Smithville Phase 3A
Block Plan Area 9
Smithville, Ontario
Functional Servicing Report

Prepared for:
Lockbridge Development Inc.
25 Sable Street
North York ON M6M 3K8

Prepared by:
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410

Project Number: 1614-14473
Date: August 2024

Sign-off Sheet

This document entitled Smithville Phase 3A/Block Plan 9, Smithville, Ontario Functional Servicing Report was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Lockbridge Development Inc. ("Client") to support the Block Plan Submission and Draft Plan Application Submission (the "Application") for a portion of Smithville Phase 3A/Block Plan Area 9 (the "Project"). In connection thereto, this document may be reviewed and used by the provincial and municipal government agencies participating in the permitting process in the normal course of their duties. Except as set forth in the previous sentence, any reliance on this document by any third party for any other purpose is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by Digitally signed by Steve Kapolnas Date: 2024.08.20 13:59:27 -04'00'

(signature)

Steve Kapolnas, P.Eng.
Project Manager – Community Development

Prepared by Digitally signed by Hitesh Lad Date: 2024.08.20 14:08:14 -04'00'

(signature)

Hitesh Lad, M.Eng., P.Eng. – Section 5 only
Project Manager/Associate - Community Development

Reviewed and Approved by Digitally signed by Kevin Brousseau Date: 2024.08.20 14:10:54 -04'00'

(signature)

Kevin Brousseau, L.E.T., C.E.T.
Principal, Practice Leader - Community Development

Table of Contents

LIST OF FIGURES **Following Page**

LIST OF APPENDICES

1.0 Introduction

The purpose of this Report is to outline how Stage 1 Draft Plan of the Subject Lands and Block Plan for Phase 3A can be developed with full municipal services, including grading, sanitary, storm drainage, domestic water and utility services. This Report is in support of the proposed Block Plan and Draft Plan of Subdivision Approval.

Stantec Consulting Ltd. (Stantec) was retained by Lockbridge Development (the "Client") to complete a Functional Servicing Report (FSR) in support of Draft Plan for Stage 1 and Block Plan Area 9 Approvals located in Smithville (Town), Township of West Lincoln (Township), Region of Niagara (Region). Block Plan Area 9 is bounded by Port Davidson Road to the west, Townline Road to the North, agricultural/non-urban lands to the south and existing residential and agricultural lands to the east.

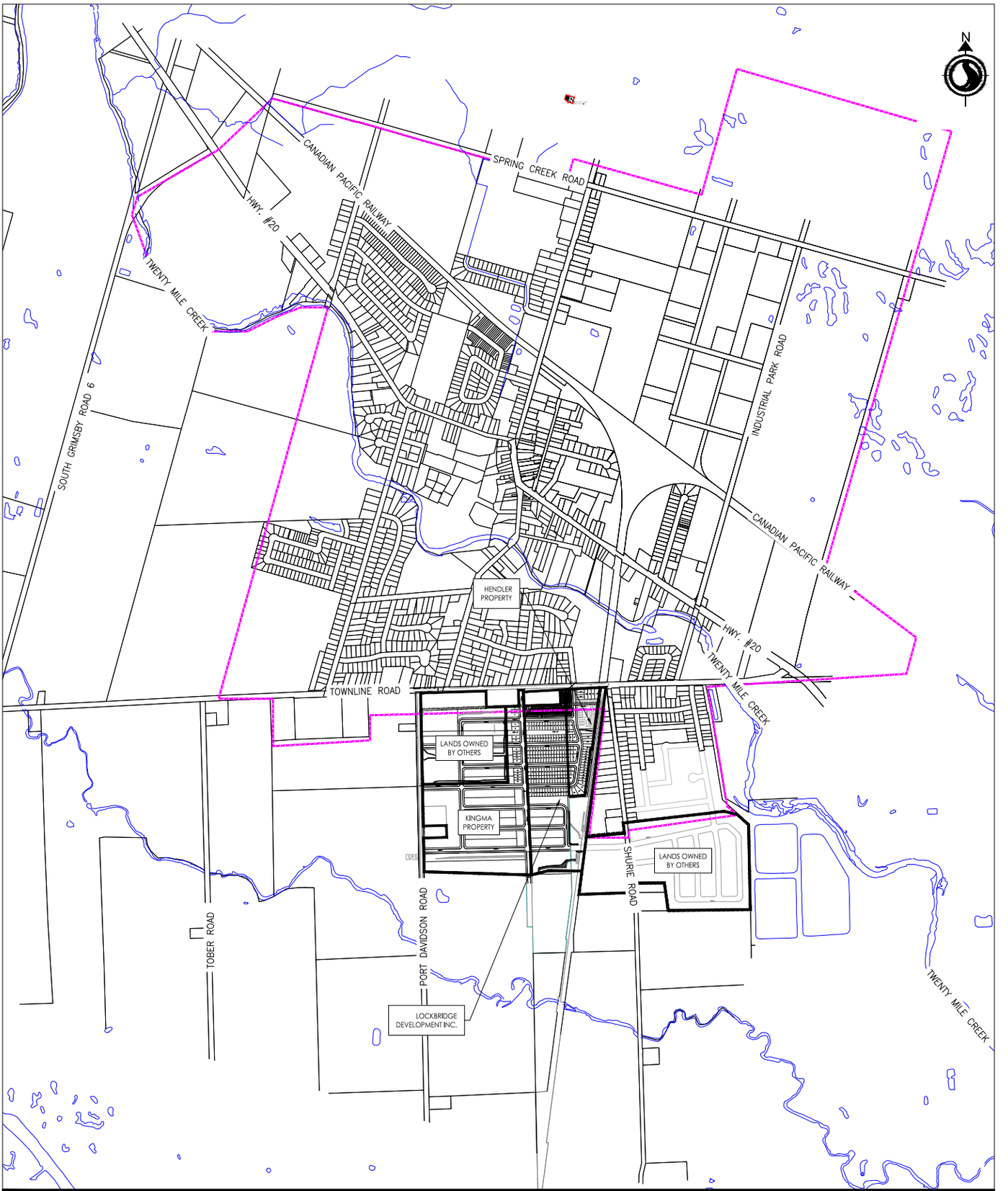
Smithville has expanded their Urban Boundary and the subject lands are within the Phase 3A Urban Expansion. As noted in preconsultation for both the Block Plan and Draft Plan, the Block Plan has been developed in conjunction with three (3) Owners/Developers, Lockbridge Development, Hendler Properties and Kingma Properties, who combined make approximately 33.2ha. Figure 1 illustrates the Block Plan Area 9 site location. Property fronting Townline Road and/or Port Davidson Road to the northwest and east of abandoned rail corridor/Shurie Road to the east, have not been studied or included in this Block Plan Submission. These lands have been conceptually incorporated in the preliminary design and will need further studies to meet the Block Planning requirements. Through this report, the aforementioned lands will be mentioned as *Ultimate Block Plan* and will be discussed in sections outlining municipal servicing strategies.

The Entire Total Area of Block Plan Area 9 which is part of Phase 3A is 63.5ha hectares (ha) and it consists of other multiple owners/developers.

1.1 BACKGROUND/OVERVIEW

The Township of West Lincoln has completed an Urban Boundary Expansion in 2023. As part of this Expansion, Block Plan Area 9 is one of fourteen Block Plan Areas that was successfully brought into the Smithville Urban Boundary under Official Plan Amendment (OPA) 63. Various studies were completed in support of OPA 63 including the Draft Smithville Master Community Plan – Water and Wastewater Master Servicing Plan (listed below).

The purpose of this FSR is to demonstrate how Block Plan Area 9 can be developed with municipal services including sanitary, domestic water, storm drainage, stormwater management (SWM) and utilities in accordance with applicable municipal standards and related requirements of the various approval agencies/authorities.



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Project No.
161414473

Title
SITE LOCATION

Revision

Date
2024-08-16

Reference Sheet

Figure No.
1.0

Introduction
August 2024

The servicing strategies presented in this Report are conceptual in nature; detailed engineering drawings and a final SWM Report will be prepared as part of the detailed design process once the Block and Draft Plans have been approved. The proposed Block Plan and the conclusions of the Smithville Master Community Plan studies form the basis of the preliminary engineering strategies for the site.

This report is to be read in conjunction with the following reports which provide the basis for servicing and stormwater management strategies for the complete development build-out:

- Smithville Master Community Plan - Water and Wastewater Master Servicing Plan (Draft), prepared by AECOM, dated January 2023
- 2021 Water and Wastewater Master Servicing Plan Update, Niagara Region, prepared by GM Blue Plan Engineering, dated December 2023
- Geotechnical Investigation, Smithville 3A/Block Plan Area 9 – Smithville, ON, prepared by Stantec Consulting Ltd., dated July 2, 2024
- HydroGeotechnical Investigation, Smithville 3A/Block Plan Area 9 – Smithville, ON, prepared by Stantec Consulting Ltd., dated July, 2024
- Geotechnical Desktop Study, Smithville 3A/Block Plan Area 9, Townline and Port Davidson Road, Smithville, ON, prepared by Stantec Consulting Ltd., dated July 2, 2024
- Karst Assessment, Stage 3A, Lockbridge Developments, Smithville ON, prepared by Terra-Dynamics Consulting Inc., dated July 25, 2024
- Traffic Impact Study, Smithville 3A Block Plan Area 9 Development, in West Lincoln, Ontario, prepared by Stantec Consulting Ltd., dated August 19, 2024
- Proposed Residential Development – Smithville Phase 3A/Block Plan Area 9 Submission, Smithville, Ontario - Noise Impact Study, prepared by Stantec Consulting Ltd., dated August 2024

2.0 Existing Conditions

2.1 LAND USE AND TOPOGRAPHY

The existing predevelopment site conditions for the Block Plan Area 9 are illustrated on Drawings C-050 and C-051 provided in Appendix A.

