.1) ----->			
Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV. TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.206E+02	0.0	0.19	101.61
0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

<---- hydrograph ---->			<-pipe / channel->		
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0510)	91.44	3.64	2.75	36.84	1.08
OUTFLOW: ID= 1 (4510)	91.44	3.48	3.00	36.84	1.06

CALIB					
NASHYD (0517)	Area (ha)=	2.14	Curve Number (CN)=	71.0	
ID= 1 DT= 5.0 min	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.32			

Unit Hyd Qpeak (cms)= 0.255

PEAK FLOW	(cms)=	0.194 (i)
TIME TO PEAK	(hrs)=	1.750
RUNOFF VOLUME	(mm)=	36.830
TOTAL RAINFALL	(mm)=	84.430
RUNOFF COEFFICIENT	=	0.436

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0511)	Area (ha)=	52.87			
ID= 1 DT= 5.0 min	Total Imp(%)=	50.00	Dir. Conn.(%)=	30.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	26.43
Dep. Storage	(mm)=	0.80
Average Slope	(%)=	1.00
Length	(m)=	593.69
Mannings n	=	0.013

Max.Eff.Inten.(mm/hr)=	189.90	114.36
over (min)	5.00	15.00
Storage Coeff. (min)=	5.76 (ii)	13.99 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.20	0.08

PEAK FLOW	(cms)=	6.21	4.85	8.838 (iii)
TIME TO PEAK	(hrs)=	1.33	1.58	1.50
RUNOFF VOLUME	(mm)=	83.63	44.13	55.98

TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.52 0.66

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0516) | Area (ha)= 10.78
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.85 5.93
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 1.00
Length (m)= 268.08 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 58.24
over (min) 5.00 15.00
Storage Coeff. (min)= 3.57 (ii) 14.36 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.26 0.08

TOTALS
PEAK FLOW (cms)= 2.21 0.62 2.415 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.33
RUNOFF VOLUME (mm)= 83.63 36.84 57.90
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.44 0.69

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2511) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0511): 52.87 8.838 1.50 55.98
+ ID2= 2 (0516): 10.78 2.415 1.33 57.90
=====

ID = 3 (2511): 63.65 10.942 1.42 56.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(4511) | OVERFLOW IS OFF
IN= 2--> OUT= 1 |
DT= 5.0 min | OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)

***** WARNING : FIRST OUTFLOW IS NOT ZERO.
0.7700 0.9000 | 3.2130 1.6220
1.6000 1.1400 | 3.9540 1.8810
2.2900 1.2810 | 4.9000 2.3000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2511) 63.650 10.942 1.42 56.30
OUTFLOW: ID= 1 (4511) 63.650 3.893 2.08 56.30

PEAK FLOW REDUCTION [Qout/Qin](%)= 35.58
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 1.8626

ADD HYD (2510) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (4510): 91.44 3.482 3.00 36.84
+ ID2= 2 (4511): 63.65 3.893 2.08 56.30
=====

ID = 3 (2510): 155.09 6.454 2.58 44.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2510) |
3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2510): 155.09 6.454 2.58 44.82
+ ID2= 2 (0517): 2.14 0.194 1.75 36.83
=====

ID = 1 (2510): 157.23 6.517 2.58 44.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0512) | Area (ha)= 27.13
ID= 1 DT= 5.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 13.56 13.56
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 425.28 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 114.36
over (min) 5.00 15.00
Storage Coeff. (min)= 4.71 (ii) 11.40 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.22 0.09

TOTALS
PEAK FLOW (cms)= 3.42 2.70 4.753 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.42
RUNOFF VOLUME (mm)= 83.63 44.13 55.98
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.52 0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0513) | Area (ha)= 6.44
ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 35.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.19 2.25
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 1.00

Length (m)= 207.20 40.00
Mannings n = 0.013 0.250
Max.Eff.Inten.(mm/hr)= 189.90 175.96
over (min)= 5.00 10.00
Storage Coeff. (min)= 3.06 (ii) 9.99 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.27 0.11
PEAK FLOW (cms)= 1.06 0.75
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 83.63 50.13
TOTAL RAINFALL (mm)= 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.59

TOTALS
1.507 (iii)
1.42
61.86
84.43
0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

DUHYD (8512)|
Inlet Cap.= 0.732|
#of Inlets= 1|
Total(cms)= 0.7|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
TOTAL HYD.(ID= 1): 6.44 1.51 1.42 61.86
MAJOR SYS.(ID= 2): 1.24 0.78 1.42 61.86
MINOR SYS.(ID= 3): 5.20 0.73 1.33 61.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)|
1 + 2 = 3|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0512): 27.13 4.753 1.42 55.98
+ ID2= 2 (8512): 5.20 0.732 1.33 61.86
ID = 3 (2512): 32.33 5.485 1.42 56.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5512)|
IN= 2--> OUT= 1|
DT= 5.0 min|
OVERFLOW IS OFF
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.6640 0.9151
0.0210 0.1601 | 0.8570 1.0220
0.0360 0.3317 | 1.0660 1.1320
0.0410 0.4218 | 1.2900 1.2450
0.1000 0.5147 | 1.5290 1.3610
0.2030 0.6105 | 1.7810 1.4800
0.3340 0.7092 | 2.0460 1.6020
0.4890 0.8107 | 2.3220 1.7260
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2512) 32.335 5.485 1.42 56.92
OUTFLOW: ID= 1 (5512) 32.335 1.229 2.33 56.87
PEAK FLOW REDUCTION [Qout/Qin](%)= 22.40
TIME SHIFT OF PEAK FLOW (min)= 55.00

MAXIMUM STORAGE USED (ha.m.)= 1.2149

ADD HYD (2514)|
1 + 2 = 3|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2510): 157.23 6.517 2.58 44.71
+ ID2= 2 (0515): 5.01 0.328 1.83 31.30
ID = 3 (2514): 162.24 6.678 2.58 44.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2514)|
3 + 2 = 1|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2514): 162.24 6.678 2.58 44.30
+ ID2= 2 (5512): 32.33 1.229 2.33 56.87
ID = 1 (2514): 194.57 7.884 2.50 46.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0518)|
ID= 1 DT= 5.0 min|
Area (ha)= 6.68 Curve Number (CN)= 71.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.718 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 34.377
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.407

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (2513)|
1 + 2 = 3|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2514): 194.57 7.884 2.50 46.39
+ ID2= 2 (4400): 264.84 9.463 2.37 36.11
ID = 3 (2513): 459.41 17.315 2.47 40.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2513)|
3 + 2 = 1|
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2513): 459.41 17.315 2.47 40.39
+ ID2= 2 (0518): 6.68 0.718 1.58 34.38
ID = 1 (2513): 466.09 17.477 2.40 40.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0520)|
Area (ha)= 108.36 Curve Number (CN)= 71.0

|ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.20

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 3.733 (i)
TIME TO PEAK (hrs)= 2.900
RUNOFF VOLUME (mm)= 34.443
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.408

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (2520)|
1 + 2 = 3
ID1= 1 (2513): 466.09 17.477 2.40 40.30
+ ID2= 2 (0520): 108.36 3.733 2.90 34.44
=====

ID = 3 (2520): 574.45 20.916 2.57 39.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4500)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 /0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 /0.0550 Main Channel
109.70 404.30 0.0550
120.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
0.68 403.38 .304E+04 1.6 1.03 32.27
1.02 403.72 .718E+04 4.5 1.25 26.57
1.36 404.06 .122E+05 9.7 1.58 20.96
1.70 404.40 .251E+05 18.1 1.44 23.04
2.08 404.78 .650E+05 42.3 1.29 25.62
2.46 405.16 .122E+06 86.3 1.40 23.62
2.84 405.54 .192E+06 151.6 1.57 21.10
3.21 405.91 .270E+06 238.3 1.75 18.90
3.59 406.29 .357E+06 345.8 1.93 17.20
3.97 406.67 .452E+06 474.9 2.09 15.85
4.35 407.05 .554E+06 631.1 2.26 14.63
4.73 407.43 .663E+06 807.8 2.42 13.67

5.11 407.81 .779E+06 1006.4 2.57 12.89
5.49 408.19 .902E+06 1229.0 2.71 12.23
5.86 408.56 .103E+07 1476.4 2.84 11.66
6.24 408.94 .117E+07 1745.6 2.96 11.18
6.62 409.32 .132E+07 2034.5 3.07 10.79
7.00 409.70 .147E+07 2353.2 3.17 10.44

<----- hydrograph -----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (2520) 574.45 20.92 2.57 39.20 1.74 1.42
OUTFLOW: ID= 1 (4500) 574.45 19.45 3.03 39.19 1.72 1.43

| CALIB |
| NASHYD (0610)| Area (ha)= 78.05 Curve Number (CN)= 71.0
|ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 3.084 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 34.443
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.408

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (2610)|
1 + 2 = 3
ID1= 1 (4500): 574.45 19.453 3.03 39.19
+ ID2= 2 (0610): 78.05 3.084 2.67 34.44
=====

ID = 3 (2610): 652.50 22.359 2.97 38.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0627)| Area (ha)= 9.39 Curve Number (CN)= 70.0
|ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 0.978 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 33.444
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.396

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (6240)| Area (ha)= 0.79
|ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 70.00

Surface Area IMPERVIOUS PERVIOUS (i)
(ha)= 0.71 0.08

Dep. Storage	(mm)=	0.52	7.16
Average Slope	(%)=	2.00	2.00
Length	(m)=	20.00	20.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=	189.90	356.02	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.61 (ii)	2.27 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.30	
PEAK FLOW (cms)=	0.29	0.09	0.377 (iii)
TIME TO PEAK (hrs)=	1.33	1.33	1.33
RUNOFF VOLUME (mm)=	83.91	60.21	76.80
TOTAL RAINFALL (mm)=	84.43	84.43	84.43
RUNOFF COEFFICIENT =	0.99	0.71	0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
STANDHYD (6210)	Area (ha)=	1.96		
ID= 1 DT= 5.0 min	Total Imp(%)=	60.00	Dir. Conn.(%)=	40.00
	IMPERVIOUS	PERVIOUS (i)		
Surface Area (ha)=	1.18	0.78		
Dep. Storage (mm)=	0.52	7.16		
Average Slope (%)=	2.00	2.00		
Length (m)=	40.00	40.00		
Mannings n =	0.013	0.250		
Max.Eff.Inten.(mm/hr)=	189.90	129.27		
over (min)	5.00	10.00		
Storage Coeff. (min)=	0.93 (ii)	7.30 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.34	0.14		
PEAK FLOW (cms)=	0.41	0.21		
TIME TO PEAK (hrs)=	1.33	1.50		
RUNOFF VOLUME (mm)=	83.91	45.60		
TOTAL RAINFALL (mm)=	84.43	84.43		
RUNOFF COEFFICIENT =	0.99	0.54		

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26240)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (6210):	1.96	0.527	1.33	60.92
+ ID2= 2 (6240):	0.79	0.377	1.33	76.80
=====				
ID = 3 (26240):	2.75	0.904	1.33	65.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(46240)	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	0.1390	0.0686
	0.0000	0.0042	0.1510	0.0822
	0.0130	0.0130	0.1630	0.0967
	0.0200	0.0250	0.1730	0.1121
	0.0250	0.0328	0.1780	0.1202
	0.0290	0.0439	2.5750	0.1742
	0.1260	0.0558	0.0000	0.0000
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (26240)	2.750	0.904	1.33	65.48
OUTFLOW: ID= 1 (46240)	2.750	0.167	1.92	65.42
	PEAK FLOW	REDUCTION [Qout/Qin](%)=	18.48	
	TIME SHIFT OF PEAK FLOW	(min)=	35.00	
	MAXIMUM STORAGE USED	(ha.m.)=	0.1030	

CALIB				
STANDHYD (6220)	Area (ha)=	0.92		
ID= 1 DT= 5.0 min	Total Imp(%)=	40.00	Dir. Conn.(%)=	20.00
	IMPERVIOUS	PERVIOUS (i)		
Surface Area (ha)=	0.37	0.55		
Dep. Storage (mm)=	0.52	7.16		
Average Slope (%)=	2.00	2.00		
Length (m)=	40.00	40.00		
Mannings n =	0.013	0.250		
Max.Eff.Inten.(mm/hr)=	189.90	106.62		
over (min)	5.00	10.00		
Storage Coeff. (min)=	0.93 (ii)	7.81 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.34	0.13		
PEAK FLOW (cms)=	0.10	0.12		
TIME TO PEAK (hrs)=	1.33	1.50		
RUNOFF VOLUME (mm)=	83.91	42.81		
TOTAL RAINFALL (mm)=	84.43	84.43		
RUNOFF COEFFICIENT =	0.99	0.51		

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(46220)	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	0.2590	0.0708
	0.0050	0.0089	0.2910	0.0871
	0.0100	0.0187	0.3210	0.1045
	0.0130	0.0298	0.3720	0.1438
	0.0150	0.0422	2.8080	0.2087
	0.2220	0.0559	0.0000	0.0000
	AREA	QPEAK	TPEAK	R.V.

(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (6220) 0.920 0.173 1.42 51.03
OUTFLOW: ID= 1 (46220) 0.920 0.014 2.92 50.54

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.04
TIME SHIFT OF PEAK FLOW (min)= 90.00
MAXIMUM STORAGE USED (ha.m.)= 0.0355

CALIB
STANDHYD (6230)
ID= 1 DT= 5.0 min
Area (ha)= 0.48
Total Imp(%)= 10.00
Dir. Conn.(%)= 5.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.05 0.43
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 20.00 20.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 71.26
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.61 (ii) 5.94 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.15

TOTALS
PEAK FLOW (cms)= 0.01 0.07 0.073 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 83.91 37.17 39.50
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.44 0.47

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26200)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (46220): 0.92 0.014 2.92 50.54
+ ID2= 2 (46240): 2.75 0.167 1.92 65.42
=====

ID = 3 (26200): 3.67 0.180 2.00 61.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (26200)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (26200): 3.67 0.180 2.00 61.69
+ ID2= 2 (6230): 0.48 0.073 1.42 39.50
=====

ID = 1 (26200): 4.15 0.230 1.50 59.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0149)
IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

----- DATA FOR SECTION (1.1) -----
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

TRAVEL TIME TABLE
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08

hydrograph
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (26200) 4.15 0.23 1.50 59.12 0.25 1.19
OUTFLOW: ID= 1 (0149) 4.15 0.23 1.58 59.12 0.26 1.20

CALIB
STANDHYD (96211)
ID= 1 DT= 5.0 min
Area (ha)= 0.61
Total Imp(%)= 58.00
Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.35 0.26
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 63.77 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 110.01
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.51 (ii) 6.19 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.15

TOTALS
PEAK FLOW (cms)= 0.13 0.06 0.161 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 83.43 41.68 58.38
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.49 0.69

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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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-----
| ROUTE CHN( 0009)|
| IN= 2--> OUT= 1 |
-----
Routing time step (min)'= 5.00

<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          414.20          0.0350      Main Channel
4.30          412.70          0.0350      Main Channel
8.60          414.20          0.0350      Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH      ELEV      VOLUME      FLOW RATE      VELOCITY      TRAV.TIME
(m)         (m)         (cu.m.)      (cms)          (m/s)         (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08

<----- hydrograph -----> <-pipe / channel->
AREA      QPEAK      TPEAK      R.V.      MAX DEPTH      MAX VEL
(ha)      (cms)      (hrs)      (mm)      (m)      (m/s)
INFLOW : ID= 2 ( 96211) 0.61 0.16 1.33 58.38 0.22 1.08
OUTFLOW: ID= 1 ( 0009) 0.61 0.15 1.42 58.35 0.21 1.05

-----
| ADD HYD ( 0147)|
| 1 + 2 = 3 |
-----
AREA      QPEAK      TPEAK      R.V.
(ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0149): 4.15 0.235 1.58 59.12
+ ID2= 2 ( 0627): 9.39 0.978 1.58 33.44
=====
ID = 3 ( 0147): 13.54 1.213 1.58 41.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----
| ADD HYD ( 0147)|
| 3 + 2 = 1 |
-----
AREA      QPEAK      TPEAK      R.V.
(ha)      (cms)      (hrs)      (mm)
ID1= 3 ( 0147): 13.54 1.213 1.58 41.31
+ ID2= 2 ( 0009): 0.61 0.149 1.42 58.35
=====
ID = 1 ( 0147): 14.15 1.318 1.58 42.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----
| CALIB
| STANDHYD ( 9621)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 16.18
Total Imp(%)= 32.00 Dir. Conn.(%)= 20.00

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-----
IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)= 5.18 11.00
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 328.43 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 84.15
over (min) 5.00 15.00
Storage Coeff. (min)= 4.03 (ii) 10.40 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.24 0.09