The subject lands are currently undeveloped agricultural lands. Legal Boundary Information and existing topographic information was obtained from by Metropolitan Consulting Inc, May 2022 via Landsmith Engineering.

There are two (2) existing culverts in the north along Townline Road, a 600 mm dia. and a 900 mm dia., a karst feature located in the northern portion of the site and surface drainage features within the Block Plan site. The 600 mm dia. discharges surface flows from the existing swale (from the abandoned rail corridor) to the storm sewer system along Townline Road with the remaining northern lands directed to the existing 900 mm dia. culvert crossing Townline Road.

The topography of the Block Plan site ranges from ±186 m asl to ±191 m. The site is generally split by a central high point. Generally, the northeastern portion of the site flows northeast to aforementioned existing culvert discharging under Townline Road. The southern portion drains to an existing water feature, and western lands fronting Port Davidson drain to existing 600 mm dia, culvert crossing underneath under Port Davidson Road or directed further south.

2.2 GEOTECHNICAL INFROMATION

A Geotechnical Investigation was completed on the Block Plan Area 9 (Stantec, July 2024), for the lands owned by Lockbridge Developments, Hendler Properties and Kingma Properties. A Desktop Study was also completed for the balance of lands within the Northwest portion of the Block Plan, contiguous to the Draft Plan.

A total of twenty-seven (27) boreholes were installed and were advanced to depths of 2.3 m to 11.4 m below ground below ground surface (BGS), terminating at inferred bedrock in some locations and/or at various depth within the bedrock. The subsurface conditions encountered in boreholes were found to be approximately 460 mm thick topsoil, underlain by clay and dolostone bedrock.

Nine (9) additional boreholes equipped with single monitoring wells and three (3) multi-level monitoring wells were installed within the site. Water level monitoring readings during installation from February 27, 2024 to March 5, 2024 were found to range from approximately 1.0 m to 2.5 m above the bedrock and 1.0 m to 7.0 m BGS at the monitoring wells.

For further details on the geotechnical characteristics of the site, please refer to the Reports referenced in Section 1.1.

2.3 KARST INFORMATION

One karst hazard has been identified in the vicinity of the site (see the Karst Assessment for more details). A sinkhole has been identified and is located within the northern portion of the site. The sinkhole's water travels under Townline Road via the 900 mm dia. culvert and eventually joins the existing Rock St spring.

In support of Block Plan Approval, Terra-Dynamics Consulting Inc. completed a Karst Assessment for the site (July 2024). It is stated in the Report that there should be no ecological risk to the Twenty Mile Creek or downstream channel through Rock Street Park and is subject to a permit process close-out or remediation.

For further details on the Karst characteristics of the site, please refer to the reports referenced in Section 1.1.

3.0 Concept Plan

3.1 DRAFT PLAN STAGE 1

The Draft Plan for Stage 1 is provided in Appendix B as prepared by Arcadis Canada Inc. The Draft Plan has two main entrances off Townline Road, and consists of a combination of single-detached, semi-detached homes, one multi-family block, Gas Easement Park, Open Space/Trails and a Stormwater Management Facility (SWMF) Block. Lockbridge Development consists of 105 single-detached homes and Hendler Property consist of 32 single-detached, 12 semi-detached, and estimate 30 townhouses within a multi-family block. Kingma Properties owns the lands west of new Street B comprising of 17 single-family lots for totaling of 196 residential units. The total area of the Stage 1 Draft Plan lands is 12.5ha.

3.2 BLOCK PLAN AREA 9

The Block Plan for the subject site is provided in Appendix B and was also prepared by Arcadis Inc. This plan incorporates the Stage 1 Draft Plan (as mentioned above) and shows an additional three entrances at Port Davidson Road and 2 entrances in the southeast at Shurie Road and Alma Drive that will connect to the existing subdivision. Within the Block Plan, there are single-detached homes, multi-residential units, neighbourhood parks, as well as a SWMF in the south end.

4.0 Grading

Preliminary Grading Plans are provided in Appendix C, Drawings C-400 and C-401. The Concept Plans (as referenced in Section 3.0) were used as a base plan for the preliminary grading design. In addition, the associated roads profiles are also included in Appendix C, Drawings C-200, C-201 and C-202 to show how the Municipal Road Design Standards have been followed (within the Block Plan).

Based on the Smithville Master Community Plan, 20 m wide local road cross-section and 22 m wide collector road cross-section was utilized for the subject Draft Plan and is shown on Figures 2.1 and 2.2.

The road grades within the proposed concept plans generally range from a minimum of 0.5% to a maximum of 6.0% to match the perimeter grades, maintain existing topography, cover over the existing gas easement, and overland flow to the proposed stormwater management facilities, as well as maintain minimum cover for local utilities (hydro, gas and communications).

The proposed lot grading within the site ranges from a minimum grade of 2% to a maximum of 6.0%; however, 3:1 (horizontal and vertical) transitions slopes are utilized to accommodate the various grades changes within the subdivision. Combinations of ‘A’ Type (back to front), ‘B’ type (rear walkouts), and ‘D’ type (split drainage) lots are planned for the design of this development, as shown on Drawings C-400 and C-401.

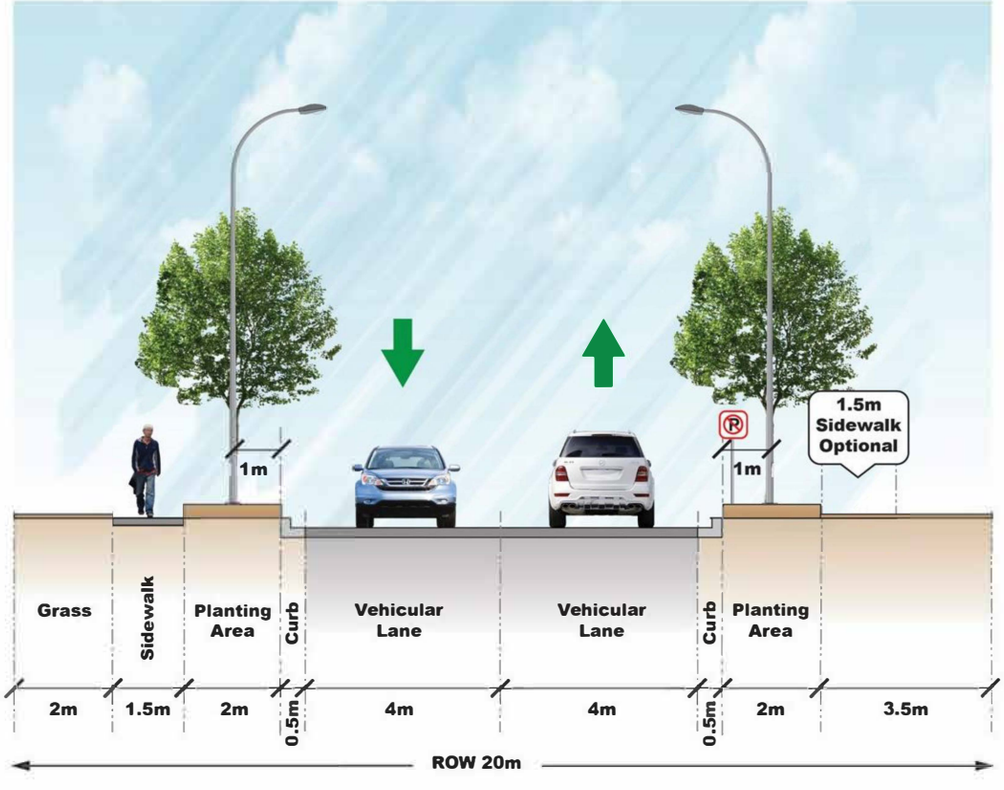
With the single-detached homes and semi-detached homes adjacent to Block 66 (the abandoned existing Rail Corridor), the backyards will drain discharge onto Block 66. Proposed catchbasins within the Block will intercept and direct the surface water under the proposed trail to the existing swale before it discharges to the existing 600 mm dia. culvert at Townline Road.

Preliminary earthworks calculations have been performed based on the preliminary road profile and Lot Grading Plans. Surplus topsoil is to be reused onsite as fill where feasible, to minimize the export of surplus topsoil materials and import of fill to address the fill shortage. The Conceptual Cut/Fill Plan and earth quantities is provided on Drawings C-900 and C-901 in Appendix C.

It should be noted that grades follow existing drainage patterns where possible. The current/existing high point in the site remains generally unchanged – the drainage patterns proposed are generally in keeping with existing conditions.

Streetscape Cross Section – Local Road

Local Road



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.co m

Notes

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK AREA 9
SMITHVILLE 3A

Project No.
161414473

Title
TYPICAL ROAD CROSS-SECTION, 20.0M

Revision

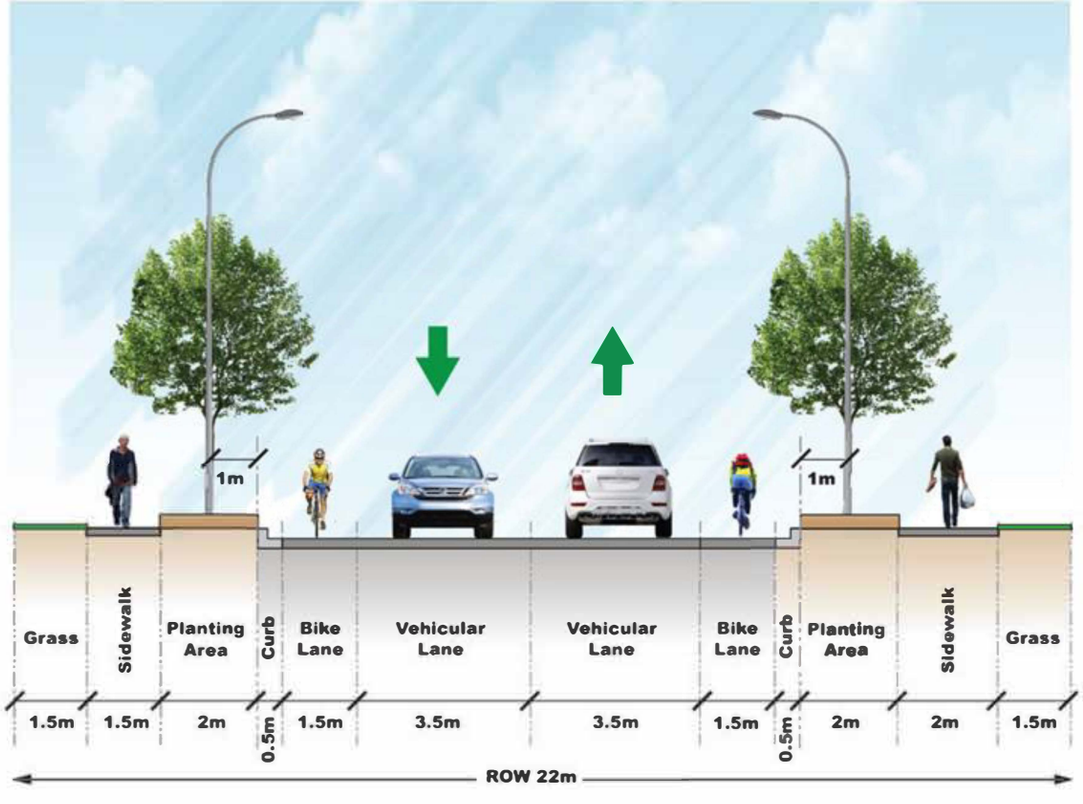
Date
2024-07-10

Reference Sheet

Figure No.
2.1

Streetscape Cross Section – Collector Road

Collector Road



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.co m

Notes

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK AREA 9
SMITHVILLE 3A

Project No.
161414473

Title
TYPICAL ROAD CROSS-SECTION, 22.0M

Revision

Date
2024-07-09

Reference Sheet

Figure No.
2.2

Grading
August 2024

In addition to matching existing grades around the perimeter of the site, the grading design also accounts for AODA accessible pedestrian access to the parklands, trails and walkways.

Other Grading design constraints include:

- Maintain cover around and above Enbridge pipeline corridor
- 5.0% maximum grade (standard for Park Blocks)
- Match existing grades, where possible, to minimize grading and cut/fill quantities and minimize changes to the surface hydrology of the site
- Provide major overland flow conveyance from the site through to the proposed stormwater management facilities
- Satisfy the Township of West Lincoln's requirements for minimum and maximum road grades
- Maintain adequate cover over storm and sanitary sewers, and watermains

5.0 Watermain Servicing

5.1 EXISTING WATERMAIN SYSTEM

Smithville is currently serviced by the Grimsby Water Treatment Plant that supplies the domestic water to local municipalities through a series of watermain networks, pumping stations and reservoirs. The Grimsby Water Plant provides treatment and pumps water to service Smithville. Smithville does have its own elevated water tank, pumping station and reservoirs.

From the 2021 Niagara Region Master Servicing Plan Update (2021 MSP), an overview of the existing water system for the Grimsby Water Treatment Plant can be found in Appendix D, Figure 3.A.1.

The 2021 MSP outlines the existing water usage data and the capacities of the existing water infrastructure within Smithville. Using the information presented in the 2021 MSP Report, Smithville can design and size the watermains to service the expansion of the Urban Boundary and balance of the subject lands to the south within Block Plan Area 9.

5.2 STAGE 1 DRAFT PLAN

The proposed site will connect to the existing watermain along Townline Road at the proposed intersections at Streets A and Street B. The existing watermain on Townline Road is a 150 mm dia. PVC pipe as shown in Appendix C, Preliminary Servicing Plans, Drawings C-100 and C-101.

The following sections outline the domestic water demand and fire flow requirements for the proposed development.

5.2.1 Domestic Use

Based on the domestic water demand calculations completed for the proposed development included in Appendix D, full occupancy of the proposed development is expected to have an average day demand of approximately 172.5 m^3/day (2.0 L/s), a maximum day demand of approximately 345 m^3/day (4.0 L/s), and a peak hour demand of approximately 690 m^3/day (8.0 L/s).

The projected domestic water demand was calculated based on the following criteria for the proposed development:

- Population density (ppu) for each housing type based on the 2024 Development Charges Background Study for Township of West Lincoln as noted below:
  - Single-Detached Units: 3.07 ppu
  - Semi-Detached Units: 3.07 ppu
  - Townhouse Units: 2.16 ppu
- A residential water usage rate of 300 L/c/d based on the 2016 Master Servicing Plan Update for the Region of Niagara
- A maximum day demand factor of 2.0, and a peak hour factor of 4.0 based on the 2016 Master Servicing Plan Update for the Region of Niagara

5.2.2 Fire Flow Requirements

According to the Region of Niagara design criteria, the fire flow requirements for any development shall be determined in accordance with the current issue of the Water Supply for Public Fire Protection, Fire Underwriter's Survey (FUS). The FUS manual outlines the following criteria for the fire flow requirements:

- Modern semi and detached homes >3 m separation – 4,000 L/min (67 L/S)
- Modern semi and detached homes <3 m separation – 6,000 L/min (100 L/S)
- High density, contiguous multi-block homes – 8,000 L/min (133 L/S)

Assuming a worst-case scenario where the majority of the proposed residences may be within a 3 m separation of each other, the larger 100 L/S fire flow is generally used in the water modeling of semi and single-detached residential areas. The multi-residential blocks (i.e., townhouses) are generally modeled using the 133 L/S fire flow demand.

5.2.3 Water Servicing Strategy

The subdivision's domestic water and fire flow servicing will be provided via connections to the Townline Road watermain. A Water Distribution Analysis will be completed by the Township to identify the appropriate sizes of the proposed watermains within the development to adequately distribute the above-noted projected water demands including fire flow demands and to confirm that the required fire flows can be achieved through the proposed fire hydrants onsite under various domestics and fire demand scenarios within the subdivision.

5.3 BLOCK PLAN AREA 9

To service the remainder of Block Plan Area 9 (not including the Draft Plan Stage 1), the remainder of site will require the design and construction of the Phase 2 distribution watermain (servicing lands south of the creek). This includes new watermains throughout Phases 3A and 3B and Phase 4 lands, and upgrades along Townline Road and Port Davidson Road that are outlined in Smithville's 2023 Master Community Plan prepared by AECOM.

Further review of these required upgrades should commence immediately by the Region and Township such to allow additional lands to be brought on stream. It is our understanding that these upgrades are needed for any portion of the Block Plan to be developed beyond the current proposed stage presented in this Report.

6.0 Sanitary Servicing

6.1 EXISTING SANITARY SYSTEM

Within Smithville, there are two Sanitary Pumping Stations (SPS), Streamside SPS and Smithville SPS. Streamside SPS collects sanitary flows from Streamside Subdivision located on the east side of Smithville and pumps it to the sanitary collection system of Smithville SPS. Smithville SPS collects sanitary flows from the Streamside SPS and the rest of the serviced area of Smithville and pumps it to Grimsby's sanitary drainage system ultimately discharging to Baker Road Wastewater Treatment Plant located in Grimsby.

Based on the 2021 Niagara Region Master Servicing Plan (2021 MSP), Streamside SPS has an operational firm capacity of 16 L/s and the Smithville SPS has an operational firm capacity of 104L/s.