*TOTALS*
PEAK FLOW (cms)= 1.43 1.67 2.422 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.50
RUNOFF VOLUME (mm)= 83.43 39.36 48.17
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.47 0.57

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING: FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----
| CALIB
| STANDHYD ( 8621)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 4.69
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)= 4.69 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 162.04 64.26
over (min) 5.00 5.00
Storage Coeff. (min)= 0.80 (ii) 0.86 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.34

*TOTALS*
PEAK FLOW (cms)= 2.11 0.00 2.107 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 59.43 35.86 59.43
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.70 0.42 0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----
| CALIB
| STANDHYD ( 8623)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 2.05
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

IMPERVIOUS      PERVIOUS (i)
Surface Area (ha)= 2.05 0.00

```

Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 162.04 103.44
over (min)= 5.00 5.00
Storage Coeff. (min)= 0.80 (ii) 0.86 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.34

PEAK FLOW (cms)= 0.92 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.33 0.921 (iii)
RUNOFF VOLUME (mm)= 59.43 53.83 59.43
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.70 0.64 0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (9623)
ID= 1 DT= 5.0 min
Area (ha)= 4.42
Total Imp(%)= 48.00 Dir. Conn.(%)= 35.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.12 2.30
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 171.66 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 92.87
over (min)= 5.00 10.00
Storage Coeff. (min)= 2.73 (ii) 8.85 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.29 0.12

PEAK FLOW (cms)= 0.75 0.42 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.50 0.973 (iii)
RUNOFF VOLUME (mm)= 83.43 40.67 1.33
TOTAL RAINFALL (mm)= 84.43 84.43 55.64
RUNOFF COEFFICIENT = 0.99 0.48 84.43
0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8624)
ID= 1 DT= 5.0 min
Area (ha)= 4.32
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.32 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 162.04 64.26
over (min)= 5.00 5.00
Storage Coeff. (min)= 0.80 (ii) 0.86 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.34

PEAK FLOW (cms)= 1.94 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.33 1.941 (iii)
RUNOFF VOLUME (mm)= 59.43 35.86 59.43
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.70 0.42 0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (9624)
ID= 1 DT= 5.0 min
Area (ha)= 8.46
Total Imp(%)= 51.00 Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.31 4.15
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 237.49 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 89.82
over (min)= 5.00 10.00
Storage Coeff. (min)= 3.32 (ii) 8.30 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.26 0.13

PEAK FLOW (cms)= 1.57 0.75 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.50 1.974 (iii)
RUNOFF VOLUME (mm)= 83.43 40.23 1.33
TOTAL RAINFALL (mm)= 84.43 84.43 57.51
RUNOFF COEFFICIENT = 0.99 0.48 84.43
0.68

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0628)
ID= 1 DT= 5.0 min
Area (ha)= 5.35
Total Imp(%)= 60.00 Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.21 2.14
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 188.86 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 124.08
over (min)= 5.00 10.00
Storage Coeff. (min)= 2.89 (ii) 9.37 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.28 0.12

PEAK FLOW (cms)= 1.02 0.51 1.301 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 83.43 44.62 60.14
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.53 0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8625)
ID= 1 DT= 5.0 min
Area (ha)= 4.11
Total Imp(%)= 100.00
Dir. Conn.(%)= 100.00

IMPERVIOUS PVIOUS (i)
Surface Area (ha)= 4.11 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 162.04 103.44
over (min) 5.00 5.00
Storage Coeff. (min)= 0.80 (ii) 0.86 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.34

PEAK FLOW (cms)= 1.85 0.00 1.846 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 59.43 53.83 59.43
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.70 0.64 0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (9625)
ID= 1 DT= 5.0 min
Area (ha)= 8.07
Total Imp(%)= 55.00
Dir. Conn.(%)= 40.00

IMPERVIOUS PVIOUS (i)
Surface Area (ha)= 4.44 3.63
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 231.95 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 103.02
over (min) 5.00 10.00
Storage Coeff. (min)= 3.27 (ii) 8.09 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.27 0.13

PEAK FLOW (cms)= 1.50 0.76 1.919 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 83.43 42.07 58.62
TOTAL RAINFALL (mm)= 84.43 84.43 84.43

RUNOFF COEFFICIENT = 0.99 0.50 0.69

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2621)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0628): 5.35 1.301 1.33 60.14
+ ID2= 2 (8621): 4.69 2.107 1.33 59.43
ID = 3 (2621): 10.04 3.408 1.33 59.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2621): 10.04 3.408 1.33 59.81
+ ID2= 2 (8623): 2.05 0.921 1.33 59.43
ID = 1 (2621): 12.09 4.329 1.33 59.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2621): 12.09 4.329 1.33 59.74
+ ID2= 2 (8624): 4.32 1.941 1.33 59.43
ID = 3 (2621): 16.41 6.269 1.33 59.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
3 + 2 = 1
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2621): 16.41 6.269 1.33 59.66
+ ID2= 2 (8625): 4.11 1.846 1.33 59.43
ID = 1 (2621): 20.52 8.116 1.33 59.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2621): 20.52 8.116 1.33 59.62
+ ID2= 2 (9621): 16.18 2.422 1.50 48.17
ID = 3 (2621): 36.70 10.133 1.33 54.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621) 3 + 2 = 1				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2621):	36.70	10.133	1.33	54.57
+ ID2= 2 (9623):	4.42	0.973	1.33	55.64
=====				
ID = 1 (2621):	41.12	11.105	1.33	54.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621) 1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2621):	41.12	11.105	1.33	54.69
+ ID2= 2 (9624):	8.46	1.974	1.33	57.51
=====				
ID = 3 (2621):	49.58	13.080	1.33	55.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621) 3 + 2 = 1				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2621):	49.58	13.080	1.33	55.17
+ ID2= 2 (9625):	8.07	1.919	1.33	58.62
=====				
ID = 1 (2621):	57.65	14.999	1.33	55.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5621) 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	1.5000	2.5000	
0.0010	0.0000	2.5000	3.0000	
0.0100	1.0000	3.0000	3.5000	
0.0500	1.5000	4.0000	4.0000	
0.5000	2.0000	0.0000	0.0000	
=====				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2621)	57.650	14.999	1.33	55.65
OUTFLOW: ID= 1 (5621)	57.650	1.386	2.50	43.58

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.24
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 2.4434

CALIB STANDHYD (9622) ID= 1 DT= 5.0 min			
Area (ha)=	6.75	Dir. Conn.(%)=	30.00
Total Imp(%)=	44.00		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.97	3.78
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	212.13	30.00
Mannings n =	0.013	0.250
=====		
Max.Eff.Inten.(mm/hr)=	189.90	92.87
over (min)	5.00	10.00

Storage Coeff. (min)=	3.10 (ii)	9.22 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.27	0.12	
=====			
PEAK FLOW (cms)=	0.95	0.68	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	1.357 (iii)
RUNOFF VOLUME (mm)=	83.43	40.67	1.42
TOTAL RAINFALL (mm)=	84.43	84.43	53.50
RUNOFF COEFFICIENT =	0.99	0.48	84.43
			0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (8622) ID= 1 DT= 5.0 min			
Area (ha)=	2.20	Dir. Conn.(%)=	99.99
Total Imp(%)=	99.99		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.20	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	20.00	40.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	162.04	103.44
over (min)	5.00	5.00
Storage Coeff. (min)=	0.80 (ii)	0.95 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.34
PEAK FLOW (cms)=	0.99	0.00
TIME TO PEAK (hrs)=	1.33	1.33
RUNOFF VOLUME (mm)=	59.43	53.83
TOTAL RAINFALL (mm)=	84.43	84.43
RUNOFF COEFFICIENT =	0.70	0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (2622) 1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (8622):	2.20	0.988	1.33	59.43
+ ID2= 2 (9622):	6.75	1.357	1.42	53.50
=====				
ID = 3 (2622):	8.95	2.304	1.33	54.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5622) IN= 2--> OUT= 1 DT= 5.0 min				
OVERFLOW IS OFF				
OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
0.0000	0.0000	0.4500	0.2500	
0.0010	0.0000	0.6500	0.3200	

	0.0030	0.1200		0.8000	0.4000
	0.1000	0.1500		0.9800	0.5000
	0.3000	0.2000		0.0000	0.0000

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (2622)	8.950	2.304	1.33	54.96
OUTFLOW: ID= 1 (5622)	8.950	0.529	1.92	53.93

PEAK FLOW REDUCTION [Qout/Qin](%)= 22.94
TIME SHIFT OF PEAK FLOW (min)= 35.00
MAXIMUM STORAGE USED (ha.m.)= 0.2781

ADD HYD (2625)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (5621):	57.65	1.386	2.50	43.58
+ ID2= 2 (5622):	8.95	0.529	1.92	53.93
=====				
ID = 3 (2625):	66.60	1.838	2.33	44.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0150)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0147):	14.15	1.318	1.58	42.05
+ ID2= 2 (2625):	66.60	1.838	2.33	44.97
=====				
ID = 3 (0150):	80.75	2.376	2.08	44.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2620)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0150):	80.75	2.376	2.08	44.46
+ ID2= 2 (2610):	652.50	22.359	2.97	38.63
=====				
ID = 3 (2620):	733.25	24.303	2.90	38.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0637)	Area (ha)=	8.42	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.20		

Unit Hyd Qpeak (cms)= 1.608

PEAK FLOW (cms)= 0.877 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 33.444
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.396

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
NASHYD (0630)	Area (ha)=	33.04	Curve Number (CN)=	70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00

U.H. Tp(hrs)= 0.38

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 2.438 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 33.503
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.397

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTE CHN(4630)
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->		
Distance	Elevation	Manning
0.00	414.20	0.0350 Main Channel
4.30	412.70	0.0350 Main Channel
8.60	414.20	0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->					
DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

<---- hydrograph ---->					<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0630)	33.04	2.44	1.83	33.50	0.96	0.92
OUTFLOW: ID= 1 (4630)	33.04	2.28	2.00	33.49	0.93	0.91

ADD HYD (2637)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2620):	733.25	24.303	2.90	38.77
+ ID2= 2 (4630):	33.04	2.282	2.00	33.49
=====				
ID = 3 (2637):	766.29	25.189	2.87	38.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1				

```
-----
              (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2637): 766.29 25.189 2.87 38.54
+ ID2= 2 ( 0637): 8.42 0.877 1.58 33.44
=====
ID = 1 ( 2637): 774.71 25.308 2.87 38.49
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0636) | Area (ha)= 3.60 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.20
|-----
```

Unit Hyd Qpeak (cms)= 0.688

PEAK FLOW (cms)= 0.375 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 33.444
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.396

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| ADD HYD ( 2636) |
| 1 + 2 = 3 |
|-----
              (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2637): 774.71 25.308 2.87 38.49
+ ID2= 2 ( 0636): 3.60 0.375 1.58 33.44
=====
ID = 3 ( 2636): 778.31 25.358 2.87 38.46
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0638) | Area (ha)= 20.63 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.20
|-----
```

Unit Hyd Qpeak (cms)= 3.940

PEAK FLOW (cms)= 2.149 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 33.444
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.396

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| NASHYD ( 0639) | Area (ha)= 4.47 Curve Number (CN)= 70.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----
| U.H. Tp(hrs)= 0.20
|-----
```

Unit Hyd Qpeak (cms)= 0.854

PEAK FLOW (cms)= 0.466 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 33.444
TOTAL RAINFALL (mm)= 84.430
RUNOFF COEFFICIENT = 0.396

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| ADD HYD ( 2630) |
| 1 + 2 = 3 |
|-----
              AREA   QPEAK   TPEAK   R.V.
              (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2636): 778.31 25.358 2.87 38.46
+ ID2= 2 ( 0638): 20.63 2.149 1.58 33.44
=====
ID = 3 ( 2630): 798.94 25.659 2.80 38.33
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2630) |
| 3 + 2 = 1 |
|-----
              AREA   QPEAK   TPEAK   R.V.
              (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2630): 798.94 25.659 2.80 38.33
+ ID2= 2 ( 0639): 4.47 0.466 1.58 33.44
=====
ID = 1 ( 2630): 803.41 25.726 2.80 38.31
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 8709) | Area (ha)= 3.51
| ID= 1 DT= 5.0 min | Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00
|-----
```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.51 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 162.04 103.44
over (min) 5.00 5.00
Storage Coeff. (min)= 0.80 (ii) 0.86 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.34