An overview of the existing wastewater system for the Baker Road Wastewater Treatment Plant serving Smithville and other areas as presented in the 2021 MSP can be found in Appendix E-1, Figure 4.A.1.

6.2 STAGE 1 DRAFT PLAN

The Stage 1 Draft Plan is within the northern portion of the Block Plan Area 9. From Smithville's Master Community Plan, it indicates that a portion of the northern half of Block Plan 9 can discharge by gravity to the existing Smithville SPS via existing creek crossing under Twenty Mile Creek via existing sewers along Anderson Crescent and Townline Road.

In reference to Drawing C-100 in Appendix C, the proposed sanitary sewer design from the site includes a 200 mm dia. sewer that discharges sanitary flows to the existing 200 mm dia. sewer along Townline Road at the proposed intersection at Street A. Throughout the site, the proposed depth of cover over the sanitary sewer ranges from 2.8 m to 5.0 m.

The proposed sanitary flow discharging from Stage 1 of the Subject Draft Plan is estimated at 8.86L/s resulting in the proposed sanitary flow crossing under the creek of 33.41L/s. With the additional flow from Stage 1 of the Subject Draft Plan discharging to the pipe under the creek crossing, the theoretical flow within this pipe has exceeded the theoretical capacity of this sanitary sewer. A Sanitary Drainage Plan and Design Sheet for Stage 1 Draft Plan lands can be found in Appendix E-2.

It should be noted that Stantec had prepared a memo in October 2023 that outlined the approach and methodology for the sanitary flow calculations discharging to the Smithville SPS. It can be found in Appendix E-3.

In correspondences with the Township of West Lincoln, the Township has shared sanitary flow monitoring data (Appendix E-4) at an existing manhole on Anderson Crescent (CIV 9) before it discharges to the creek crossing to the existing Smithville Pumping Station. The data monitoring is from September 2023 to January 2024 with the highest peak flow measured at 11.57L/s on January 9, 2024 to January 10, 2024.

It should be noted that the theoretical design flow without the proposed Stage 1 Draft Plan Lands added is 24.55L/s (33.41L/s – 8.86 L/s). The monitored flow from CV9 is 11.57L/s from January 2024, which is less than half the theoretical flow within the system, indicating an ability for the system to accommodate the additional flows from the Stage 3A Draft Plan into the existing sewer system without the need for upgrading. By adding the monitored flow from the existing system and the proposed flow from Stage 1 Draft Plan Lands, the combined sanitary flow generated is estimated at 19.70L/s. The Sanitary Design Sheet showing the calculations can be found in Appendix E-5.

Further, calculations have been undertaken to consider a scenario whereby the existing built-up area within the existing sanitary catchment (that discharges through Andrew Cresent) intensifies, resulting in the need for additional capacity. These calculations were carried out on the basis of including People Per Unit (PPU) instead of People per Hectare (pp/ha). Each unit was increased to 6.0 PPU to allow for two additional dwelling units per property: 1.) dwelling housing 2 people and 2.) the other dwelling housing one person. The flow generated from Stage 1 of the Subject Draft Plan and the intensification of the existing built-up area, the theoretical flow generated is estimated at 38.46L/s. Sanitary calculations can be found in Appendix E-6.

6.3 BLOCK PLAN

To service the remainder of Block Plan Area 9 (not including the Draft Plan Stage 1), a new sanitary pumping station will be required, somewhere along Port Davidson Road, as outlined in the 2023 Smithville Water and Wastewater Master Servicing Plan prepared by AECOM. It should be noted that an exact location of the pumping station has not been determined yet – discussions have occurred that the current preferred location per the AECOM report may not be feasible due to landowner participation. Through discussions, the Ownership Group have offered to locate the future SPS on lands within Block 9, should that prove to be more feasible when required. All remaining portions of the Block Plan Area 9 will discharge to the proposed pumping station and pumped by forcemain to Townline Road, and eventually to the Smithville SPS as outlined in Smithville's Master Community Plan.

The southeast side of the Block Plan (east of the abandoned rail corridor) will discharge by gravity to the new proposed pumping station near Port Davidson Road (which then ultimately connects to the existing Smithville pumping station, per 2023 AECOM Report. In order to discharge these areas by gravity, the sanitary sewer along Street B will be ranging from 2.8 m to 10.2 m deep. This depth is solely due to the length of the service required to allow the Almas Lands to drain by gravity. The proposed sanitary sewer will be within the groundwater and bedrock.

7.0 Storm Servicing

7.1 STAGE 1 DRAFT PLAN

As shown on the Preliminary Servicing Plan, Drawing No. C-100, included in Appendix C, the design includes a storm sewer that ranges from 300 mm to 1200 mm dia. which discharges to the proposed north SWMF.

The site's minor flows are piped and designed to the 5-year storm event. The minor flows will discharge to the proposed north SWM Block via storm sewers and major flows are conveyed over land and follow a similar route as the minor piped flows.

The flow from the proposed North SWMF will outlet to the existing 900 mm dia. culvert under Townline Road and ultimately to Twenty Mile Creek.

Storm services will be provided to all residential units, at minimum 2% slope and services will connect directly into the proposed storm sewers. The foundation weeping tiles will not drain by gravity and will be pumped via sump pumps to the storm service laterals.

Storm sewers are proposed to be installed with a minimum cover of 1.5 m at slopes between 0.25% and 1.0%.

For more information regarding the preliminary north SWM strategy, please refer to Appendix F.

7.2 BLOCK PLAN

To service the remainder of contiguous Block Plan Area 9, as shown as shown on the Preliminary Servicing Plan, Drawing No. C-100, included in Appendix C, the proposed storm sewers will discharge to a SWMF in the south of the Block Plan.

The proposed storm sewer will range from 300 mm to 1200 mm in dia. and is designed to the 5-year storm event. Minor flows will discharge to the proposed south SWM Block and the major flows are conveyed over land and follow a similar route as the minor piped flows.

The south SWMF will outlet to an existing watercourse that is defined by the NPCA at the south.

It is expected that a further SWMF will be required east of Shurie Road, in conjunction with development of the Almas lands. This is shown conceptually on the Block Plan and will be subject to clarification through preliminary design of these lands.

8.0 Erosion and Sediment Control

The erosion and sediment control strategy has been developed and is to be implemented during the construction process, in order to minimize the potential for offsite discharge of sediment and the resultant negative environmental impacts. This plan will focus on the protection of the downstream areas.

8.1 EROSION POTENTIAL

The *Toronto and Region Conservation Authority's Erosion and Sediment Control Guide for Urban Construction (2019)* was used to determine the erosion potential of the Site. The erosion potential is based on slope gradient, slope length, and soil texture and is then used to determine the appropriate erosion control methods, as follows:

- Site Slopes: Generally gentle (< 2%) to moderate (2-10%) – average slope is approximately 2%.
- Slope Lengths: Long (generally greater than 30 m).
- Erodibility Classification: High erodibility rate for silty sand and low erodibility rate for sandy soils.

Therefore, based on this classification the Site has moderate to high erosion potential, depending on the specific location within the Site.

8.2 PRELIMINARY EROSION AND SEDIMENTATION CONTROL PLAN

The following approach to erosion and sediment control onsite has been prepared to minimize the potential impacts associated with onsite erosion and/or offsite transport of sediment to downstream areas.

Prior to any grading or servicing works commencing onsite, erosion and sedimentation control measures shall be implemented as detailed on the Pre-grading, Erosion and Sedimentation Control Plans (prepared during detail design). The erosion and sedimentation controls will include the following items:

- Steep slopes (>3:1) shall have erosion blankets.
- Light and/or heavy-duty silt fencing will be erected on all site boundaries where there is potential for runoff to be discharged offsite, to protect adjacent downstream lands from migration of sediment in overland flow. The location of this fencing will be adjacent to the limit of grading. Silt fence attached to paige wire fencing will be installed periodically throughout the Site adjacent to sensitive areas. Silt fencing should be erected before grading begins to protect adjacent and downstream areas from migration of sediment in overland flow.
- Storm service outlets will be installed during servicing and roadworks construction to provide lot level dead and live storage where appropriate.

- Erosion control berms/swales will be located in appropriate (critical) areas to divert flows to temporary sediment basins.
- A construction entrance feature ("mud-mat") will be provided at all site entrances to minimize the offsite transport of sediment via construction vehicles.
- Runoff will be directed to a temporary sedimentation facility via swales to minimize untreated runoff discharged from the Site.
- The temporary sedimentation facility should not be sited in the location of the proposed permanent SWMF as it may inhibit the function of the final SWMF as an infiltration basin.
- Swales constructed onsite will have temporary rock check dams to help attenuate flows and encourage deposition of suspended sediment where appropriate.
- All disturbed areas where construction is not expected for 30 days shall be re-vegetated with 50 mm of topsoil and hydro-seeding according to OPSS 572.
- During construction, all catchbasins are to be sealed until roads are paved to prevent sediment deposition in the catchbasins' sumps and conveyance of silt to the SWMF.
- An Erosion Control Implementation Schedule will be included with the Detailed Erosion and Sedimentation Control Plan, prepared in conjunction with the pre-grading application and/or final engineering design.
- Following completion of construction and site stabilization, all erosion and sediment control measures and accumulated sediment are to be removed.

The erosion control measures shall be maintained in good repair during the entire construction period and shall only be removed as contributing drainage areas are restored and stabilized. In addition, the condition of erosion control works, their overall performance, and any repairs, replacement, or modifications to the installed item shall be noted in the Monitoring Reports submitted to the NPCA and the Township. The Monitoring Reports should be submitted bi-monthly (quarterly during periods of inactivity or house construction) and should be based on inspection completed bi-weekly or after any significant rainfall events (>13 mm), whichever is more frequent.

8.3 MONITORING, MAINTENANCE AND MITIGATION

Monitoring and maintenance activities are an important part of a SWM Plan to ensure that the designed features continue to operate as intended. A Monitoring Program should be established in consultation with the Region of Niagara, Township of West Lincoln, and the Ministry of Environment, Conservation and Parks and incorporated into the Final Stormwater Management Plan at the detailed design stage.

9.0 Utilities

9.1 NIAGARA PENINSULA ENERGY INC

NPEI advises that they can supply power to the proposed site and that there are no capacity issues. These services will be extended to service the subject lands, there, no constraints for providing hydro services to the proposed development.

9.2 NATURAL GAS

Enbridge advises that the site can likely be accommodated if immediate application is made. There is an existing main on the North side of Townline Road. These services will be extended to service the subject lands. There are no constraints for providing natural gas services to the proposed development.

9.3 BELL

Bell has advised that they can have the infrastructure in place in the area to service the site. These services will be extended to service the subject lands. There are no constraints for providing telecommunication services to the proposed development.

9.4 COGECO

Cogeco advises that they are able to service the site and have infrastructure in the area. These services will be extended to service the subject lands. There are no constraints for providing hydro services to the proposed development.

9.5 ENBRIDGE GAS EASEMENT

The existing pipelines will be daylighted at the locations where the roadways cross the gas easement to confirm elevations and the impacts to the services and grading. The ground surface within the easement will be regraded and fill will be added around and over the existing pipelines.

9.6 UTILITY SUMMARY

Internal hydro services, Bell and Cogeco cable lines and gas mains for the development can be design and constructed within a joint trench within the Subject Plan.

10.0 Conclusions and Recommendations

10.1 CONCLUSIONS

Based on the finding of this Report, it is concluded that:

- The proposed Stage 1 Draft Plan within Block Plan Area 9 can be adequately serviced by municipal sewage, storm drainage, water services and utilities.
- The proposed North SWMF features provides water quantity and water quality control for the proposed Stage 1 Draft Plan development.
- The proposed SWMF provides sufficient storage to attenuate post-development discharge to maintain existing target flow rates.
- SWM measures can be provided in accordance with various agency guidelines

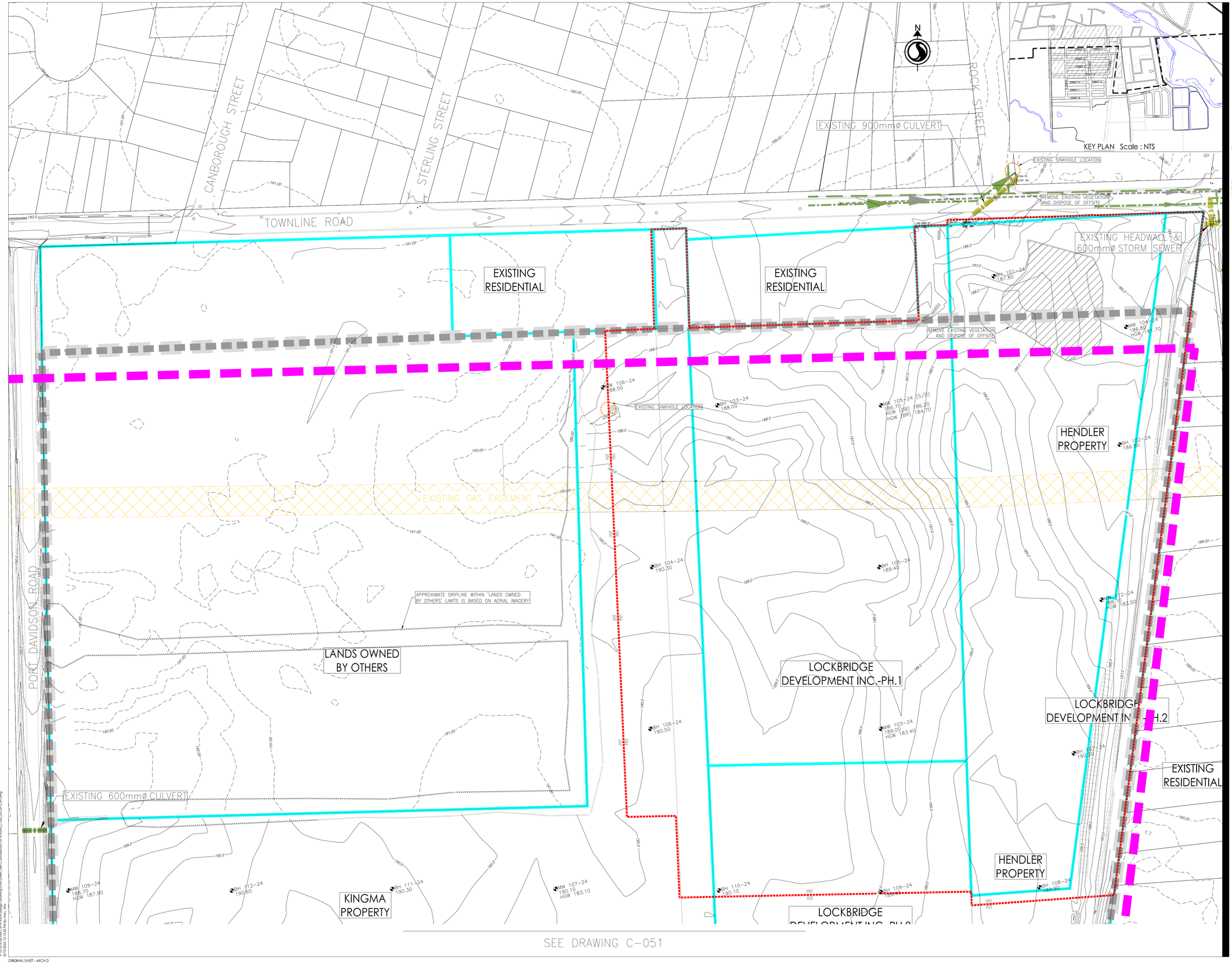
10.2 RECOMMENDATIONS

This Report be circulated to the Municipalities and various approval agencies in support of Draft Plan of Subdivision and Block Plan Approval.

Detailed grading and servicing design drawings will be prepared, a Final Stormwater Management Report and Erosion Settlement Control Plan be completed once the Draft Plan of Development for has been conditionally approved to support construction.

APPENDIX A
Existing Conditions

Existing Conditions & Removals Plan, C-050
Existing Conditions & Removals Plan, C-051



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 4250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

Legend

- PROPERTY LINE
- EXISTING URBAN BOUNDARY
- BLOCK 3A LIMIT
- BLOCK PLAN AREA 9 LIMIT
- STAGE 1 DRAFT PLAN LIMITS
- EXISTING ENBRIDGE GAS EASEMENT (APPROXIMATE LOCATION)
- EXISTING DRIPLINE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN (200mm UNLESS NOTED)
- 185.00 EXISTING CONTOUR
- 185.00 EXISTING CONTOUR (FROM S.W.O.O.P, 2010)
- PROPOSED SLOPE (3:1 UNLESS NOTED OTHERWISE)
- EXISTING TREE
- IDENTIFICATION NUMBER / INSTALL YEAR — BH/MW 101-24 187.80 HGW 291.69 — BOREHOLE/MONITORING WELL (WITH GROUND ELEVATION, AND HIGH GROUND WATER ELEVATION)
- EXISTING SINKHOLE - TERRA-DYNAMICS MAY 2024

0.	STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15
Revision		By	Appd	YYYY.MM.DD
File Name:	161414394_C-050_051DP-Con	WJE	WJE	SAK	2024.08.18
		Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

Title
EXISTING CONDITIONS & REMOVALS PLAN

Project No. 161414473

Scale 1:1000 (0, 10, 30, 50m)