TOTALS
PEAK FLOW (cms)= 1.58 0.00 1.577 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 59.43 53.83 59.43
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.70 0.64 0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 9709) | Area (ha)= 7.20
| ID= 1 DT= 5.0 min | Total Imp(%)= 56.00 Dir. Conn.(%)= 40.00
|-----
```

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.03 3.17
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 219.09 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 189.90 106.78
over (min) 5.00 10.00

Storage Coeff. (min)= 3.16 (ii) 7.94 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.27 0.13
TOTALS
PEAK FLOW (cms)= 1.35 0.69 1.732 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 83.43 42.56 58.91
TOTAL RAINFALL (mm)= 84.43 84.43 84.43
RUNOFF COEFFICIENT = 0.99 0.50 0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2709)
1 + 2 = 3
ID1= 1 (8709): 3.51 1.577 1.33 59.43
+ ID2= 2 (9709): 7.20 1.732 1.33 58.91
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5709)
IN= 2--> OUT= 1
DT= 5.0 min
OVERFLOW IS OFF
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.6000 0.3800
0.0010 0.0000 | 0.9000 0.5400
0.0100 0.1000 | 1.1000 0.7100
0.0500 0.2000 | 1.4000 0.8900
0.4000 0.2400 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2709) 10.710 3.309 1.33 59.08
OUTFLOW: ID= 1 (5709) 10.710 0.592 2.00 59.08

PEAK FLOW REDUCTION [Qout/Qin](%)= 17.90
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 0.3750

FINISH

** SIMULATION : 100 year Fergus Shand Dam Chi **

CHICAGO STORM | IDF curve parameters: A=4382.000
| Ptotal= 94.08 mm | B= 21.000
C= 0.939
used in: INTENSITY = A / (t + B)^C
Duration of storm = 4.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.33

TIME RAIN | TIME RAIN |' TIME RAIN | TIME RAIN

hrs	mm/hr	hrs	mm/hr	'	hrs	mm/hr	hrs	mm/hr
0.00	3.55	1.00	33.31	2.00	18.02	3.00	5.69	
0.08	3.91	1.08	54.51	2.08	15.69	3.08	5.34	
0.17	4.34	1.17	109.99	2.17	13.83	3.17	5.02	
0.25	4.86	1.25	205.33	2.25	12.30	3.25	4.73	
0.33	5.50	1.33	132.84	2.33	11.04	3.33	4.47	
0.42	6.30	1.42	87.25	2.42	9.97	3.42	4.24	
0.50	7.33	1.50	62.23	2.50	9.07	3.50	4.02	
0.58	8.67	1.58	46.93	2.58	8.30	3.58	3.82	
0.67	10.48	1.67	36.86	2.67	7.63	3.67	3.64	
0.75	13.04	1.75	29.86	2.75	7.05	3.75	3.48	
0.83	16.82	1.83	24.77	2.83	6.54	3.83	3.32	
0.92	22.83	1.92	20.96	2.92	6.09	3.92	3.18	

CALIB
NASHYD (0100) | Area (ha)= 136.98 Curve Number (CN)= 69.0
ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.17

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 4.464

PEAK FLOW (cms)= 5.477 (i)
TIME TO PEAK (hrs)= 2.867
RUNOFF VOLUME (mm)= 39.054
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.415

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0201) | Area (ha)= 14.60 Curve Number (CN)= 74.0
ID= 1 DT= 2.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.97

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.575

PEAK FLOW (cms)= 0.820 (i)
TIME TO PEAK (hrs)= 2.567
RUNOFF VOLUME (mm)= 47.141
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.501

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0203) | Area (ha)= 8.20
ID= 1 DT= 2.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.69	4.51
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 189.44 118.35
over (min) 5.00 8.00
Storage Coeff. (min)= 0.82 (ii) 7.40 (ii)

Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.53 0.15

PEAK FLOW (cms)= 1.15 1.15
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 92.08 49.10
TOTAL RAINFALL (mm)= 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.52

TOTALS
1.854 (iii)
1.37
59.84
94.08
0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2200)|
1 + 2 = 3
ID1= 1 (0201): 14.60 0.820 2.57 47.14
+ ID2= 2 (0203): 8.20 1.854 1.37 59.84
=====

ID = 3 (2200): 22.80 1.906 1.43 51.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5200)|
| IN= 2---> OUT= 1 |
DT= 5.0 min
OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.1980 0.2314
0.0040 0.0218 | 0.2920 0.2621
0.0060 0.0446 | 0.3980 0.2937
0.0070 0.0683 | 0.5150 0.3261
0.0080 0.0930 | 0.8290 0.3592
0.0090 0.1187 | 1.3520 0.3930
0.0230 0.1453 | 2.0570 0.4275
0.0610 0.1730 | 2.9590 0.4629
0.1200 0.2017 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (2200) 22.800 1.906 1.43 51.71
OUTFLOW: ID= 1 (5200) 22.800 1.034 2.50 51.27

PEAK FLOW REDUCTION [Qout/Qin](%)= 54.24
TIME SHIFT OF PEAK FLOW (min)= 64.00
MAXIMUM STORAGE USED (ha.m.)= 0.3724

**** WARNING : SELECTED ROUTING TIME STEP DENIED.

CALIB
| NASHYD (0205) | Area (ha)= 4.80 Curve Number (CN)= 90.0
| ID= 1 DT= 2.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.41

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.447

PEAK FLOW (cms)= 0.768 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 70.953
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.754

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
| STANDHYD (0206) | Area (ha)= 0.20
| ID= 1 DT= 2.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 189.44 118.35
over (min)= 5.00 8.00
Storage Coeff. (min)= 0.82 (ii) 7.40 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.53 0.15

PEAK FLOW (cms)= 0.03 0.03
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 92.08 49.10
TOTAL RAINFALL (mm)= 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.52

TOTALS
0.045 (iii)
1.37
59.82
94.08
0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2201)|
1 + 2 = 3
ID1= 1 (0205): 4.80 0.768 1.83 70.95
+ ID2= 2 (0206): 0.20 0.045 1.37 59.82
=====

ID = 3 (2201): 5.00 0.785 1.83 70.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2201)|
3 + 2 = 1
ID1= 3 (2201): 5.00 0.785 1.83 70.51
+ ID2= 2 (5200): 22.80 1.034 2.50 51.27
=====

ID = 1 (2201): 27.80 1.564 2.17 54.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
| STANDHYD (0209) | Area (ha)= 2.70
| ID= 1 DT= 2.0 min | Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.43 2.27
Dep. Storage (mm)= 2.00 5.00

Average Slope (%)= 1.20 1.20
Length (m)= 35.00 35.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 189.44 82.86
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.00 (ii) 9.18 (ii)
Unit Hyd. Tpeak (min)= 4.00 10.00
Unit Hyd. peak (cms)= 0.51 0.12

PEAK FLOW (cms)= 0.12 0.37 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.50 0.422 (iii)
RUNOFF VOLUME (mm)= 92.08 43.49 47.38
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.46 0.50

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0207)
ID= 1 DT= 2.0 min | Area (ha)= 1.30
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.58 0.72
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 189.44 118.35
over (min)= 5.00 8.00
Storage Coeff. (min)= 0.82 (ii) 7.40 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.53 0.15

PEAK FLOW (cms)= 0.18 0.18 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.50 0.294 (iii)
RUNOFF VOLUME (mm)= 92.08 49.10 59.84
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.52 0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2202)
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0207): 1.30 0.294 1.37 59.84
+ ID2= 2 (0209): 2.70 0.422 1.50 47.38

=====

ID = 3 (2202):	4.00	0.691	1.47	51.43
-----------------	------	-------	------	-------

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2202)
3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2202): 4.00 0.691 1.47 51.43
+ ID2= 2 (2201): 27.80 1.564 2.17 54.73
=====

ID = 1 (2202):	31.80	1.762	2.00	54.31
-----------------	-------	-------	------	-------

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2100)
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0100): 136.98 5.477 2.87 39.05
+ ID2= 2 (2202): 31.80 1.762 2.00 54.31
=====

ID = 3 (2100):	168.78	6.788	2.73	41.93
-----------------	--------	-------	------	-------

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0302)
ID= 1 DT= 2.0 min | Area (ha)= 2.90 Curve Number (CN)= 74.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.45

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.277 (i)
TIME TO PEAK (hrs)= 1.933
RUNOFF VOLUME (mm)= 47.141
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.501

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0304)
ID= 1 DT= 2.0 min | Area (ha)= 4.40
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 1.98 2.42
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 189.44 118.35
over (min)= 5.00 8.00
Storage Coeff. (min)= 0.86 (ii) 7.82 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.53 0.14

PEAK FLOW (cms)= 0.62 0.61 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.50 0.983 (iii)
RUNOFF VOLUME (mm)= 92.08 49.10 1.37 59.84

TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.52 0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2300) |
| 1 + 2 = 3 |
+-----+
ID1= 1 ( 0302): 2.90 0.277 1.93 47.14
+ ID2= 2 ( 0304): 4.40 0.983 1.37 59.84
+-----+
ID = 3 ( 2300): 7.30 1.051 1.43 54.80
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB
| STANDHYD ( 0308) |
ID= 1 DT= 2.0 min |
+-----+
Area (ha)= 0.20
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
+-----+
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.09 0.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.00 1.00
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 189.44 118.35
over (min) 5.00 8.00
Storage Coeff. (min)= 0.86 (ii) 7.82 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.53 0.14

TOTALS
PEAK FLOW (cms)= 0.03 0.03 0.045 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.37
RUNOFF VOLUME (mm)= 92.08 49.10 59.82
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.52 0.64

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| CALIB
| STANDHYD ( 0310) |
ID= 1 DT= 2.0 min |
+-----+
Area (ha)= 5.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00
+-----+
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.91 4.79
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.20 1.20
Length (m)= 25.00 25.00
Mannings n = 0.013 0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 189.44 82.86
over (min) 5.00 8.00
Storage Coeff. (min)= 0.82 (ii) 7.51 (ii)
Unit Hyd. Tpeak (min)= 4.00 8.00
Unit Hyd. peak (cms)= 0.53 0.15

TOTALS
PEAK FLOW (cms)= 0.26 0.05 0.971 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.47
RUNOFF VOLUME (mm)= 92.08 43.49 47.38
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.46 0.50

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

***** WARNING: FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 ( 2301) |
| 1 + 2 = 3 |
+-----+
ID1= 1 ( 2300): 7.30 1.051 1.43 54.80
+ ID2= 2 ( 0308): 0.20 0.045 1.37 59.82
+-----+
ID = 3 ( 2301): 7.50 1.095 1.43 54.93
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 2301) |
| 3 + 2 = 1 |
+-----+
ID1= 3 ( 2301): 7.50 1.095 1.43 54.93
+ ID2= 2 ( 0310): 5.70 0.971 1.47 47.38
+-----+
ID = 1 ( 2301): 13.20 2.064 1.43 51.67
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 2302) |
| 1 + 2 = 3 |
+-----+
ID1= 1 ( 2100): 168.78 6.788 2.73 41.93
+ ID2= 2 ( 2301): 13.20 2.064 1.43 51.67
+-----+
ID = 3 ( 2302): 181.98 7.129 2.67 42.64
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB
| STANDHYD ( 0400) |
ID= 1 DT= 2.0 min |
+-----+
Area (ha)= 82.86
Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00
+-----+
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
```

Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 157.34 78.34
over (min)= 12.00 20.00
Storage Coeff. (min)= 11.74 (ii) 19.52 (ii)
Unit Hyd. Tpeak (min)= 12.00 20.00
Unit Hyd. peak (cms)= 0.10 0.06

PEAK FLOW (cms)= 0.78 8.21
TIME TO PEAK (hrs)= 1.50 1.73
RUNOFF VOLUME (mm)= 92.08 42.01
TOTAL RAINFALL (mm)= 94.08 94.08
RUNOFF COEFFICIENT = 0.98 0.45

TOTALS
8.766 (iii)
1.73
43.51
94.08
0.46

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2400)|
| 1 + 2 = 3 |
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2302): 181.98 7.129 2.67 42.64
+ ID2= 2 (0400): 82.86 8.766 1.73 43.51
ID = 3 (2400): 264.84 13.433 1.77 42.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(4400)|
| IN= 2---> OUT= 1 |
Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550
96.60 409.10 0.0550
115.80 408.90 0.0550
124.80 409.10 0.0550
131.00 408.90 0.0550 / 0.0350 Main Channel
133.60 408.00 0.0350 Main Channel
134.40 407.60 0.0350 Main Channel
135.00 407.50 0.0350 Main Channel
135.80 407.60 0.0350 Main Channel
136.50 408.00 0.0350 Main Channel
139.40 408.80 0.0350 / 0.0550 Main Channel
143.50 408.90 0.0550
148.50 408.70 0.0550
163.80 408.90 0.0550
183.20 408.90 0.0550
243.70 409.70 0.0550
278.70 410.20 0.0550
330.50 411.40 0.0550

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.19 407.69 .366E+03 0.1 0.51 58.83
0.37 407.87 .106E+04 0.5 0.81 37.08
0.56 408.06 .199E+04 1.1 1.00 29.93

0.74 408.24 .328E+04 2.1 1.14 26.32
0.93 408.43 .498E+04 3.6 1.28 23.32
1.11 408.61 .708E+04 5.6 1.43 20.94
1.30 408.80 .105E+05 8.5 1.45 20.61
1.49 408.99 .247E+05 14.8 1.07 27.91
1.68 409.18 .601E+05 30.4 0.91 32.97
1.87 409.37 .109E+06 58.5 0.96 31.05
2.06 409.56 .166E+06 98.3 1.06 28.11
2.25 409.75 .231E+06 150.3 1.17 25.57
2.44 409.94 .303E+06 215.4 1.28 23.46
2.64 410.14 .383E+06 293.8 1.38 21.74
2.83 410.33 .470E+06 390.1 1.49 20.10
3.02 410.52 .563E+06 502.4 1.60 18.66
3.21 410.71 .660E+06 628.8 1.71 17.48
3.40 410.90 .762E+06 769.5 1.81 16.49
3.59 411.09 .868E+06 924.9 1.91 15.65

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (2400) 264.84 13.43 1.77 42.91 1.45 1.14
OUTFLOW: ID= 1 (4400) 264.84 11.18 2.43 42.91 1.38 1.26

CALIB
NASHYD (0515)| Area (ha)= 5.01 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.41

Unit Hyd Qpeak (cms)= 0.467

PEAK FLOW (cms)= 0.393 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 37.368
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.397

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0510)| Area (ha)= 91.44 Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.09

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)= 4.338 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 43.658
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.464

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTE CHN(4510)|
| IN= 2---> OUT= 1 |
Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.206E+02	0.0	0.19	101.61
0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

<---- hydrograph ---->			<-pipe / channel->		
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)
INFLOW : ID= 2 (0510)	91.44	4.34	2.67	43.66	1.16
OUTFLOW: ID= 1 (4510)	91.44	4.17	3.00	43.65	1.14

CALIB	Area (ha)=	2.14	Curve Number (CN)=	71.0
NASHYD (0517)	Ia (mm)=	1.50	# of Linear Res.(N)=	3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)=	0.32		

Unit Hyd Qpeak (cms)= 0.255

PEAK FLOW (cms)= 0.231 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 43.645
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.464

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)=	52.87	Dir. Conn.(%)=	30.00
STANDHYD (0511)	Total Imp(%)=	50.00		
ID= 1 DT= 5.0 min				

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	26.43	26.43
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	593.69	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	132.52
over (min)	5.00	15.00
Storage Coeff. (min)=	5.58 (ii)	13.34 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.20	0.08

PEAK FLOW (cms)=	6.85	5.80	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.58	10.226 (iii)
RUNOFF VOLUME (mm)=	93.28	51.77	1.50
TOTAL RAINFALL (mm)=	94.08	94.08	64.22
RUNOFF COEFFICIENT =	0.99	0.55	94.08
			0.68

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	Area (ha)=	10.78	Dir. Conn.(%)=	45.00
STANDHYD (0516)	Total Imp(%)=	45.00		
ID= 1 DT= 5.0 min				

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.85	5.93
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	268.08	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	77.66
over (min)	5.00	15.00
Storage Coeff. (min)=	3.46 (ii)	13.08 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.26	0.08

PEAK FLOW (cms)=	2.42	0.77	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.58	2.681 (iii)
RUNOFF VOLUME (mm)=	93.28	43.66	1.33
TOTAL RAINFALL (mm)=	94.08	94.08	65.99
RUNOFF COEFFICIENT =	0.99	0.46	94.08
			0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. 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 (2511)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0511):	52.87	10.226	1.50	64.22
+ ID2= 2 (0516):	10.78	2.681	1.33	65.99
ID = 3 (2511):	63.65	12.493	1.42	64.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(4511)	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
IN= 2--> OUT= 1				
DT= 5.0 min				
**** WARNING : FIRST OUTFLOW IS NOT ZERO.	0.7700	0.9000	3.2130	1.6220
	1.6000	1.1400	3.9540	1.8810
	2.2900	1.2810	4.9000	2.3000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2511)	63.650	12.493	1.42	64.52
OUTFLOW: ID= 1 (4511)	63.650	4.489	2.08	64.52