Revision 0

Drawing No. **C-050**

ORIGINAL SHEET - ARCH D

SEE DRAWING C-050

KINGMA PROPERTY

LOCKBRIDGE DEVELOPMENT INC.-PH.2

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

EXISTING RESIDENTIAL

EXISTING WOODLOT

LANDS OWNED BY OTHERS

PORT DAVIDSON ROAD

APPROXIMATE DRIPLINE WITHIN "LANDS OWNED BY OTHERS" LIMITS IS BASED ON AERIAL IMAGERY

APPROXIMATE DRIPLINE WITHIN "LANDS OWNED BY OTHERS" LIMITS IS BASED ON AERIAL IMAGERY

MW 109-24 186.70 HGW 187.90
BH 112-24 190.60
BH 111-24 190.30
MW 107-24 190.10 HGW 183.10
BH 110-24 190.10
BH 109-24 189.80
BH 116-24 189.70
BH 115-24 189.40
BH 114-24 189.70
BH 113-24 190.00
MW 102-24 189.60 HGW 186.90
BH 121-24 187.20
BH 120-24 189.20
BH 119-24 188.40
MW 108-24 (S/D) 189.80 HGW (OB) 183.00 HGW (BR) 182.60
BH 118-24 190.60
BH 117-24 189.70
MW 110-24 186.80 HGW 185.90
BH 124-24 188.80
MW 111-24 186.40 HGW 186.60
BH 123-24 188.00
BH 122-24 189.00
MW 101-24(S/D) 189.40 HGW (OB) 182.60 HGW (BR) 182.40

KEY PLAN Scale : NTS

N

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 4250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

Legend

- PROPERTY LINE
- EXISTING URBAN BOUNDARY
- BLOCK 3A LIMIT
- BLOCK PLAN AREA 9 LIMIT
- STAGE 1 DRAFT PLAN LIMITS
- EXISTING ENBRIDGE GAS EASEMENT (APPROXIMATE LOCATION)
- EXISTING DRIPLINE
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN (200mm UNLESS NOTED)
- 185.00 EXISTING CONTOUR
- 185.00 EXISTING CONTOUR (FROM S.W.O.O.P, 2010)
- PROPOSED SLOPE (3:1 UNLESS NOTED OTHERWISE)
- EXISTING TREE
- IDENTIFICATION NUMBER / INSTALL YEAR — BH/MW 109-24 187.90 HGW 291.69 — BOREHOLE/MONITORING WELL (WITH GROUND ELEVATION, AND HIGH GROUND WATER ELEVATION
- EXISTING SINKHOLE - TERRA-DYNAMICS MAY 2024

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Revision	By	Appd	YYYY.MM.DD
0. STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15
File Name: 161414394_C-050_051DP-Con	WJE (Dwn.)	WJE (Dsgn.)	SAK (Chkd.) 2024.08.18 YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

Title
EXISTING CONDITIONS & REMOVALS PLAN

Project No.
161414473

Scale
1:1000 (0 10 30 50m)

Revision
0

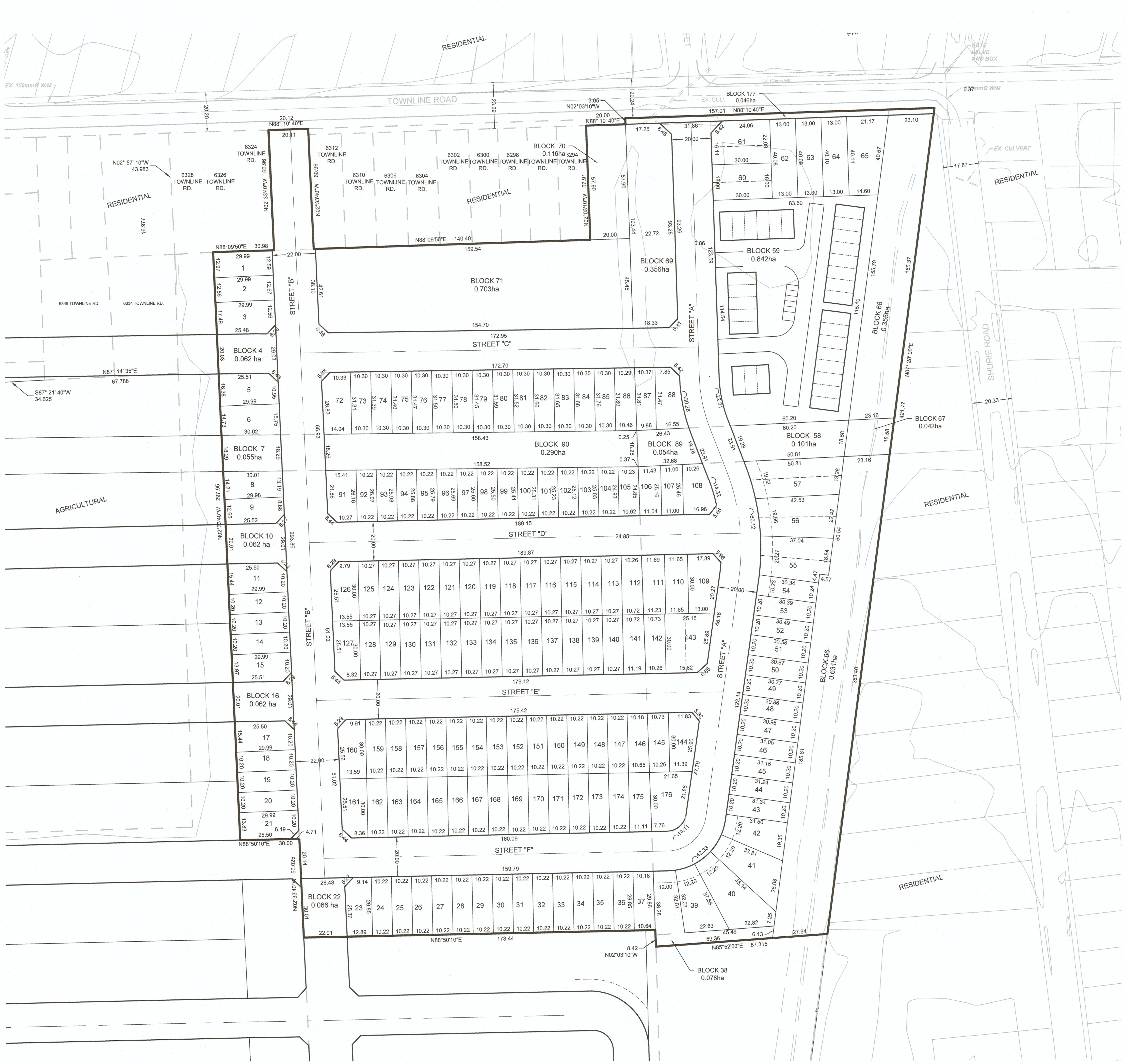
Drawing No.
C-051

V:\01414\Active\161414394\Design\drawings\plot\sheet_files\Concept\plot\161414394_C-050_051DP-Con.dwg
8/19/2024 12:13:50 PM By: Hoh, Jho

ORIGINAL SHEET - ARCH D

APPENDIX B
Concept Plans

Draft Plan of Subdivision
Block Plan Area 9 - Preferred Land Use Concept



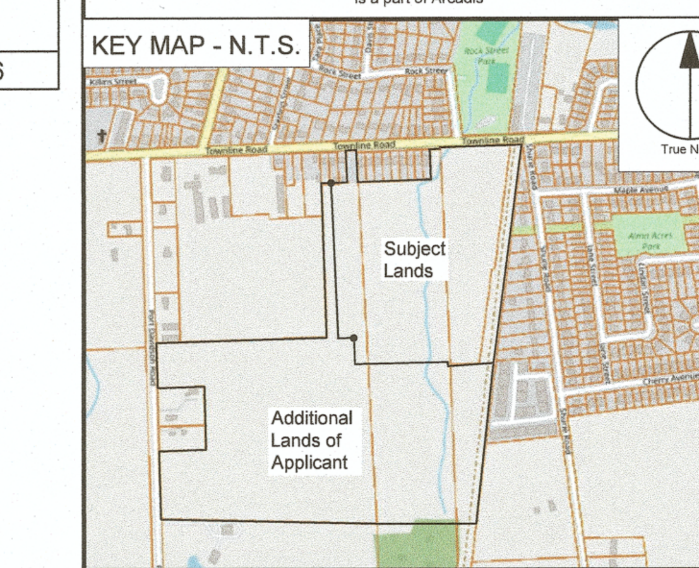
LAND USE SCHEDULE				
BLOCKS/LOTS	DESCRIPTION	AREA (ha)	AREA (Acres)	# UNITS
1-3, 5,6,8,9,11-15, 17-21, 23-37, 39-54, 62-65, 72-88, 91-142, 144-176	SINGLE DETACHED DWELLINGS	5.265	13.010	154
55-57, 60, 61, 143	SEMI DETACHED DWELLINGS	0.429	1.060	12
59	TOWNHOUSE DWELLINGS	0.842	2.081	30
69, 70, 71	STORMWATER MANAGEMENT	1.175	2.903	
7, 90, 89, 58, 67	GAS EASEMENT	0.542	1.340	
66, 68	OPEN SPACE/TRAIL	0.986	2.436	
38	OPEN SPACE ACCESS	0.078	0.193	
177	ROAD WIDENING	0.046	0.113	
STREETS "A", "B", "C", "D", "E" & "F"	PUBLIC R.O.W.	2.897	7.160	
4, 7, 10, 16, 22	FUTURE ROAD CONNECTION	0.252	0.623	
TOTAL		12.512	30.296	196

LAND USE SCHEDULE		
DESCRIPTION	OWNER	# UNITS
SINGLE DETACHED DWELLINGS	HENDLER	32
	LOCKBRIDGE	122
SEMI DETACHED DWELLINGS	HENDLER	12
	LOCKBRIDGE	0
TOWNHOUSE DWELLINGS	HENDLER	30
	LOCKBRIDGE	0
TOTAL		196

DRAFT PLAN OF SUBDIVISION SMITHVILLE BLOCK 9

PART OF LOTS 31 & 32, CONCESSION 6 AND PART OF THE ROAD ALLOWANCE BETWEEN LOTS 31 & 32, GEOGRAPHIC TOWNSHIP OF GAINSBOROUGH, TOWNSHIP OF WEST LINCOLN, REGIONAL MUNICIPALITY OF NIAGARA

KEY MAP - N.T.S.