PEAK FLOW REDUCTION [Qout/Qin](%)= 35.93
TIME SHIFT OF PEAK FLOW (min)= 40.00

MAXIMUM STORAGE USED (ha.m.)= 2.1214

```
-----
| ADD HYD ( 2510)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 4510): AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
+ ID2= 2 ( 4511): 63.65 4.489 2.08 64.52
=====
ID = 3 ( 2510): 155.09 7.715 2.58 52.21
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2510)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2510): AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
+ ID2= 2 ( 0517): 2.14 0.231 1.75 43.65
=====
ID = 1 ( 2510): 157.23 7.789 2.58 52.10
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0512)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 27.13
Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	13.56	13.56
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	425.28	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	132.52
over (min)	5.00	15.00
Storage Coeff. (min)=	4.57 (ii)	10.87 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	0.23	0.09

TOTALS
PEAK FLOW (cms)= 3.76 3.21 5.472 (iii)
TIME TO PEAK (hrs)= 1.33 1.58 1.50
RUNOFF VOLUME (mm)= 93.28 51.77 64.22
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.99 0.55 0.68

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB |
| STANDHYD ( 0513)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 6.44
Total Imp(%)= 65.00 Dir. Conn.(%)= 35.00
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.19	2.25
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	207.20	40.00
Mannings n =	0.013	0.250

Max.Eff.Inten.(mm/hr)=	205.33	202.03
over (min)	5.00	10.00
Storage Coeff. (min)=	2.97 (ii)	9.52 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.28	0.12

PEAK FLOW (cms)=	1.16	0.88	*TOTALS*
TIME TO PEAK (hrs)=	1.33	1.50	1.720 (iii)
RUNOFF VOLUME (mm)=	93.28	58.34	1.42
TOTAL RAINFALL (mm)=	94.08	94.08	70.57
RUNOFF COEFFICIENT =	0.99	0.62	94.08
			0.75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 71.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| DUHYD ( 8512)|
| Inlet Cap.= 0.732|
| #of Inlets= 1|
| Total(cms)= 0.7|
-----
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
TOTAL HYD.(ID= 1): 6.44 1.72 1.42 70.57
=====
MAJOR SYS.(ID= 2): 1.54 0.99 1.42 70.57
MINOR SYS.(ID= 3): 4.90 0.73 1.25 70.57
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2512)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0512): AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
+ ID2= 2 ( 8512): 27.13 5.472 1.50 64.22
+ ID2= 2 ( 8512): 4.90 0.732 1.25 70.57
=====
ID = 3 ( 2512): 32.03 6.204 1.50 65.19
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| RESERVOIR( 5512)|
| IN= 2---> OUT= 1 |
| DT= 5.0 min |
-----
OVERFLOW IS OFF
OUTFLOW (cms) STORAGE (ha.m.) | OUTFLOW (cms) STORAGE (ha.m.)
0.0000 0.0000 | 0.6640 0.9151
0.0210 0.1601 | 0.8570 1.0220
0.0360 0.3317 | 1.0660 1.1320
0.0410 0.4218 | 1.2900 1.2450
0.1000 0.5147 | 1.5290 1.3610
0.2030 0.6105 | 1.7810 1.4800
0.3340 0.7092 | 2.0460 1.6020
0.4890 0.8107 | 2.3220 1.7260
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (2512)	32.033	6.204	1.50	65.19
OUTFLOW: ID= 1 (5512)	32.033	1.506	2.25	65.13

PEAK FLOW REDUCTION [Qout/Qin](%)= 24.27
TIME SHIFT OF PEAK FLOW (min)= 45.00
MAXIMUM STORAGE USED (ha.m.)= 1.3505

| ADD HYD (2514)|
1 + 2 = 3
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 1 (2510): 157.23 7.789 2.58 52.10
+ ID2= 2 (0515): 5.01 0.393 1.83 37.37
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2514)|
3 + 2 = 1
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 3 (2514): 162.24 7.983 2.58 51.64
+ ID2= 2 (0512): 32.03 1.506 2.25 65.13
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0518)| Area (ha)= 6.68 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

 U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.861 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 41.075
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.437

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (2513)|
1 + 2 = 3
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 1 (2514): 194.27 9.433 2.50 53.87
+ ID2= 2 (4400): 264.84 11.182 2.43 42.91
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (2513)|
3 + 2 = 1
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 3 (2513): 459.11 20.601 2.50 47.47
+ ID2= 2 (0518): 6.68 0.861 1.58 41.08
=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0520)| Area (ha)= 108.36 Curve Number (CN)= 71.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

 U.H. Tp(hrs)= 1.20

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 4.493 (i)
TIME TO PEAK (hrs)= 2.900
RUNOFF VOLUME (mm)= 41.154
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.437

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (2520)|
1 + 2 = 3
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
ID1= 1 (2513): 465.79 20.779 2.47 47.38
+ ID2= 2 (0520): 108.36 4.493 2.90 41.15
=====

ID = 3 (2520): 574.15 24.955 2.57 46.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(4500)|
IN= 2- -> OUT= 1

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 /0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 /0.0550 Main Channel
109.70 404.30 0.0550
128.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
0.68 403.38 .304E+04 1.6 1.03 32.27
1.02 403.72 .718E+04 4.5 1.25 26.57
1.36 404.06 .122E+05 9.7 1.58 20.96
1.70 404.40 .251E+05 18.1 1.44 23.04
2.08 404.78 .650E+05 42.3 1.29 25.62
2.46 405.16 .122E+06 86.3 1.40 23.62
2.84 405.54 .192E+06 151.6 1.57 21.10
3.21 405.91 .270E+06 238.3 1.75 18.90
3.59 406.29 .357E+06 345.8 1.93 17.20
3.97 406.67 .452E+06 474.9 2.09 15.85
4.35 407.05 .554E+06 631.1 2.26 14.63
4.73 407.43 .663E+06 807.8 2.42 13.67
5.11 407.81 .779E+06 1006.4 2.57 12.89
5.49 408.19 .902E+06 1229.0 2.71 12.23

5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

<---- hydrograph ---->			<-pipe / channel->		
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH
	(ha)	(cms)	(hrs)	(mm)	(m)
INFLOW : ID= 2 (2520)	574.15	24.96	2.57	46.20	1.81
OUTFLOW: ID= 1 (4500)	574.15	23.22	3.07	46.20	1.78

CALIB			
NASHYD (0610)	Area (ha)=	78.05	Curve Number (CN)= 71.0
ID= 1 DT= 2.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.00	

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak	(cms)=	2.981
PEAK FLOW	(cms)=	3.715 (i)
TIME TO PEAK	(hrs)=	2.633
RUNOFF VOLUME	(mm)=	41.154
TOTAL RAINFALL	(mm)=	94.082
RUNOFF COEFFICIENT	=	0.437

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (2610)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (4500):	574.15	23.222	3.07	46.20
+ ID2= 2 (0610):	78.05	3.715	2.63	41.15
ID = 3 (2610):	652.20	26.703	2.97	45.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0627)	Area (ha)=	9.39	Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.20	

Unit Hyd Qpeak	(cms)=	1.793
PEAK FLOW	(cms)=	1.174 (i)
TIME TO PEAK	(hrs)=	1.583
RUNOFF VOLUME	(mm)=	40.015
TOTAL RAINFALL	(mm)=	94.082
RUNOFF COEFFICIENT	=	0.425

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (6240)	Area (ha)=	0.79	
ID= 1 DT= 5.0 min	Total Imp(%)=	90.00	Dir. Conn.(%)= 70.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.71
Dep. Storage	(mm)=	0.52
Average Slope	(%)=	2.00

Length	(m)=	20.00	20.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=	205.33	402.32	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.59 (ii)	2.20 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.30	

TOTALS

PEAK FLOW	(cms)=	0.32	0.10	0.412 (iii)
TIME TO PEAK	(hrs)=	1.33	1.33	1.33
RUNOFF VOLUME	(mm)=	93.56	69.23	86.26
TOTAL RAINFALL	(mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT	=	0.99	0.74	0.92

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (6210)	Area (ha)=	1.96	
ID= 1 DT= 5.0 min	Total Imp(%)=	60.00	Dir. Conn.(%)= 40.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.18
Dep. Storage	(mm)=	0.52
Average Slope	(%)=	2.00
Length	(m)=	40.00
Mannings n	=	0.013

Max.Eff.Inten.(mm/hr)=	205.33	150.29
over (min)	5.00	10.00
Storage Coeff. (min)=	0.90 (ii)	6.89 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.34	0.14

TOTALS

PEAK FLOW	(cms)=	0.45	0.25	0.588 (iii)
TIME TO PEAK	(hrs)=	1.33	1.50	1.33
RUNOFF VOLUME	(mm)=	93.56	53.60	69.58
TOTAL RAINFALL	(mm)=	94.08	94.08	94.08
RUNOFF COEFFICIENT	=	0.99	0.57	0.74

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 (26240)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (6210):	1.96	0.588	1.33	69.58
+ ID2= 2 (6240):	0.79	0.412	1.33	86.26
ID = 3 (26240):	2.75	1.000	1.33	74.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(46240)	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 | 0.1390 0.0686
0.0060 0.0042 | 0.1510 0.0822
0.0130 0.0130 | 0.1630 0.0967
0.0200 0.0250 | 0.1730 0.1121
0.0250 0.0320 | 0.1780 0.1202
0.0290 0.0430 | 2.5750 0.1742
0.1260 0.0558 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 26240) 2.750 1.000 1.33 74.37
OUTFLOW: ID= 1 ( 46240) 2.750 0.177 2.00 74.31

PEAK FLOW REDUCTION [Qout/Qin](%)= 17.73
TIME SHIFT OF PEAK FLOW (min)= 40.00
MAXIMUM STORAGE USED (ha.m.)= 0.1192
```

```
-----
| CALIB |
| STANDHYD ( 6220) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 0.92
Total Imp(%)= 40.00 Dir. Conn.(%)= 20.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.37 0.55
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 40.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 124.69
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.90 (ii) 7.36 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.13

*TOTALS*
PEAK FLOW (cms)= 0.10 0.14 0.204 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 93.56 50.56 59.16
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.99 0.54 0.63
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| RESERVOIR( 46220) |
| IN= 2--> OUT= 1 |
| DT= 5.0 min |
-----
OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
0.0000 0.0000 | 0.2590 0.0708
0.0050 0.0089 | 0.2910 0.0871
0.0100 0.0187 | 0.3210 0.1045
0.0130 0.0298 | 0.3720 0.1438
0.0150 0.0422 | 2.8080 0.2087
0.2220 0.0559 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 ( 6220) 0.920 0.204 1.42 59.16
```

```
OUTFLOW: ID= 1 ( 46220) 0.920 0.015 3.00 58.67

PEAK FLOW REDUCTION [Qout/Qin](%)= 7.34
TIME SHIFT OF PEAK FLOW (min)= 95.00
MAXIMUM STORAGE USED (ha.m.)= 0.0420
```

```
-----
| CALIB |
| STANDHYD ( 6230) |
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 0.48
Total Imp(%)= 10.00 Dir. Conn.(%)= 5.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.05 0.43
Dep. Storage (mm)= 0.52 7.16
Average Slope (%)= 2.00 2.00
Length (m)= 20.00 20.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 84.41
over (min)= 5.00 10.00
Storage Coeff. (min)= 0.59 (ii) 5.58 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.16

*TOTALS*
PEAK FLOW (cms)= 0.01 0.08 0.088 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.42
RUNOFF VOLUME (mm)= 93.56 44.35 46.80
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.99 0.47 0.50
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. 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 ( 26200) |
| 1 + 2 = 3 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 ( 46220): 0.92 0.015 3.00 58.67
+ ID2= 2 ( 46240): 2.75 0.177 2.00 74.31
=====
ID = 3 ( 26200): 3.67 0.191 2.00 70.39
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 26200) |
| 3 + 2 = 1 |
-----
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 ( 26200): 3.67 0.191 2.00 70.39
+ ID2= 2 ( 6230): 0.48 0.088 1.42 46.80
=====
ID = 1 ( 26200): 4.15 0.255 1.50 67.66
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTE CHN( 0149) |
| IN= 2--> OUT= 1 |
-----
Routing time step (min)'= 5.00

<----- DATA FOR SECTION ( 1.1) ----->
```

```

Distance      Elevation      Manning
0.00          414.20        0.0350      Main Channel
4.30          412.70        0.0350      Main Channel
8.60          414.20        0.0350      Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH      ELEV      VOLUME      FLOW RATE      VELOCITY      TRAV.TIME
(m)         (m)         (cu.m.)      (cms)          (m/s)         (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 26200) 4.15 0.25 1.50 67.66 0.26 1.22
OUTFLOW: ID= 1 ( 0149) 4.15 0.26 1.58 67.66 0.26 1.22

-----
| CALIB |
| STANDHYD ( 96211) | Area (ha)= 0.61
| ID= 1 DT= 5.0 min | Total Imp(%)= 58.00 Dir. Conn.(%)= 40.00

-----
IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.35 0.26
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 63.77 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 128.44
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.46 (ii) 6.00 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.15

*TOTALS*
PEAK FLOW (cms)= 0.14 0.07 0.179 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 93.08 49.20 66.74
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.99 0.52 0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----
-----
```

```

| ROUTE CHN( 0009)|
| IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

-----
<----- DATA FOR SECTION ( 1.1) ----->
Distance      Elevation      Manning
0.00          414.20        0.0350      Main Channel
4.30          412.70        0.0350      Main Channel
8.60          414.20        0.0350      Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH      ELEV      VOLUME      FLOW RATE      VELOCITY      TRAV.TIME
(m)         (m)         (cu.m.)      (cms)          (m/s)         (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 96211) 0.61 0.18 1.33 66.74 0.23 1.13
OUTFLOW: ID= 1 ( 0009) 0.61 0.17 1.42 66.71 0.23 1.11

-----
| ADD HYD ( 0147)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0149): 4.15 0.256 1.58 67.66
+ ID2= 2 ( 0627): 9.39 1.174 1.58 40.01
=====
ID = 3 ( 0147): 13.54 1.430 1.58 48.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----
| ADD HYD ( 0147)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 0147): 13.54 1.430 1.58 48.49
+ ID2= 2 ( 0009): 0.61 0.169 1.42 66.71
=====
ID = 1 ( 0147): 14.15 1.551 1.58 49.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----
| CALIB |
| STANDHYD ( 9621) | Area (ha)= 16.18
| ID= 1 DT= 5.0 min | Total Imp(%)= 32.00 Dir. Conn.(%)= 20.00

-----
IMPERVIOUS PERVIOUS (i)
```

Surface Area (ha)= 5.18 11.00
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 328.43 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 98.21
over (min)= 5.00 10.00
Storage Coeff. (min)= 3.91 (ii) 9.89 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.25 0.11

PEAK FLOW (cms)= 1.56 2.06 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.50 3.170 (iii)
RUNOFF VOLUME (mm)= 93.08 46.47 1.42
TOTAL RAINFALL (mm)= 94.08 94.08 55.79
RUNOFF COEFFICIENT = 0.99 0.49 94.08 0.59

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8623)
ID= 1 DT= 5.0 min
Area (ha)= 4.69
Total Imp(%)= 100.00
Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.69 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 75.38
over (min)= 5.00 5.00
Storage Coeff. (min)= 0.73 (ii) 0.78 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.34

PEAK FLOW (cms)= 2.67 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.33 2.672 (iii)
RUNOFF VOLUME (mm)= 69.08 42.55 69.08
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.73 0.45 0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8623)
ID= 1 DT= 5.0 min
Area (ha)= 2.05
Total Imp(%)= 100.00
Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.05 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00

Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 118.14
over (min)= 5.00 5.00
Storage Coeff. (min)= 0.73 (ii) 0.78 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.34

PEAK FLOW (cms)= 1.17 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.33 1.168 (iii)
RUNOFF VOLUME (mm)= 69.08 62.38 1.33
TOTAL RAINFALL (mm)= 94.08 94.08 69.08
RUNOFF COEFFICIENT = 0.73 0.66 94.08 0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (9623)
ID= 1 DT= 5.0 min
Area (ha)= 4.42
Total Imp(%)= 48.00
Dir. Conn.(%)= 35.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.12 2.30
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 171.66 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 108.17
over (min)= 5.00 10.00
Storage Coeff. (min)= 2.65 (ii) 8.40 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.29 0.12

PEAK FLOW (cms)= 0.81 0.50 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.50 1.091 (iii)
RUNOFF VOLUME (mm)= 93.08 47.94 63.74
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.99 0.51 0.68

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8624)
ID= 1 DT= 5.0 min
Area (ha)= 4.32
Total Imp(%)= 100.00
Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.32 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 75.38
over (min)= 5.00 5.00

Storage Coeff. (min)= 0.73 (ii) 0.78 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.34

TOTALS
PEAK FLOW (cms)= 2.46 0.00 2.461 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 69.08 42.55 69.08
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.73 0.45 0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (9624)
ID= 1 DT= 5.0 min
Area (ha)= 8.46
Total Imp(%)= 51.00
Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.31 4.15
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 237.49 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 104.69
over (min) 5.00 10.00
Storage Coeff. (min)= 3.22 (ii) 8.05 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.27 0.13

TOTALS
PEAK FLOW (cms)= 1.72 0.89 2.208 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 93.08 47.44 65.70
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.99 0.50 0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0628)
ID= 1 DT= 5.0 min
Area (ha)= 5.35
Total Imp(%)= 60.00
Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 3.21 2.14
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 188.86 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 143.67
over (min) 5.00 10.00
Storage Coeff. (min)= 2.81 (ii) 8.91 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.28 0.12

TOTALS
PEAK FLOW (cms)= 1.12 0.61 1.456 (iii)

TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 93.08 52.30 68.61
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.99 0.56 0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8625)
ID= 1 DT= 5.0 min
Area (ha)= 4.11
Total Imp(%)= 100.00
Dir. Conn.(%)= 100.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.11 0.00
Dep. Storage (mm)= 25.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 20.00 40.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 118.14
over (min) 5.00 5.00
Storage Coeff. (min)= 0.73 (ii) 0.78 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.34

TOTALS
PEAK FLOW (cms)= 2.34 0.00 2.342 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 69.08 62.38 69.08
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.73 0.66 0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (9625)
ID= 1 DT= 5.0 min
Area (ha)= 8.07
Total Imp(%)= 55.00
Dir. Conn.(%)= 40.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.44 3.63
Dep. Storage (mm)= 1.00 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 231.95 30.00
Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 119.74
over (min) 5.00 10.00
Storage Coeff. (min)= 3.17 (ii) 7.84 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.27 0.13

TOTALS
PEAK FLOW (cms)= 1.64 0.89 2.147 (iii)
TIME TO PEAK (hrs)= 1.33 1.50 1.33
RUNOFF VOLUME (mm)= 93.08 49.49 66.93
TOTAL RAINFALL (mm)= 94.08 94.08 94.08
RUNOFF COEFFICIENT = 0.99 0.53 0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. 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 (2621)					
1 + 2 = 3					
	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0628):	5.35	1.456	1.33	68.61	
+ ID2= 2 (8621):	4.69	2.672	1.33	69.08	
=====					
ID = 3 (2621):	10.04	4.128	1.33	68.83	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)					
3 + 2 = 1					
	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 3 (2621):	10.04	4.128	1.33	68.83	
+ ID2= 2 (8623):	2.05	1.168	1.33	69.08	
=====					
ID = 1 (2621):	12.09	5.296	1.33	68.87	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)					
1 + 2 = 3					
	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (2621):	12.09	5.296	1.33	68.87	
+ ID2= 2 (8624):	4.32	2.461	1.33	69.08	
=====					
ID = 3 (2621):	16.41	7.757	1.33	68.93	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)					
3 + 2 = 1					
	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 3 (2621):	16.41	7.757	1.33	68.93	
+ ID2= 2 (8625):	4.11	2.342	1.33	69.08	
=====					
ID = 1 (2621):	20.52	10.099	1.33	68.96	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)					
1 + 2 = 3					
	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (2621):	20.52	10.099	1.33	68.96	
+ ID2= 2 (9621):	16.18	3.170	1.42	55.79	
=====					
ID = 3 (2621):	36.70	12.757	1.33	63.16	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2621):	36.70	12.757	1.33	63.16
+ ID2= 2 (9623):	4.42	1.091	1.33	63.74
=====				
ID = 1 (2621):	41.12	13.848	1.33	63.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (2621):	41.12	13.848	1.33	63.22
+ ID2= 2 (9624):	8.46	2.208	1.33	65.70
=====				
ID = 3 (2621):	49.58	16.056	1.33	63.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)				
3 + 2 = 1				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (2621):	49.58	16.056	1.33	63.64
+ ID2= 2 (9625):	8.07	2.147	1.33	66.93
=====				
ID = 1 (2621):	57.65	18.202	1.33	64.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5621)				
IN= 2--> OUT= 1				
DT= 5.0 min				
OVERFLOW IS OFF				
OUTFLOW		STORAGE	OUTFLOW	STORAGE
(cms)		(ha.m.)	(cms)	(ha.m.)
0.0000		0.0000	1.5000	2.5000
0.0010		0.0000	2.5000	3.0000
0.0100		1.0000	3.0000	3.5000
0.0500		1.5000	4.0000	4.0000
0.5000		2.0000	0.0000	0.0000
		AREA	QPEAK	TPEAK
		(ha)	(cms)	(hrs)
INFLOW : ID= 2 (2621)		57.650	18.202	1.33
OUTFLOW: ID= 1 (5621)		57.650	1.915	2.33
				64.10
				52.02

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.52
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 2.7083

CALIB					
STANDHYD (9622)		Area (ha)= 6.75			
ID= 1 DT= 5.0 min		Total Imp(%)= 44.00		Dir. Conn.(%)= 30.00	
		IMPERVIOUS		PERVIOUS (i)	
Surface Area	(ha)=	2.97		3.78	
Dep. Storage	(mm)=	1.00		1.50	
Average Slope	(%)=	1.00		2.00	
Length	(m)=	212.13		30.00	
Mannings n	=	0.013		0.250	
Max.Eff.Inten.(mm/hr)=		205.33		108.17	
over (min)		5.00		10.00	
Storage Coeff. (min)=		3.01	(ii)	8.76	(ii)
Unit Hyd. Tpeak (min)=		5.00		10.00	

Unit Hyd. peak (cms)= 0.28 0.12

TOTALS

PEAK FLOW (cms)= 1.04 0.81 1.559 (iii)

TIME TO PEAK (hrs)= 1.33 1.50 1.42

RUNOFF VOLUME (mm)= 93.08 47.94 61.48

TOTAL RAINFALL (mm)= 94.08 94.08 94.08

RUNOFF COEFFICIENT = 0.99 0.51 0.65

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 70.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB

STANDHYD (8622)

ID= 1 DT= 5.0 min

Area (ha)= 2.20

Total Imp(%)= 99.99

Dir. Conn.(%)= 99.99

IMPERVIOUS PERVIOUS (i)

Surface Area (ha)= 2.20 0.00

Dep. Storage (mm)= 25.00 1.50

Average Slope (%)= 1.00 2.00

Length (m)= 20.00 40.00

Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 205.33 118.14

over (min)= 5.00 5.00

Storage Coeff. (min)= 0.73 (ii) 0.86 (ii)

Unit Hyd. Tpeak (min)= 5.00 5.00

Unit Hyd. peak (cms)= 0.34 0.34

TOTALS

PEAK FLOW (cms)= 1.25 0.00 1.253 (iii)

TIME TO PEAK (hrs)= 1.33 1.33 1.33

RUNOFF VOLUME (mm)= 69.08 62.38 69.08

TOTAL RAINFALL (mm)= 94.08 94.08 94.08

RUNOFF COEFFICIENT = 0.73 0.66 0.73

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (2622)

1 + 2 = 3

ID1= 1 (8622): 2.20 1.253 1.33 69.08

+ ID2= 2 (9622): 6.75 1.559 1.42 61.48

ID = 3 (2622): 8.95 2.740 1.33 63.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(5622)

IN= 2--> OUT= 1

DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW STORAGE | OUTFLOW STORAGE

(cms) (ha.m.) | (cms) (ha.m.)

0.0000 0.0000 | 0.4500 0.2500

0.0010 0.0000 | 0.6500 0.3200

0.0030 0.1200 | 0.8000 0.4000

0.1000 0.1500 | 0.9800 0.5000

0.3000 0.2000 | 0.0000 0.0000

AREA QPEAK TPEAK R.V.

(ha) (cms) (hrs) (mm)

INFLOW : ID= 2 (2622) 8.950 2.740 1.33 63.35

OUTFLOW: ID= 1 (5622) 8.950 0.637 1.92 62.31

PEAK FLOW REDUCTION [Qout/Qin](%)= 23.23

TIME SHIFT OF PEAK FLOW (min)= 35.00

MAXIMUM STORAGE USED (ha.m.)= 0.3155

ADD HYD (2625)

1 + 2 = 3

ID1= 1 (5621): 57.65 1.915 2.33 52.02

+ ID2= 2 (5622): 8.95 0.637 1.92 62.31

ID = 3 (2625): 66.60 2.491 2.25 53.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0150)

1 + 2 = 3

ID1= 1 (0147): 14.15 1.551 1.58 49.27

+ ID2= 2 (2625): 66.60 2.491 2.25 53.40

ID = 3 (0150): 80.75 3.226 1.92 52.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2620)

1 + 2 = 3

ID1= 1 (0150): 80.75 3.226 1.92 52.68

+ ID2= 2 (2610): 652.20 26.703 2.97 45.59

ID = 3 (2620): 732.95 29.134 2.93 45.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB

NASHYD (0637)

ID= 1 DT= 5.0 min

Area (ha)= 8.42

Ia (mm)= 5.00

U.H. Tp(hrs)= 0.20

Curve Number (CN)= 70.0

of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 1.608

PEAK FLOW (cms)= 1.053 (i)

TIME TO PEAK (hrs)= 1.583

RUNOFF VOLUME (mm)= 40.015

TOTAL RAINFALL (mm)= 94.082

RUNOFF COEFFICIENT = 0.425

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB

NASHYD (0630)

ID= 1 DT= 5.0 min

Area (ha)= 33.04

Ia (mm)= 5.00

U.H. Tp(hrs)= 0.38

Curve Number (CN)= 70.0

of Linear Res.(N)= 3.00

Unit Hyd Qpeak (cms)= 3.321
PEAK FLOW (cms)= 2.939 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 40.085
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.426

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTE CHN(4630)
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .893E+01 0.0 0.17 47.72
0.16 412.86 .357E+02 0.0 0.28 30.06
0.24 412.94 .804E+02 0.1 0.36 22.94
0.32 413.02 .143E+03 0.1 0.44 18.94
0.39 413.09 .223E+03 0.2 0.51 16.32
0.47 413.17 .322E+03 0.4 0.58 14.45
0.55 413.25 .438E+03 0.6 0.64 13.04
0.63 413.33 .572E+03 0.8 0.70 11.93
0.71 413.41 .724E+03 1.1 0.76 11.03
0.79 413.49 .893E+03 1.4 0.81 10.28
0.87 413.57 .108E+04 1.9 0.86 9.65
0.95 413.65 .129E+04 2.4 0.92 9.10
1.03 413.73 .151E+04 2.9 0.97 8.63
1.11 413.81 .175E+04 3.6 1.01 8.22
1.18 413.88 .201E+04 4.3 1.06 7.85
1.26 413.96 .229E+04 5.1 1.11 7.52
1.34 414.04 .258E+04 6.0 1.15 7.22
1.42 414.12 .289E+04 6.9 1.20 6.95
1.50 414.20 .323E+04 8.0 1.24 6.70

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (0630) 33.04 2.94 1.83 40.08 1.03 0.97
OUTFLOW: ID= 1 (4630) 33.04 2.76 2.00 40.08 1.00 0.95

ADD HYD (2637)
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2620): 732.95 29.134 2.93 45.88
+ ID2= 2 (4630): 33.04 2.762 2.00 40.08
=====

ID = 3 (2637): 765.99 30.165 2.87 45.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637)
3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (2637): 765.99 30.165 2.87 45.63

+ ID2= 2 (0637): 8.42 1.053 1.58 40.01
=====

ID = 1 (2637): 774.41 30.304 2.83 45.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0636) | Area (ha)= 3.60 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 0.688

PEAK FLOW (cms)= 0.450 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 40.015
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.425

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (2636)
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2637): 774.41 30.304 2.83 45.56
+ ID2= 2 (0636): 3.60 0.450 1.58 40.01
=====

ID = 3 (2636): 778.01 30.365 2.83 45.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0638) | Area (ha)= 20.63 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 3.940

PEAK FLOW (cms)= 2.580 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 40.015
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.425

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0639) | Area (ha)= 4.47 Curve Number (CN)= 70.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.20

Unit Hyd Qpeak (cms)= 0.854

PEAK FLOW (cms)= 0.559 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 40.015
TOTAL RAINFALL (mm)= 94.082
RUNOFF COEFFICIENT = 0.425

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0100)
ID= 1 DT= 2.0 min
Area (ha)= 136.98
Ia (mm)= 5.00
U.H. Tp(hrs)= 1.17
Curve Number (CN)= 85.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 4.464
PEAK FLOW (cms)= 13.246 (i)
TIME TO PEAK (hrs)= 11.300
RUNOFF VOLUME (mm)= 170.153
TOTAL RAINFALL (mm)= 211.999
RUNOFF COEFFICIENT = 0.803

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0203)
ID= 1 DT= 2.0 min
Area (ha)= 14.60
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.97
Curve Number (CN)= 88.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.575
PEAK FLOW (cms)= 1.537 (i)
TIME TO PEAK (hrs)= 11.133
RUNOFF VOLUME (mm)= 180.756
TOTAL RAINFALL (mm)= 211.999
RUNOFF COEFFICIENT = 0.853

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0203)
ID= 1 DT= 2.0 min
Area (ha)= 8.20
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00
IMPERVIOUS
Surface Area (ha)= 3.69
Dep. Storage (mm)= 2.00
Average Slope (%)= 1.20
Length (m)= 25.00
Mannings n = 0.013
PERVIOUS (i)
4.51
5.00
1.20
25.00
0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 53.00
over (min)= 5.00
Storage Coeff. (min)= 1.36 (ii)
Unit Hyd. Tpeak (min)= 4.00
Unit Hyd. peak (cms)= 0.47
PEAK FLOW (cms)= 0.30
TIME TO PEAK (hrs)= 9.40
RUNOFF VOLUME (mm)= 210.00
TOTAL RAINFALL (mm)= 212.00
RUNOFF COEFFICIENT = 0.99
70.29
10.00
8.50 (ii)
10.00
0.13
0.88
10.00
188.90
212.00
0.86
TOTALS
1.179 (iii)
10.00
188.90
212.00
0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2200)
1 + 2 = 3
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (0201): 14.60 1.537 11.13 180.76
+ ID2= 2 (0203): 8.20 1.179 10.00 188.90
=====

ID = 3 (2200): 22.80 2.381 11.00 183.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0205)
ID= 1 DT= 2.0 min
Area (ha)= 4.80
Ia (mm)= 1.50
U.H. Tp(hrs)= 0.41
Curve Number (CN)= 96.0
of Linear Res.(N)= 3.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.447
PEAK FLOW (cms)= 0.652 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 200.421
TOTAL RAINFALL (mm)= 211.999
RUNOFF COEFFICIENT = 0.945

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0206)
ID= 1 DT= 2.0 min
Area (ha)= 0.20
Total Imp(%)= 45.00
Dir. Conn.(%)= 25.00
IMPERVIOUS
Surface Area (ha)= 0.09
Dep. Storage (mm)= 2.00
Average Slope (%)= 1.20
Length (m)= 25.00
Mannings n = 0.013
PERVIOUS (i)
0.11
5.00
1.20
25.00
0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 53.00
over (min)= 5.00
Storage Coeff. (min)= 1.36 (ii)
Unit Hyd. Tpeak (min)= 4.00
Unit Hyd. peak (cms)= 0.47
PEAK FLOW (cms)= 0.01
TIME TO PEAK (hrs)= 9.33
RUNOFF VOLUME (mm)= 210.00
TOTAL RAINFALL (mm)= 212.00
RUNOFF COEFFICIENT = 0.99
70.29
10.00
8.50 (ii)
10.00
0.13
0.02
10.00
181.86
212.00
0.86
TOTALS
0.029 (iii)
10.00
188.87
212.00
0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 ( 2201)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0205):  AREA   QPEAK   TPEAK   R.V.
                  (ha)   (cms)   (hrs)   (mm)
+ ID2= 2 ( 0206):  4.00  0.652  10.17  200.42
                  0.20  0.029  10.00  188.87
=====
ID = 3 ( 2201):  5.00  0.677  10.13  199.96
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2201)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2201):  AREA   QPEAK   TPEAK   R.V.
                  (ha)   (cms)   (hrs)   (mm)
+ ID2= 2 ( 2200): 22.80  2.381  11.00  183.68
=====
ID = 1 ( 2201): 27.80  2.930  11.00  186.61
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 0209)|
| ID= 1 DT= 2.0 min |
-----
Area (ha)= 2.70
Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.43	2.27
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	35.00	35.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	55.75
over (min)	5.00	12.00
Storage Coeff. (min)=	1.66 (ii)	11.25 (ii)
Unit Hyd. Tpeak (min)=	4.00	12.00
Unit Hyd. peak (cms)=	0.44	0.10

		TOTALS
PEAK FLOW (cms)=	0.03	0.379 (iii)
TIME TO PEAK (hrs)=	9.43	10.00
RUNOFF VOLUME (mm)=	210.00	175.49
TOTAL RAINFALL (mm)=	212.00	212.00
RUNOFF COEFFICIENT =	0.99	0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 0207)|
| ID= 1 DT= 2.0 min |
-----
Area (ha)= 1.30
Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00
```

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.58	0.72
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00

Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	70.29
over (min)	5.00	10.00
Storage Coeff. (min)=	1.36 (ii)	8.50 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.47	0.13

		TOTALS
PEAK FLOW (cms)=	0.05	0.14 0.187 (iii)
TIME TO PEAK (hrs)=	9.37	10.00
RUNOFF VOLUME (mm)=	210.00	181.86 188.89
TOTAL RAINFALL (mm)=	212.00	212.00 212.00
RUNOFF COEFFICIENT =	0.99	0.86 0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 ( 2202)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0207):  AREA   QPEAK   TPEAK   R.V.
                  (ha)   (cms)   (hrs)   (mm)
+ ID2= 2 ( 0209):  2.70  0.379  10.00  178.25
=====
ID = 3 ( 2202):  4.00  0.566  10.00  181.71
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2202)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2202):  AREA   QPEAK   TPEAK   R.V.
                  (ha)   (cms)   (hrs)   (mm)
+ ID2= 2 ( 2201): 27.80  2.930  11.00  186.61
=====
ID = 1 ( 2202): 31.80  3.457  10.00  185.99
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2100)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 0100):  AREA   QPEAK   TPEAK   R.V.
                  (ha)   (cms)   (hrs)   (mm)
+ ID2= 2 ( 2202): 31.80  3.457  10.00  185.99
=====
ID = 3 ( 2100): 168.78 16.204  11.03  173.14
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| NASHYD ( 0302)|
| ID= 1 DT= 2.0 min |
-----
Area (ha)= 2.90 Curve Number (CN)= 88.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.45
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.372 (i)
TIME TO PEAK (hrs)= 10.200
RUNOFF VOLUME (mm)= 180.755
TOTAL RAINFALL (mm)= 211.999
RUNOFF COEFFICIENT = 0.853

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0304) | Area (ha)= 4.40
ID= 1 DT= 2.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.98	2.42
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	70.29
over (min)	5.00	10.00
Storage Coeff. (min)=	1.43 (ii)	8.98 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.46	0.12

TOTALS

PEAK FLOW (cms)=	0.16	0.47	0.632 (iii)
TIME TO PEAK (hrs)=	9.40	10.00	10.00
RUNOFF VOLUME (mm)=	210.00	181.86	188.89
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	0.99	0.86	0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2300) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0302): 2.90 0.372 10.20 180.76
+ ID2= 2 (0304): 4.40 0.632 10.00 188.89
=====

ID = 3 (2300): 7.30 0.987 10.00 185.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0308) | Area (ha)= 0.20
ID= 1 DT= 2.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 25.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.09	0.11
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	1.00
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	70.29
------------------------	-------	-------

over (min)	5.00	10.00
Storage Coeff. (min)=	1.43 (ii)	8.98 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.46	0.12

TOTALS

PEAK FLOW (cms)=	0.01	0.02	0.029 (iii)
TIME TO PEAK (hrs)=	9.33	10.00	10.00
RUNOFF VOLUME (mm)=	210.00	181.86	188.87
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	0.99	0.86	0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0310) | Area (ha)= 5.70
ID= 1 DT= 2.0 min | Total Imp(%)= 16.00 Dir. Conn.(%)= 8.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.91	4.79
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.20	1.20
Length (m)=	25.00	25.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	55.75
over (min)	5.00	10.00
Storage Coeff. (min)=	1.36 (ii)	9.20 (ii)
Unit Hyd. Tpeak (min)=	4.00	10.00
Unit Hyd. peak (cms)=	0.47	0.12

TOTALS

PEAK FLOW (cms)=	0.07	0.74	0.804 (iii)
TIME TO PEAK (hrs)=	9.37	10.00	10.00
RUNOFF VOLUME (mm)=	210.00	175.49	178.25
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	0.99	0.83	0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

***** WARNING: FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2301) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (2300): 7.30 0.987 10.00 185.66
+ ID2= 2 (0308): 0.20 0.029 10.00 188.87
=====

ID = 3 (2301): 7.50 1.016 10.00 185.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ADD HYD ( 2301)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2301): AREA QPEAK TPEAK R.V.
              (ha) (cms) (hrs) (mm)
+ ID2= 2 ( 0310): 7.50 1.016 10.00 185.75
              5.70 0.804 10.00 178.25
=====
ID = 1 ( 2301): 13.20 1.821 10.00 182.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
| ADD HYD ( 2302)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 2100): AREA QPEAK TPEAK R.V.
              (ha) (cms) (hrs) (mm)
+ ID2= 2 ( 2301): 168.78 16.204 11.03 173.14
              13.20 1.821 10.00 182.51
=====
ID = 3 ( 2302): 181.98 17.576 11.00 173.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
| CALIB
| STANDHYD ( 0400)|
| ID= 1 DT= 2.0 min |
-----
Area (ha)= 82.86
Total Imp(%)= 10.00 Dir. Conn.(%)= 3.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 8.29 74.57
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 0.70 2.00
Length (m)= 1437.00 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 53.00 54.48
over (min)= 18.00 28.00
Storage Coeff. (min)= 18.14 (ii) 27.14 (ii)
Unit Hyd. Tpeak (min)= 18.00 28.00
Unit Hyd. peak (cms)= 0.06 0.04

*TOTALS*
PEAK FLOW (cms)= 0.35 9.88 10.218 (iii)
TIME TO PEAK (hrs)= 10.03 10.23 10.23
RUNOFF VOLUME (mm)= 209.99 172.71 173.84
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 0.99 0.81 0.82
```