INFORMATION REQUIRED

UNDER SECTION 51 (17) OF THE PLANNING ACT, R.S.O. 1990. c.P.13 AS AMENDED
(a) - AS SHOWN
(b) - AS SHOWN
(c) - AS SHOWN
(d) - AS LISTED BELOW
(e) - AS SHOWN
(f) - AS SHOWN
(g) - AS SHOWN
(h) - MUNICIPAL WATER
(i) - LACUSTRINE SILTY/HEAVY CLAY
(j) - AS SHOWN
(k) - MUNICIPAL SANITARY AND STORM SEWERS
(l) - NONE

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

SIGNED
ROY S. KIRKUP, ONTARIO LAND SURVEYOR
J.D. BARNES LIMITED
DATE Aug 14, 2024

OWNER'S CERTIFICATE

I HEREBY CONSENT TO THE FILING OF THIS PLAN BY ARCADIS, IN DRAFT FORM.

SIGNED
DON MANSON
LOCKBRIDGE DEVELOPMENT INC.
DATE Aug 12 2024

SIGNED
JUDY HENDLER
DATE Aug 12 2024

SIGNED
FRED VANDERVELDE
TEK CORPORATION
DATE Aug 12, 2024

No.	DESCRIPTION	DATE
01	FIRST DPS SUBMISSION	2024-08-13

DRAWING ISSUE RECORD

JOHN S. ARIENS
REGISTERED PROFESSIONAL PLANNER
R.P.P.
ONTARIO PROFESSIONAL PLANNERS INSTITUTE
INSTITUT DES PLANIFICATEURS PROFESSIONNELS DE L'ONTARIO

APPROVALS

ARCADIS
360 James Street North - Suite 200
Hamilton ON L8L 1H5 Canada
tel 905 546 1010
www.arcadis.com

SCALE 15 0 10 20 40
1:1000 (m)

PROJECT NO:
144262

DRAWN BY:	CHECKED BY:
J. MARCUS	J. MARCUS
PROJECT MGR:	APPROVED BY:
J. MARCUS	J. ARIENS

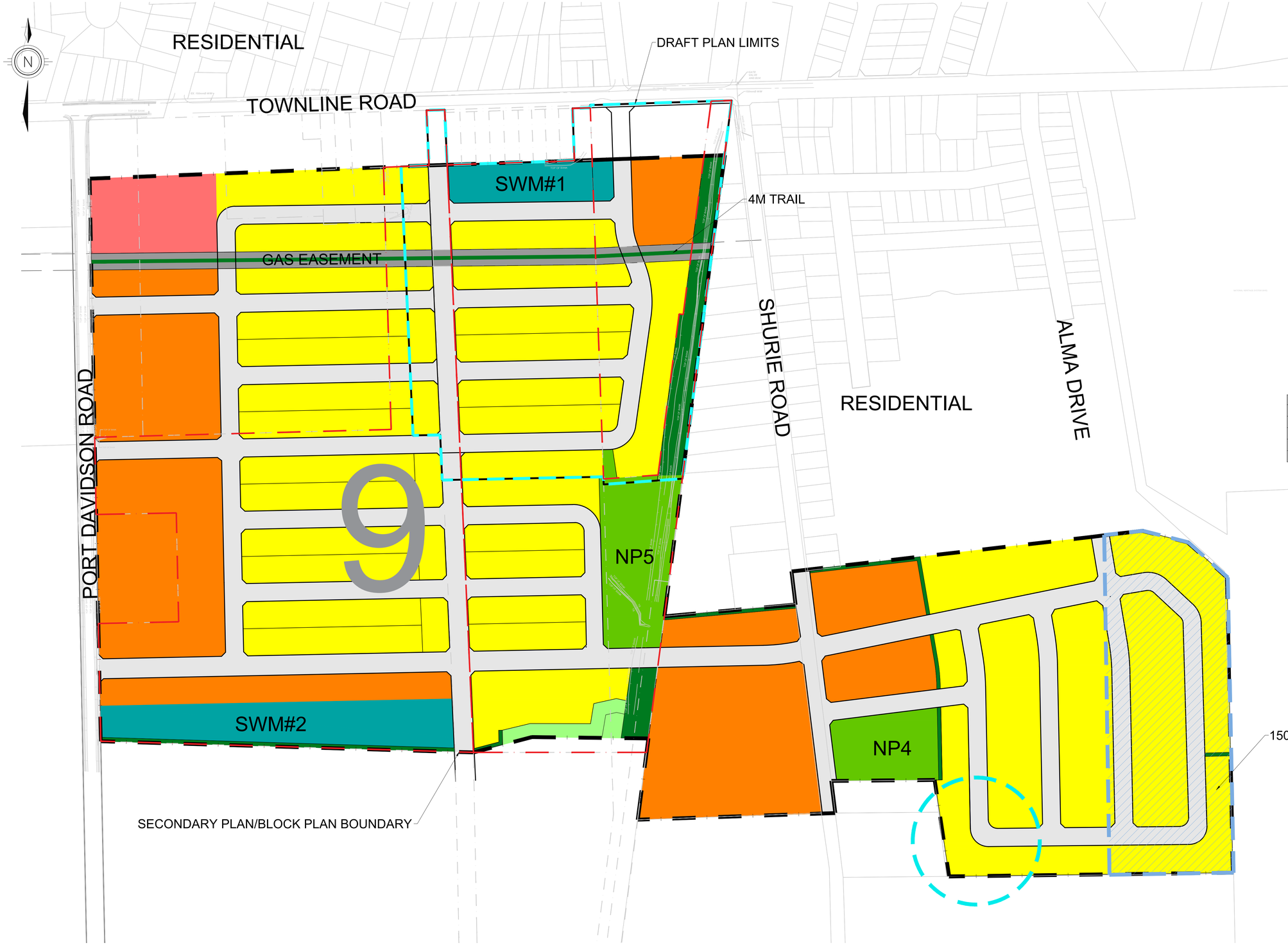
SHEET TITLE
DRAFT PLAN OF SUBDIVISION

SHEET NUMBER
DPS1.0

ISSUE
01

File Location: J:\144262_Block_Plan_A\7.0_Production\7.03_Design\17_Planning\Sheets\144262DP Concept 1-V3.dwg Last Saved: August 13, 2024, by jared.marcus Plotted: Tuesday, August 13, 2024 4:21:12 PM by Jared Marcus

10mm
SCALE CHECK
1 in



DEVELOPMENT DETAILS		
LAND USE	AREA	PERCENTAGE
LOW DENSITY RESIDENTIAL (LDR)	±25.15ha (62.25 acres)	±58.73%
MEDIUM DENSITY RESIDENTIAL (MDR)	±12.38ha (30.59 acres)	±28.91%
COMMERCIAL	±1.18ha (2.92 acres)	±2.76%
NATURAL HERITAGE	±1.44ha (3.56 acres)	±3.36%
NATURAL FEATURES AND 15M BUFFER	±0.30 ha (0.73 acres)	±0.70%
PARK [NP4 - NP5]	±2.37 ha (5.75 acres)	±5.53%
NET DEVELOPABLE AREA TOTAL	±42.82ha (105.81 acres)	±100%
GAS EASEMENT	±1.25ha (3.11 acres)	
SWM	±2.55ha (6.30 acres)	
R.O.W	±14.45ha (35.71 acres)	
TOTAL LAND AREA *(including lands in arc, karst and railway setback area - noted below)*	±61.07ha (150.91 acres)	

NET LAND USE DENSITIES	UNITS
±62.25 acres of LDR @ 8 upa	498 units
±30.59 acres of MDR @ 15 upa	459 units
TOTAL UNITS	957 units
POPULATION 957 units @ 2.7ppu	2,584 persons

DEVELOPMENT DETAILS - PHASE 1		
LAND USE	AREA	PERCENTAGE
LOW DENSITY RESIDENTIAL (LDR)	±5.63ha (13.92 acres)	87.02%
MEDIUM DENSITY RESIDENTIAL (MDR)	±0.84ha (2.07 acres)	12.98%
NET DEVELOPABLE AREA TOTAL	±6.47ha (15.99 acres)	100%
GAS EASEMENT	±0.54ha (1.33 acres)	
PARK	±0.08ha. (0.20 acres)	
NATURAL HERITAGE	±0.85ha. (2.10 acres)	
SWM	±0.80ha (1.99 acres)	
R.O.W	±3.01ha (7.43 acres)	
TOTAL LAND AREA	±11.75ha (29.03 acres)	