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| ADD HYD ( 2400)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 2302): AREA QPEAK TPEAK R.V.
              (ha) (cms) (hrs) (mm)
+ ID2= 2 ( 0400): 181.98 17.576 11.00 173.82
              82.86 10.218 10.23 173.84
=====
ID = 3 ( 2400): 264.84 26.422 11.00 173.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
| ROUTE CHN( 4400)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 2.00
-----
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 411.10 0.0550
27.30 410.20 0.0550
77.50 409.10 0.0550
96.60 409.10 0.0550
115.80 408.90 0.0550
124.80 409.10 0.0550
131.00 408.90 0.0550 /0.0350 Main Channel
133.60 408.00 0.0350 Main Channel
134.40 407.60 0.0350 Main Channel
135.00 407.50 0.0350 Main Channel
135.80 407.60 0.0350 Main Channel
136.50 408.00 0.0350 Main Channel
139.40 408.80 0.0350 /0.0550 Main Channel
143.50 408.90 0.0550
148.50 408.70 0.0550
163.80 408.90 0.0550
183.20 408.90 0.0550
243.70 409.70 0.0550
278.70 410.20 0.0550
330.50 411.40 0.0550
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.19 407.69 .366E+03 0.1 0.51 58.83
0.37 407.87 .106E+04 0.5 0.81 37.08
0.56 408.06 .199E+04 1.1 1.00 29.93
0.74 408.24 .328E+04 2.1 1.14 26.32
0.93 408.43 .498E+04 3.6 1.28 23.32
1.11 408.61 .708E+04 5.6 1.43 20.94
1.30 408.80 .105E+05 8.5 1.45 20.61
1.49 408.99 .247E+05 14.8 1.07 27.91
1.68 409.18 .601E+05 30.4 0.91 32.97
1.87 409.37 .109E+06 58.5 0.96 31.05
2.06 409.56 .166E+06 98.3 1.06 28.11
2.25 409.75 .231E+06 150.3 1.17 25.57
2.44 409.94 .303E+06 215.4 1.28 23.46
2.64 410.14 .383E+06 293.8 1.38 21.74
2.83 410.33 .470E+06 390.1 1.49 20.10
3.02 410.52 .563E+06 502.4 1.60 18.66
3.21 410.71 .660E+06 628.8 1.71 17.48
3.40 410.90 .762E+06 769.5 1.81 16.49
3.59 411.09 .868E+06 924.9 1.91 15.65
```

```
<----- hydrograph -----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 2400) 264.84 26.42 11.00 173.82 1.63 0.94
OUTFLOW: ID= 1 ( 4400) 264.84 24.70 11.33 173.82 1.61 0.96
```

```
| CALIB
| NASHYD ( 0515)|
| ID= 1 DT= 5.0 min |
-----
Area (ha)= 5.01 Curve Number (CN)= 80.0
Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.41

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
```

Unit Hyd Qpeak (cms)= 0.467
PEAK FLOW (cms)= 0.616 (i)
TIME TO PEAK (hrs)= 10.167

RUNOFF VOLUME (mm)= 161.698
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.763

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0510) | Area (ha)= 91.44 Curve Number (CN)= 86.0
ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.09

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 3.204

PEAK FLOW (cms)= 9.158 (i)
TIME TO PEAK (hrs)= 11.250
RUNOFF VOLUME (mm)= 175.940
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.830

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTE CHN(4510) |
IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.206E+02	0.0	0.19	101.61
0.16	412.86	.822E+02	0.0	0.30	64.01
0.24	412.94	.185E+03	0.1	0.39	48.85
0.32	413.02	.329E+03	0.1	0.48	40.33
0.39	413.09	.514E+03	0.2	0.55	34.75
0.47	413.17	.740E+03	0.4	0.62	30.77
0.55	413.25	.101E+04	0.6	0.69	27.77
0.63	413.33	.132E+04	0.9	0.75	25.40
0.71	413.41	.166E+04	1.2	0.82	23.48
0.79	413.49	.206E+04	1.6	0.88	21.89
0.87	413.57	.249E+04	2.0	0.93	20.54
0.95	413.65	.296E+04	2.5	0.99	19.39
1.03	413.73	.347E+04	3.1	1.04	18.38
1.11	413.81	.403E+04	3.8	1.10	17.49
1.18	413.88	.462E+04	4.6	1.15	16.71
1.26	413.96	.526E+04	5.5	1.20	16.00
1.34	414.04	.594E+04	6.4	1.25	15.37
1.42	414.12	.666E+04	7.5	1.30	14.79
1.50	414.20	.742E+04	8.7	1.34	14.27

**** WARNING: TRAVEL TIME TABLE EXCEEDED

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0510)	91.44	9.16	11.25	175.94	1.50	1.34
OUTFLOW: ID= 1 (4510)	91.44	9.02	11.42	175.93	1.50	1.34

CALIB
NASHYD (0517) | Area (ha)= 2.14 Curve Number (CN)= 86.0
ID= 1 DT= 5.0 min | Ia (mm)= 1.50 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.32

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.255

PEAK FLOW (cms)= 0.289 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 175.887
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.830

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0511) | Area (ha)= 52.87
ID= 1 DT= 5.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	26.43	26.43
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	593.69	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 53.00 72.31
over (min) 10.00 20.00
Storage Coeff. (min)= 9.59 (ii) 19.48 (ii)
Unit Hyd. Tpeak (min)= 10.00 20.00
Unit Hyd. peak (cms)= 0.11 0.06

		TOTALS
PEAK FLOW (cms)=	2.33	4.99
TIME TO PEAK (hrs)=	10.00	10.08
RUNOFF VOLUME (mm)=	211.20	185.02
TOTAL RAINFALL (mm)=	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.87
		0.91

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0516) | Area (ha)= 10.78
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.85	5.93
Dep. Storage (mm)=	0.80	1.50
Average Slope (%)=	1.00	1.00
Length (m)=	268.08	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 53.00 50.59
over (min) 5.00 20.00
Storage Coeff. (min)= 5.95 (ii) 17.36 (ii)
Unit Hyd. Tpeak (min)= 5.00 20.00

Unit Hyd. peak (cms)= 0.19 0.06
TOTALS
PEAK FLOW (cms)= 0.71 0.79 1.506 (iii)
TIME TO PEAK (hrs)= 10.00 10.00 10.00
RUNOFF VOLUME (mm)= 211.20 175.94 191.81
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.83 0.90

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. 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 (2511)
1 + 2 = 3
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (0511): 52.87 7.311 10.00 192.87
+ ID2= 2 (0516): 10.78 1.506 10.00 191.81
=====

ID = 3 (2511): 63.65 8.818 10.00 192.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2510)
1 + 2 = 3
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (2511): 63.65 8.818 10.00 192.69
+ ID2= 2 (4510): 91.44 9.022 11.42 175.93
=====

ID = 3 (2510): 155.09 15.328 11.00 182.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2510)
3 + 2 = 1
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 3 (2510): 155.09 15.328 11.00 182.81
+ ID2= 2 (0517): 2.14 0.289 10.08 175.89
=====

ID = 1 (2510): 157.23 15.550 11.00 182.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0512)
ID= 1 DT= 5.0 min
Area (ha)= 27.13
Total Imp(%)= 50.00 Dir. Conn.(%)= 30.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 13.56 13.56
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 2.00
Length (m)= 425.28 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 53.00 72.31
over (min) 10.00 20.00
Storage Coeff. (min)= 7.85 (ii) 15.88 (ii)
Unit Hyd. Tpeak (min)= 10.00 20.00
Unit Hyd. peak (cms)= 0.13 0.07

TOTALS
PEAK FLOW (cms)= 1.20 2.62 3.821 (iii)
TIME TO PEAK (hrs)= 10.00 10.00 10.00
RUNOFF VOLUME (mm)= 211.20 185.02 192.87
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.87 0.91

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0513)
ID= 1 DT= 5.0 min
Area (ha)= 6.44
Total Imp(%)= 65.00 Dir. Conn.(%)= 35.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 4.19 2.25
Dep. Storage (mm)= 0.80 1.50
Average Slope (%)= 1.00 1.00
Length (m)= 207.20 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 53.00 96.89
over (min) 5.00 15.00
Storage Coeff. (min)= 5.10 (ii) 13.90 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.21 0.08

TOTALS
PEAK FLOW (cms)= 0.33 0.60 0.927 (iii)
TIME TO PEAK (hrs)= 10.00 10.00 10.00
RUNOFF VOLUME (mm)= 211.20 191.05 198.10
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.90 0.93

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

DUHYD (0512)
Inlet Cap.= 0.732
#of Inlets= 1
Total(cms)= 0.7
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
TOTAL HYD.(ID= 1): 6.44 0.93 10.00 198.10
=====

MAJOR SYS.(ID= 2): 0.23 0.20 10.00 198.10
MINOR SYS.(ID= 3): 6.21 0.73 9.33 198.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2512)
1 + 2 = 3
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (0512): 27.13 3.821 10.00 192.87

```
+ ID2= 2 ( 8512):      6.21   0.732      9.33  198.10
=====
ID = 3 ( 2512):      33.34  4.553      10.00  193.85

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----

| ADD HYD ( 2514)|
| 1 + 2 = 3 |      AREA      QPEAK      TPEAK      R.V.
|              (ha)      (cms)      (hrs)      (mm)
-----
ID1= 1 ( 2510):      157.23  15.550      11.00  182.72
+ ID2= 2 ( 2512):      33.34  4.553      10.00  193.85
=====
ID = 3 ( 2514):      190.57  19.083      11.00  184.67

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----

| ADD HYD ( 2514)|
| 3 + 2 = 1 |      AREA      QPEAK      TPEAK      R.V.
|              (ha)      (cms)      (hrs)      (mm)
-----
ID1= 3 ( 2514):      190.57  19.083      11.00  184.67
+ ID2= 2 ( 0515):       5.01  0.616      10.17  161.70
=====
ID = 1 ( 2514):      195.58  19.594      11.00  184.08

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----

| CALIB
| NASHYD ( 0518)| Area (ha)= 6.68 Curve Number (CN)= 86.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 0.20
-----

NOTE:  RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
```

```
Unit Hyd Qpeak (cms)= 1.276

PEAK FLOW (cms)= 0.930 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 172.207
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.812

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
-----
```

```
| ADD HYD ( 2513)|
| 1 + 2 = 3 |      AREA      QPEAK      TPEAK      R.V.
|              (ha)      (cms)      (hrs)      (mm)
-----
ID1= 1 ( 2514):      195.58  19.594      11.00  184.08
+ ID2= 2 ( 4400):      264.84  24.698      11.33  173.82
=====
ID = 3 ( 2513):      460.42  43.555      11.00  178.18

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----
```

```
| ADD HYD ( 2513)|
| 3 + 2 = 1 |      AREA      QPEAK      TPEAK      R.V.
|              (ha)      (cms)      (hrs)      (mm)
-----
ID1= 3 ( 2513):      460.42  43.555      11.00  178.18
+ ID2= 2 ( 0518):       6.68  0.930      10.00  172.21
=====
```

```
ID = 1 ( 2513):      467.10  44.235      11.00  178.09

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----

| CALIB
| NASHYD ( 0520)| Area (ha)= 108.36 Curve Number (CN)= 86.0
| ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= 1.20
-----

NOTE:  RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 3.449

PEAK FLOW (cms)= 10.463 (i)
TIME TO PEAK (hrs)= 11.333
RUNOFF VOLUME (mm)= 172.534
TOTAL RAINFALL (mm)= 211.999
RUNOFF COEFFICIENT = 0.814

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
-----
```

```
| ADD HYD ( 2520)|
| 1 + 2 = 3 |      AREA      QPEAK      TPEAK      R.V.
|              (ha)      (cms)      (hrs)      (mm)
-----
ID1= 1 ( 2513):      467.10  44.235      11.00  178.09
+ ID2= 2 ( 0520):      108.36  10.463      11.33  172.53
=====
ID = 3 ( 2520):      575.46  54.354      11.00  177.05

NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-----

| ROUTE CHN( 4500)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 2.00
-----
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 409.70 0.0550
19.70 408.80 0.0550
41.70 407.20 0.0550
60.50 405.30 0.0550
80.00 404.50 0.0550
95.70 404.60 0.0550 /0.0350 Main Channel
98.60 403.40 0.0350 Main Channel
100.40 403.40 0.0350 Main Channel
100.80 402.90 0.0350 Main Channel
101.50 402.70 0.0350 Main Channel
102.30 402.80 0.0350 Main Channel
103.30 403.20 0.0350 Main Channel
104.00 403.20 0.0350 Main Channel
105.60 404.40 0.0350 /0.0550 Main Channel
109.70 404.30 0.0550
128.60 404.20 0.0550
154.10 405.40 0.0550
179.10 406.70 0.0550
201.90 408.60 0.0550
224.20 410.60 0.0550
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.34 403.04 .954E+03 0.3 0.70 47.40
0.68 403.38 .304E+04 1.6 1.03 32.27
1.02 403.72 .718E+04 4.5 1.25 26.57
1.36 404.06 .122E+05 9.7 1.58 20.96
```

1.70	404.40	.251E+05	18.1	1.44	23.04
2.08	404.78	.650E+05	42.3	1.29	25.62
2.46	405.16	.122E+06	86.3	1.40	23.62
2.84	405.54	.192E+06	151.6	1.57	21.10
3.21	405.91	.270E+06	238.3	1.75	18.90
3.59	406.29	.357E+06	345.8	1.93	17.20
3.97	406.67	.452E+06	474.9	2.09	15.85
4.35	407.05	.554E+06	631.1	2.26	14.63
4.73	407.43	.663E+06	807.8	2.42	13.67
5.11	407.81	.779E+06	1006.4	2.57	12.89
5.49	408.19	.902E+06	1229.0	2.71	12.23
5.86	408.56	.103E+07	1476.4	2.84	11.66
6.24	408.94	.117E+07	1745.6	2.96	11.18
6.62	409.32	.132E+07	2034.5	3.07	10.79
7.00	409.70	.147E+07	2353.2	3.17	10.44

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (2520)	575.46	54.35	11.00	177.05	2.18	1.32
OUTFLOW: ID= 1 (4500)	575.46	51.49	11.30	177.04	2.16	1.31

CALIB	
NASHYD (0610)	Area (ha)= 78.05 Curve Number (CN)= 86.0
ID= 1 DT= 2.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.00

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 2.981

PEAK FLOW (cms)= 8.022 (i)
 TIME TO PEAK (hrs)= 11.167
 RUNOFF VOLUME (mm)= 172.534
 TOTAL RAINFALL (mm)= 211.999
 RUNOFF COEFFICIENT = 0.814

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (2610)				
1 + 2 = 3				
	AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)			
ID1= 1 (4500):	575.46 51.492 11.30 177.04			
+ ID2= 2 (0610):	78.05 8.022 11.17 172.53			
=====				
ID = 3 (2610):	653.51 59.472 11.27 176.51			

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
NASHYD (0627)	Area (ha)= 9.39 Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.20

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 1.793

PEAK FLOW (cms)= 1.298 (i)

TIME TO PEAK (hrs)= 10.000
 RUNOFF VOLUME (mm)= 169.831
 TOTAL RAINFALL (mm)= 212.000
 RUNOFF COEFFICIENT = 0.801

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (6240)	Area (ha)= 0.79
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 70.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.71	0.08
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	20.00	20.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	158.23
over (min)	5.00	5.00
Storage Coeff. (min)=	1.02 (ii)	3.77 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.34	0.25

TOTALS

PEAK FLOW (cms)=	0.08	0.03	0.116 (iii)
TIME TO PEAK (hrs)=	9.33	10.00	10.00
RUNOFF VOLUME (mm)=	211.48	198.67	207.64
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.94	0.98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 88.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (6210)	Area (ha)= 1.96
ID= 1 DT= 5.0 min	Total Imp(%)= 60.00 Dir. Conn.(%)= 40.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.18	0.78
Dep. Storage (mm)=	0.52	7.16
Average Slope (%)=	2.00	2.00
Length (m)=	40.00	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	78.11
over (min)	5.00	10.00
Storage Coeff. (min)=	1.54 (ii)	9.33 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.33	0.12

TOTALS

PEAK FLOW (cms)=	0.12	0.17	0.285 (iii)
TIME TO PEAK (hrs)=	9.50	10.00	10.00
RUNOFF VOLUME (mm)=	211.48	186.45	196.46
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.88	0.93

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. 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 ( 26240)|
| 1 + 2 = 3 |
-----
| ID1= 1 ( 6210): 1.96 0.285 10.00 196.46
+ ID2= 2 ( 6240): 0.79 0.116 10.00 207.64
=====
ID = 3 ( 26240): 2.75 0.401 10.00 199.67
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 6220)|
| ID= 1 DT= 5.0 min |
-----
| IMPERVIOUS PERVIOUS (i)
| Area (ha)= 0.92
| Total Imp(%)= 40.00 Dir. Conn.(%)= 20.00
|
| Surface Area (ha)= 0.37 0.55
| Dep. Storage (mm)= 0.52 7.16
| Average Slope (%)= 2.00 2.00
| Length (m)= 40.00 40.00
| Mannings n = 0.013 0.250
-----
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)= 53.00 69.15
over (min) 5.00 10.00
Storage Coeff. (min)= 1.54 (ii) 9.72 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.33 0.11

PEAK FLOW (cms)= 0.03 0.11 *TOTALS*
TIME TO PEAK (hrs)= 9.42 10.00 0.133 (iii)
RUNOFF VOLUME (mm)= 211.48 183.55 189.13
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.87 0.89
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 6230)|
| ID= 1 DT= 5.0 min |
-----
| IMPERVIOUS PERVIOUS (i)
| Area (ha)= 0.48
| Total Imp(%)= 10.00 Dir. Conn.(%)= 5.00
|
| Surface Area (ha)= 0.05 0.43
| Dep. Storage (mm)= 0.52 7.16
| Average Slope (%)= 2.00 2.00
| Length (m)= 20.00 20.00
-----
```

Mannings n = 0.013 0.250

```
NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
Max.Eff.Inten.(mm/hr)= 53.00 54.14
over (min) 5.00 10.00
Storage Coeff. (min)= 1.02 (ii) 6.97 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.14

PEAK FLOW (cms)= 0.00 0.06 *TOTALS*
TIME TO PEAK (hrs)= 9.25 10.00 0.068 (iii)
RUNOFF VOLUME (mm)= 211.48 176.93 178.64
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.83 0.84
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 Ia = Dep. 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 ( 0004)|
| 1 + 2 = 3 |
-----
| ID1= 1 ( 26240): 2.75 0.401 10.00 199.67
+ ID2= 2 ( 6220): 0.92 0.133 10.00 189.13
=====
ID = 3 ( 0004): 3.67 0.534 10.00 197.03
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0004)|
| 3 + 2 = 1 |
-----
| ID1= 3 ( 0004): 3.67 0.534 10.00 197.03
+ ID2= 2 ( 6230): 0.48 0.068 10.00 178.64
=====
ID = 1 ( 0004): 4.15 0.602 10.00 194.90
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ROUTE CHN( 4620)|
| IN= 2---> OUT= 1 |
-----
Routing time step (min)'= 2.00
```

```
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel
```

```
<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
```

0.71	413.41	.369E+03	3.5	2.39	1.78
0.79	413.49	.456E+03	4.6	2.56	1.66
0.87	413.57	.551E+03	5.9	2.73	1.56
0.95	413.65	.656E+03	7.4	2.89	1.47
1.03	413.73	.770E+03	9.2	3.05	1.39
1.11	413.81	.893E+03	11.2	3.21	1.32
1.18	413.88	.103E+04	13.5	3.36	1.27
1.26	413.96	.117E+04	16.0	3.51	1.21
1.34	414.04	.132E+04	18.9	3.65	1.16
1.42	414.12	.148E+04	22.0	3.79	1.12
1.50	414.20	.165E+04	25.4	3.93	1.08

<---- hydrograph ----> <-pipe / channel->

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0004)	4.15	0.60	10.00	194.90	0.37	1.52
OUTFLOW: ID= 1 (4620)	4.15	0.60	10.00	194.89	0.36	1.52

CALIB
STANDHYD (8623)
ID= 1 DT= 2.0 min

Area (ha)= 2.05
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	2.05	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	20.00	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	50.33
over (min)	5.00	2.00
Storage Coeff. (min)=	1.25 (ii)	1.34 (ii)
Unit Hyd. Tpeak (min)=	4.00	2.00
Unit Hyd. peak (cms)=	0.48	0.66
TOTALS		
PEAK FLOW (cms)=	0.30	0.00
TIME TO PEAK (hrs)=	9.37	10.00
RUNOFF VOLUME (mm)=	187.00	173.54
TOTAL RAINFALL (mm)=	212.00	212.00
RUNOFF COEFFICIENT =	0.88	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8621)
ID= 1 DT= 2.0 min

Area (ha)= 4.69
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.69	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	20.00	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	50.33
over (min)	5.00	2.00
Storage Coeff. (min)=	1.25 (ii)	1.34 (ii)
Unit Hyd. Tpeak (min)=	4.00	2.00
Unit Hyd. peak (cms)=	0.48	0.66
TOTALS		
PEAK FLOW (cms)=	0.69	0.00
TIME TO PEAK (hrs)=	9.37	10.00
RUNOFF VOLUME (mm)=	187.00	173.54
TOTAL RAINFALL (mm)=	212.00	212.00
RUNOFF COEFFICIENT =	0.88	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (8624)
ID= 1 DT= 2.0 min

Area (ha)= 4.32
Total Imp(%)= 100.00 Dir. Conn.(%)= 100.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.32	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	20.00	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	50.33
over (min)	5.00	2.00
Storage Coeff. (min)=	1.25 (ii)	1.34 (ii)
Unit Hyd. Tpeak (min)=	4.00	2.00
Unit Hyd. peak (cms)=	0.48	0.66
TOTALS		
PEAK FLOW (cms)=	0.64	0.00
TIME TO PEAK (hrs)=	9.40	10.00
RUNOFF VOLUME (mm)=	187.00	173.54
TOTAL RAINFALL (mm)=	212.00	212.00
RUNOFF COEFFICIENT =	0.88	0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (9621)
ID= 1 DT= 5.0 min

Area (ha)= 16.18
Total Imp(%)= 32.00 Dir. Conn.(%)= 20.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	5.18	11.00
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	328.43	30.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	59.86	
over (min)	5.00	15.00	
Storage Coeff. (min)=	6.72 (ii)	14.01 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.18	0.08	
			TOTALS
PEAK FLOW (cms)=	0.48	1.79	2.264 (iii)
TIME TO PEAK (hrs)=	10.00	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	175.55	182.64
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.83	0.86

***** WARNING: FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (8625)	Area (ha)= 4.11		
ID= 1 DT= 2.0 min	Total Imp(%)= 100.00	Dir. Conn.(%)= 100.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.11	0.00
Dep. Storage (mm)=	25.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	20.00	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	50.33	
over (min)	5.00	2.00	
Storage Coeff. (min)=	1.25 (ii)	1.34 (ii)	
Unit Hyd. Tpeak (min)=	4.00	2.00	
Unit Hyd. peak (cms)=	0.48	0.66	
			TOTALS
PEAK FLOW (cms)=	0.61	0.00	0.605 (iii)
TIME TO PEAK (hrs)=	9.37	10.00	9.97
RUNOFF VOLUME (mm)=	187.00	173.54	186.99
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	0.88	0.82	0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (9625)	Area (ha)= 8.07		
ID= 1 DT= 5.0 min	Total Imp(%)= 55.00	Dir. Conn.(%)= 40.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.44	3.63
Dep. Storage (mm)=	1.00	5.00

Average Slope (%)=	1.00	2.00
Length (m)=	231.95	30.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	68.37	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.46 (ii)	12.37 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.20	0.08	
			TOTALS
PEAK FLOW (cms)=	0.48	0.68	1.155 (iii)
TIME TO PEAK (hrs)=	10.00	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	179.30	191.98
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.85	0.91

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0628)	Area (ha)= 5.35		
ID= 1 DT= 5.0 min	Total Imp(%)= 60.00	Dir. Conn.(%)= 40.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.21	2.14
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	188.86	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)=	53.00	77.38	
over (min)	5.00	15.00	
Storage Coeff. (min)=	4.82 (ii)	12.64 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.22	0.08	
			TOTALS
PEAK FLOW (cms)=	0.32	0.45	0.768 (iii)
TIME TO PEAK (hrs)=	10.00	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	182.53	193.92
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.86	0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (9624)	Area (ha)= 8.46		
ID= 1 DT= 5.0 min	Total Imp(%)= 51.00	Dir. Conn.(%)= 40.00	

	IMPERVIOUS	PERVIOUS (i)
--	------------	--------------

Surface Area (ha)= 4.31 4.15
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 237.49 30.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 53.00 62.46
over (min)= 5.00 15.00
Storage Coeff. (min)= 5.53 (ii) 12.70 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.20 0.08

PEAK FLOW (cms)= 0.50 0.71 1.205 (iii)
TIME TO PEAK (hrs)= 10.00 10.00 10.00
RUNOFF VOLUME (mm)= 211.00 176.79 190.47
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.83 0.90

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (9623)
ID= 1 DT= 5.0 min
Area (ha)= 4.42
Total Imp(%)= 48.00
Dir. Conn.(%)= 35.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 2.12 2.30
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 171.66 30.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 53.00 63.85
over (min)= 5.00 15.00
Storage Coeff. (min)= 4.55 (ii) 11.66 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.23 0.09

PEAK FLOW (cms)= 0.23 0.40 0.630 (iii)
TIME TO PEAK (hrs)= 10.00 10.00 10.00
RUNOFF VOLUME (mm)= 211.00 177.41 189.17
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.84 0.89

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (2621)
1 + 2 = 3
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)

ID1= 1 (0628): 5.35 0.768 10.00 193.92
+ ID2= 2 (8621): 4.69 0.690 9.97 187.00
=====

ID = 3 (2621): 10.04 1.459 10.00 190.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
3 + 2 = 1
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 3 (2621): 10.04 1.459 10.00 190.68
+ ID2= 2 (8623): 2.05 0.302 9.97 187.00
=====

ID = 1 (2621): 12.09 1.760 10.00 190.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
1 + 2 = 3
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (2621): 12.09 1.760 10.00 190.06
+ ID2= 2 (8624): 4.32 0.636 9.97 187.00
=====

ID = 3 (2621): 16.41 2.396 10.00 189.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
3 + 2 = 1
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 3 (2621): 16.41 2.396 10.00 189.25
+ ID2= 2 (8625): 4.11 0.605 9.97 186.99
=====

ID = 1 (2621): 20.52 3.001 10.00 188.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
1 + 2 = 3
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 1 (2621): 20.52 3.001 10.00 188.80
+ ID2= 2 (9621): 16.18 2.264 10.00 182.64
=====

ID = 3 (2621): 36.70 5.265 10.00 186.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
3 + 2 = 1
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)
ID1= 3 (2621): 36.70 5.265 10.00 186.08
+ ID2= 2 (9623): 4.42 0.630 10.00 189.17
=====

ID = 1 (2621): 41.12 5.895 10.00 186.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2621)
1 + 2 = 3
AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)

```
-----
              (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2621): 41.12  5.895  10.00  186.42
+ ID2= 2 ( 9624):  8.46  1.205  10.00  190.47
=====
ID = 3 ( 2621): 49.58  7.101  10.00  187.11
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 2621)|
| 3 + 2 = 1 |
-----
              AREA   QPEAK   TPEAK   R.V.
              (ha)   (cms)   (hrs)   (mm)
ID1= 3 ( 2621): 49.58  7.101  10.00  187.11
+ ID2= 2 ( 9625):  8.07  1.155  10.00  191.98
=====
ID = 1 ( 2621): 57.65  8.256  10.00  187.79
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 9622)|
| ID= 1 DT= 5.0 min |
-----
              IMPERVIOUS   PERVIOUS (i)
              Area (ha)= 6.75
              Total Imp(%)= 44.00   Dir. Conn.(%)= 30.00

Surface Area (ha)= 2.97   3.78
Dep. Storage (mm)= 1.00   5.00
Average Slope (%)= 1.00   2.00
Length (m)= 212.13   30.00
Mannings n = 0.013   0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)= 53.00   63.85
over (min)= 5.00   15.00
Storage Coeff. (min)= 5.17 (ii) 12.28 (ii)
Unit Hyd. Tpeak (min)= 5.00   15.00
Unit Hyd. peak (cms)= 0.21   0.09

*TOTALS*
PEAK FLOW (cms)= 0.30   0.66   0.959 (iii)
TIME TO PEAK (hrs)= 10.00   10.00   10.00
RUNOFF VOLUME (mm)= 211.00   177.41   187.49
TOTAL RAINFALL (mm)= 212.00   212.00   212.00
RUNOFF COEFFICIENT = 1.00   0.84   0.88
```

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| CALIB
| STANDHYD ( 8622)|
| ID= 1 DT= 2.0 min |
-----
              AREA   IMPERVIOUS   PERVIOUS (i)
              (ha)= 2.20   0.00
              Total Imp(%)= 99.99   Dir. Conn.(%)= 99.99

Surface Area (ha)= 2.20   0.00
Dep. Storage (mm)= 25.00   1.50
Average Slope (%)= 1.00   2.00
Length (m)= 20.00   40.00
Mannings n = 0.013   0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)= 53.00   50.33
over (min)= 5.00   2.00
Storage Coeff. (min)= 1.25 (ii) 1.48 (ii)
Unit Hyd. Tpeak (min)= 4.00   2.00
Unit Hyd. peak (cms)= 0.48   0.63

*TOTALS*
PEAK FLOW (cms)= 0.32   0.00   0.324 (iii)
TIME TO PEAK (hrs)= 9.37   10.00   9.97
RUNOFF VOLUME (mm)= 187.00   173.54   187.00
TOTAL RAINFALL (mm)= 212.00   212.00   212.00
RUNOFF COEFFICIENT = 0.88   0.82   0.88
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
| ADD HYD ( 2622)|
| 1 + 2 = 3 |
-----
              AREA   QPEAK   TPEAK   R.V.
              (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 8622): 2.20  0.324  9.97  187.00
+ ID2= 2 ( 9622): 6.75  0.959  10.00  187.49
=====
ID = 3 ( 2622): 8.95  1.282  10.00  187.37
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| ADD HYD ( 0118)|
| 1 + 2 = 3 |
-----
              AREA   QPEAK   TPEAK   R.V.
              (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 2621): 57.65  8.256  10.00  187.79
+ ID2= 2 ( 2622): 8.95  1.282  10.00  187.37
=====
ID = 3 ( 0118): 66.60  9.538  10.00  187.73
-----
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
| CALIB
| STANDHYD ( 96211)|
| ID= 1 DT= 2.0 min |
-----
              Area (ha)= 0.61
              Total Imp(%)= 58.00   Dir. Conn.(%)= 40.00

              IMPERVIOUS   PERVIOUS (i)
Surface Area (ha)= 0.35   0.26
Dep. Storage (mm)= 1.00   5.00
Average Slope (%)= 1.00   2.00
Length (m)= 63.77   30.00
Mannings n = 0.013   0.250
```

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

```
Max.Eff.Inten.(mm/hr)= 53.00   73.52
over (min)= 5.00   12.00
Storage Coeff. (min)= 2.51 (ii) 10.32 (ii)
Unit Hyd. Tpeak (min)= 4.00   12.00
Unit Hyd. peak (cms)= 0.37   0.10

*TOTALS*
PEAK FLOW (cms)= 0.04   0.05   0.088 (iii)
TIME TO PEAK (hrs)= 9.60   10.00   10.00
RUNOFF VOLUME (mm)= 211.00   181.23   193.13
```

TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.85 0.91

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ROUTE CHN(0009)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 414.20 0.0350 Main Channel
4.30 412.70 0.0350 Main Channel
8.60 414.20 0.0350 Main Channel

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.08 412.78 .456E+01 0.0 0.55 7.70
0.16 412.86 .182E+02 0.1 0.88 4.85
0.24 412.94 .410E+02 0.2 1.15 3.70
0.32 413.02 .729E+02 0.4 1.39 3.05
0.39 413.09 .114E+03 0.7 1.61 2.63
0.47 413.17 .164E+03 1.2 1.82 2.33
0.55 413.25 .223E+03 1.8 2.02 2.10
0.63 413.33 .292E+03 2.5 2.21 1.92
0.71 413.41 .369E+03 3.5 2.39 1.78
0.79 413.49 .456E+03 4.6 2.56 1.66
0.87 413.57 .551E+03 5.9 2.73 1.56
0.95 413.65 .656E+03 7.4 2.89 1.47
1.03 413.73 .770E+03 9.2 3.05 1.39
1.11 413.81 .893E+03 11.2 3.21 1.32
1.18 413.88 .103E+04 13.5 3.36 1.27
1.26 413.96 .117E+04 16.0 3.51 1.21
1.34 414.04 .132E+04 18.9 3.65 1.16
1.42 414.12 .148E+04 22.0 3.79 1.12
1.50 414.20 .165E+04 25.4 3.93 1.08

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 (96211) 0.61 0.09 10.00 193.13 0.17 0.92
OUTFLOW: ID= 1 (0009) 0.61 0.09 10.00 193.10 0.17 0.92

| ADD HYD (0117)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0118): 66.60 9.538 10.00 187.73
+ ID2= 2 (4620): 4.15 0.602 10.00 194.89
=====

ID = 3 (0117): 70.75 9.684 10.00 190.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0117)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 3 (0117): 70.75 9.684 10.00 190.44

+ ID2= 2 (0627): 9.39 1.298 10.00 169.83
=====

ID = 1 (0117): 80.14 10.982 10.00 188.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0117)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0117): 80.14 10.982 10.00 188.02
+ ID2= 2 (0009): 0.61 0.088 10.00 193.10
=====

ID = 3 (0117): 80.75 11.069 10.00 188.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0116)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0117): 80.75 11.069 10.00 188.06
+ ID2= 2 (2610): 653.51 59.472 11.27 176.51
=====

ID = 3 (0116): 734.26 66.283 11.00 177.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB
| NASHYD (0637)| Area (ha)= 8.36 Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.47

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.679

PEAK FLOW (cms)= 1.035 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 170.144
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.803

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB
| NASHYD (0630)| Area (ha)= 33.04 Curve Number (CN)= 85.0
ID= 1 DT= 2.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.38

NOTE: RAINFALL WAS TRANSFORMED TO 2.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 3.321

PEAK FLOW (cms)= 4.294 (i)
TIME TO PEAK (hrs)= 10.133
RUNOFF VOLUME (mm)= 170.152
TOTAL RAINFALL (mm)= 211.999
RUNOFF COEFFICIENT = 0.803

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ROUTE CHN(4630)|
IN= 2---> OUT= 1 |

Routing time step (min)'= 2.00

<----- DATA FOR SECTION (1.1) ----->

Distance	Elevation	Manning	
0.00	414.20	0.0350	Main Channel
4.30	412.70	0.0350	Main Channel
8.60	414.20	0.0350	Main Channel

<----- TRAVEL TIME TABLE ----->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.08	412.78	.893E+01	0.0	0.17	47.72
0.16	412.86	.357E+02	0.0	0.28	30.06
0.24	412.94	.804E+02	0.1	0.36	22.94
0.32	413.02	.143E+03	0.1	0.44	18.94
0.39	413.09	.223E+03	0.2	0.51	16.32
0.47	413.17	.322E+03	0.4	0.58	14.45
0.55	413.25	.438E+03	0.6	0.64	13.04
0.63	413.33	.572E+03	0.8	0.70	11.93
0.71	413.41	.724E+03	1.1	0.76	11.03
0.79	413.49	.893E+03	1.4	0.81	10.28
0.87	413.57	.108E+04	1.9	0.86	9.65
0.95	413.65	.129E+04	2.4	0.92	9.10
1.03	413.73	.151E+04	2.9	0.97	8.63
1.11	413.81	.175E+04	3.6	1.01	8.22
1.18	413.88	.201E+04	4.3	1.06	7.85
1.26	413.96	.229E+04	5.1	1.11	7.52
1.34	414.04	.258E+04	6.0	1.15	7.22
1.42	414.12	.289E+04	6.9	1.20	6.95
1.50	414.20	.323E+04	8.0	1.24	6.70

<---- hydrograph ---->

<-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0630)	33.04	4.29	10.13	170.15	1.19	1.06
OUTFLOW: ID= 1 (4630)	33.04	4.22	10.23	170.14	1.18	1.06

ADD HYD (2637)|
1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0116):	734.26	66.283	11.00	177.78
+ ID2= 2 (4630):	33.04	4.224	10.23	170.14
=====				
ID = 3 (2637):	767.30	69.804	11.00	177.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (2637)|
3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (2637):	767.30	69.804	11.00	177.45
+ ID2= 2 (0637):	8.36	1.035	10.25	170.14
=====				
ID = 1 (2637):	775.66	70.699	11.00	177.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0636)|
ID= 1 DT= 5.0 min |

Area	(ha)=	Curve Number	(CN)=
Ia	(mm)=	5.00	# of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.48

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.264

PEAK FLOW (cms)= 0.409 (i)

TIME TO PEAK (hrs)= 10.250

RUNOFF VOLUME (mm)= 170.145

TOTAL RAINFALL (mm)= 212.000

RUNOFF COEFFICIENT = 0.803

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (2636)|
1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (2637):	775.66	70.699	11.00	177.37
+ ID2= 2 (0636):	3.32	0.409	10.25	170.14
=====				
ID = 3 (2636):	778.98	71.055	11.00	177.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0638)|
ID= 1 DT= 5.0 min |

Area	(ha)=	Curve Number	(CN)=
Ia <th>(mm)=</th> <td>5.00</td> <td># of Linear Res.(N)= 3.00</td>	(mm)=	5.00	# of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.46

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 1.713

PEAK FLOW (cms)= 2.567 (i)

TIME TO PEAK (hrs)= 10.167

RUNOFF VOLUME (mm)= 170.143

TOTAL RAINFALL (mm)= 212.000

RUNOFF COEFFICIENT = 0.803

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0639)|
ID= 1 DT= 5.0 min |

Area	(ha)=	Curve Number	(CN)=
Ia <th>(mm)=</th> <td>5.00</td> <td># of Linear Res.(N)= 3.00</td>	(mm)=	5.00	# of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.43

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Unit Hyd Qpeak (cms)= 0.409

PEAK FLOW (cms)= 0.582 (i)

TIME TO PEAK (hrs)= 10.167

RUNOFF VOLUME (mm)= 170.139

TOTAL RAINFALL (mm)= 212.000

RUNOFF COEFFICIENT = 0.803

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
| ADD HYD ( 2630)|
| 1 + 2 = 3 |
-----
ID1= 1 ( 2630): 778.98 71.055 11.00 177.34
+ ID2= 2 ( 0638): 20.63 2.567 10.17 170.14
=====
ID = 3 ( 2630): 799.61 73.257 11.00 177.15
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

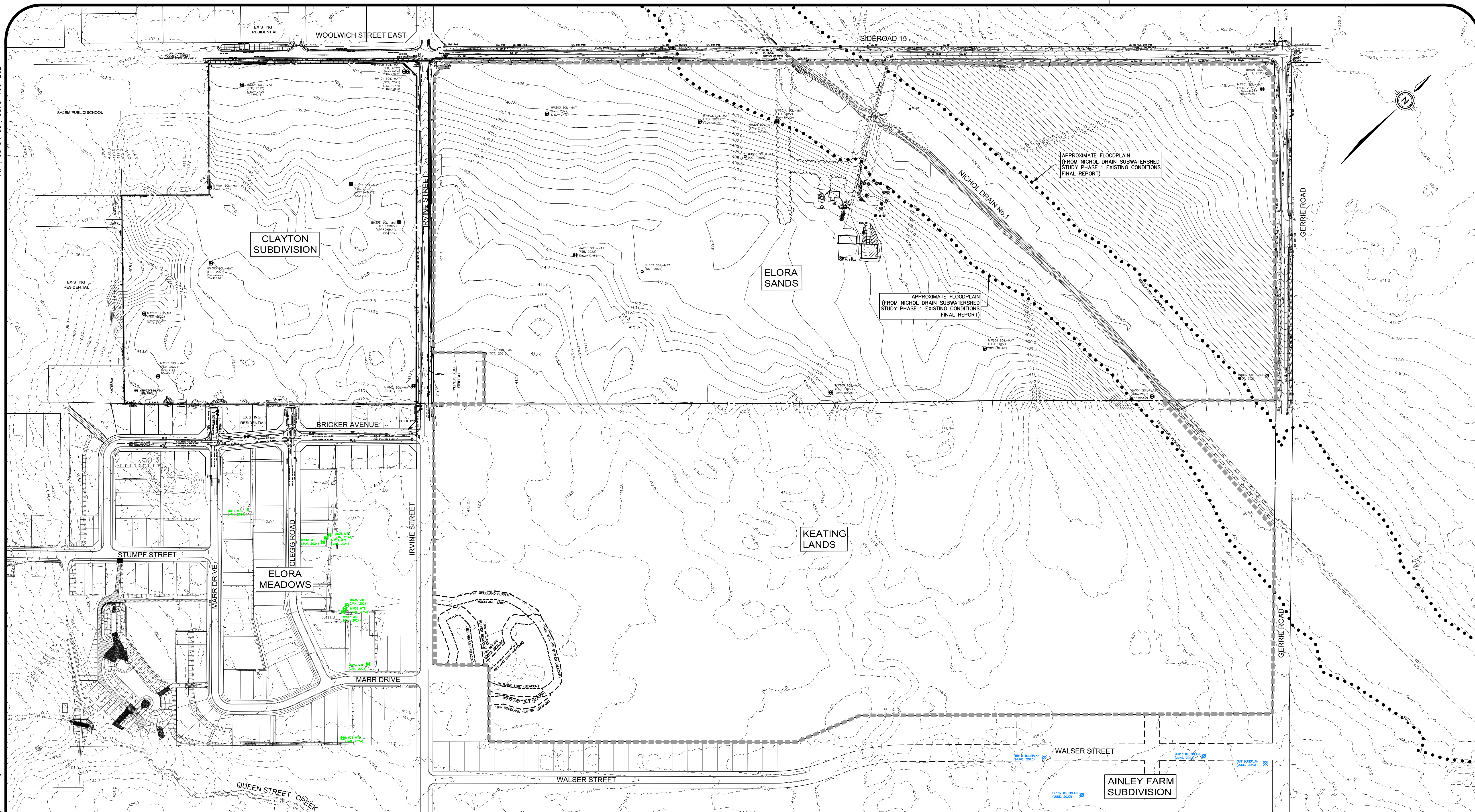
```
| ADD HYD ( 2630)|
| 3 + 2 = 1 |
-----
ID1= 3 ( 2630): 799.61 73.257 11.00 177.15
+ ID2= 2 ( 0639): 4.60 0.582 10.17 170.14
=====
ID = 1 ( 2630): 804.21 73.744 11.00 177.11
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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=====
=====
```


Drawings



PROPERTY BOUNDARY
SUBJECT LANDS
EXISTING CONTOURS
GRCA CONTOURS
EXISTING FENCE
EXISTING EMBANKMENT
(SLOPE AS NOTED)
APPROXIMATE
FLOODPLAIN LIMIT
(FROM NDSS)

 MW SOIL-MAT
(FEB. 2022)
Elev. = 407.34
TC = 408.26
 BH SOIL-MAT
(OCT. 2021)
 APPROXIMATE
MW MTE
(JAN. 2024)
 APPROXIMATE
BH BLUEPLAN
(JUNE, 2023)

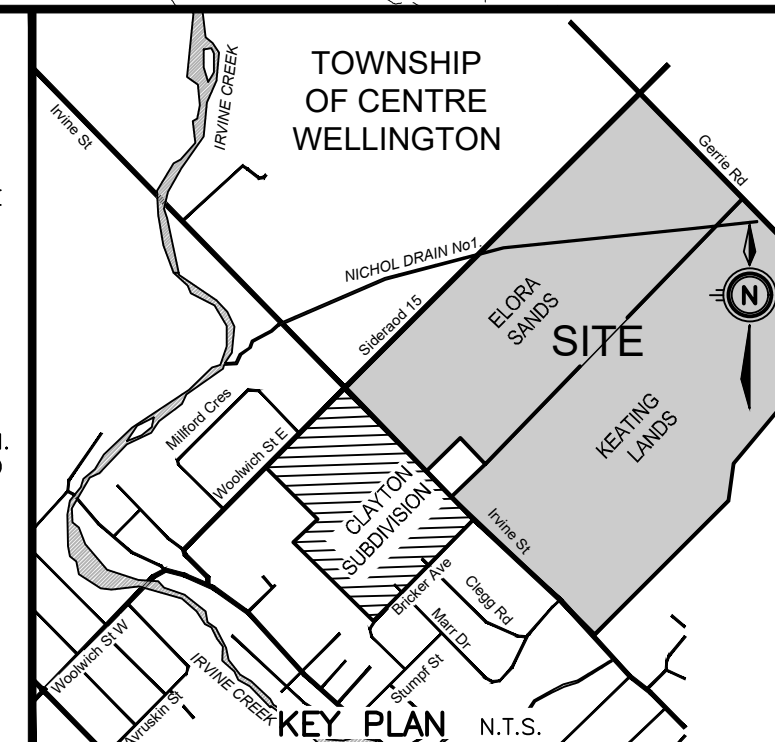
DRIPLINE
 EXISTING
 MONITORING WELL
 ELORA MEADOWS
 EXISTING BOREHOLE
 MONITORING WELL
 ELORA MEADOWS
 EXISTING BOREHOLE
 ANLEY FARM
 SUBDIVISION

NOTE TO CONTRACTOR :
DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER
AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE
ENGINEER'S WRITTEN PERMISSION.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT
M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT
OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION.
IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO
NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT
OF CONSTRUCTION TO ARRANGE FOR INSPECTION.



TOWNSHIP OF CENTRE WELLINGTON

8.			
7.			
6.			
5.			
4.			
3.			
2.			
1.			
No.	REVISION	BY	mm-mm-dd

GEODETIC BM ELEV. = 387.982m
ELORA POST OFFICE, BOLT IN FRONT WALL, IN LINTEL OF
CENTRE BASEMENT WINDOW. (HISTORICAL NUMBER 16U117E)

SITE BENCHMARK	ELEV. =	m
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m	CLIENT
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ELORA SANDS DEVELOPMENTS INC.

2555 Meadowpine Blvd. Unit 3 Mississauga Ont

ELORA SANDS /
KEATING LANDS

DRAWING

EXISTING CONDITIONS

PLAN

PLAN

EXISTING CONDITIONS PLAN



Engineers, Scientists, Surveyors

519-743-6500

Project Manager	S. PETERSON	Project No.	49878-100
Design By	MXF	Checked By	JEM
Drawn By	ACH	Checked By	MXF
Surveyed By	MTE/BSRD	Drawing No.	EC2.1
Date	Jan.29/25		
Scale	1:2000	Sheet	of