	A	B	C
1	NET LAND USE DENSITIES - PHASE 1		UNITS
2	±13.92 acres of LDR @ 8 upa		111 units
3	±2.07 acres of MDR @ 15 upa		31 units
4	TOTAL UNITS		142 units
5	POPULATION 142 units @ 2.7ppu		383 persons

LEGEND

- BLOCK PLAN AREA 9
- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- COMMERCIAL
- PARK LAND / OPEN SPACE/ NP4 . NP5
- NATURAL HERITAGE SYSTEM (NHS)-TRAILS
- NATURAL FEATURES AND 15M BUFFER
- PROPOSED S.W.M. FACILITY
- PHASE 1 - 5.41ha (13.36 acres)
- S.W.M. LOCATION
- LAGOON BUFFER

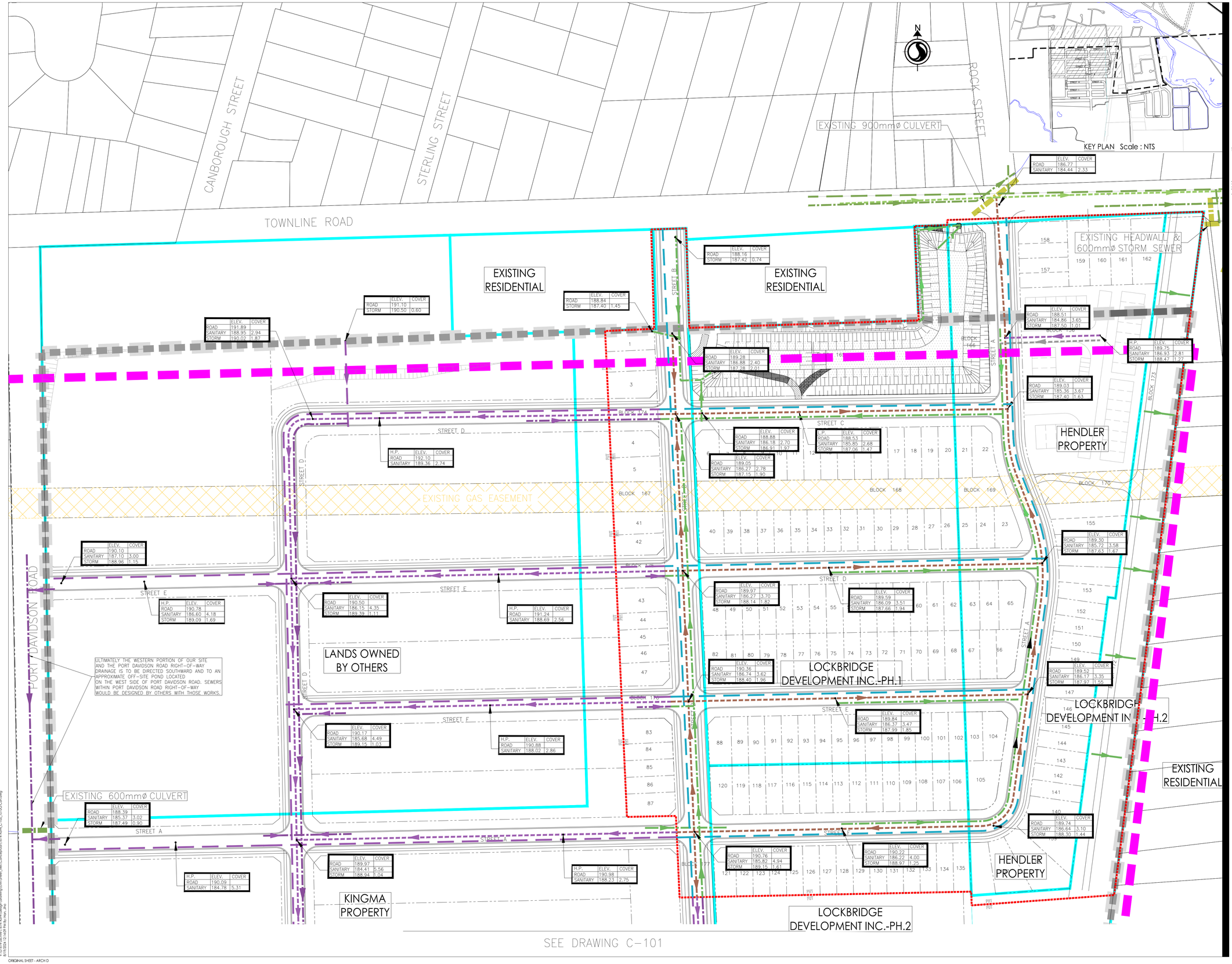
ARCADIS
360 James Street North - Suite 200
Hamilton ON L8L 1H5 Canada
tel 905 546 1010
www.arcadis.com

SOUTHEAST SMITHVILLE - BLOCK PLAN AREA 9
PREFERRED LAND USE CONCEPT
(*BASED ON APPROVED OPA 63)

SCALE	1:2000
DATE	JANUARY 05, 2024
PROJECT No.	144262

APPENDIX C
Engineering Drawings

Preliminary Servicing Plan, C-100
Preliminary Servicing Plan, C-101
External Sanitary Drainage Area Plan, C-110
Conceptual Road Profiles - Streets A & B, C-200
Conceptual Road Profiles - Streets C & J, C-201
Conceptual Road Profiles - Streets D, E & F, C-202
Preliminary Grading Plan, C-400
Preliminary Grading Plan, C-401
Preliminary SWM Facility Plan - North, C-800
Conceptual Cut/Fill Plan, C-900
Conceptual Cut/Fill Plan, C-901



	ELEV.	COVER
ROAD	191.89	
SANITARY	188.95	2.94
STORM	190.02	1.87

	ELEV.	COVER
ROAD	191.10	
STORM	190.50	0.60

	ELEV.	COVER
ROAD	188.84	
STORM	187.40	1.45

	ELEV.	COVER
ROAD	188.16	
STORM	187.42	0.74

	ELEV.	COVER
ROAD	189.28	
SANITARY	186.88	2.40
STORM	187.28	2.01

H.P.	ELEV.	COVER
ROAD	192.10	
SANITARY	189.36	2.74

	ELEV.	COVER
ROAD	188.88	
SANITARY	186.18	2.70
STORM	186.91	1.97

	ELEV.	COVER
ROAD	189.05	
SANITARY	186.27	2.78
STORM	187.15	1.90

H.P.	ELEV.	COVER
ROAD	188.53	
SANITARY	186.85	2.68
STORM	187.06	1.47

	ELEV.	COVER
ROAD	188.51	
SANITARY	184.86	3.65
STORM	187.50	1.01

H.P.	ELEV.	COVER
ROAD	189.75	
SANITARY	186.93	2.81
STORM	188.47	1.27

	ELEV.	COVER
ROAD	189.03	
SANITARY	185.36	3.67
STORM	187.40	1.63

	ELEV.	COVER
ROAD	189.30	
SANITARY	185.72	3.58
STORM	187.63	1.67

	ELEV.	COVER
ROAD	189.97	
SANITARY	186.27	3.70
STORM	188.14	1.82

	ELEV.	COVER
ROAD	189.59	
SANITARY	186.09	3.51
STORM	187.66	1.94

	ELEV.	COVER
ROAD	189.52	
SANITARY	186.17	3.35
STORM	187.97	1.55

	ELEV.	COVER
ROAD	189.84	
SANITARY	186.37	3.47
STORM	187.99	1.85

	ELEV.	COVER
ROAD	189.74	
SANITARY	186.64	3.10
STORM	188.30	1.44

	ELEV.	COVER
ROAD	190.10	
SANITARY	187.10	3.00
STORM	188.96	1.15

H.P.	ELEV.	COVER
ROAD	190.78	
SANITARY	186.60	4.18
STORM	189.09	1.69

	ELEV.	COVER
ROAD	190.50	
SANITARY	186.15	4.35
STORM	189.39	1.11

H.P.	ELEV.	COVER
ROAD	191.24	
SANITARY	188.69	2.56

	ELEV.	COVER
ROAD	190.17	
SANITARY	185.68	4.49
STORM	189.15	1.03

H.P.	ELEV.	COVER
ROAD	190.88	
SANITARY	188.02	2.86

	ELEV.	COVER
ROAD	190.36	
SANITARY	186.77	3.59
STORM	188.14	1.82

	ELEV.	COVER
ROAD	190.39	
SANITARY	186.89	3.50
STORM	188.25	1.64

	ELEV.	COVER
ROAD	190.39	
SANITARY	186.89	3.50
STORM	188.25	1.64

	ELEV.	COVER
ROAD	190.76	
SANITARY	185.82	4.94
STORM	189.15	1.61

	ELEV.	COVER
ROAD	190.22	
SANITARY	186.22	4.00
STORM	188.97	1.25

	ELEV.	COVER
ROAD	189.97	
SANITARY	184.41	5.56
STORM	188.94	1.04

H.P.	ELEV.	COVER
ROAD	190.09	
SANITARY	184.78	5.31

H.P.	ELEV.	COVER
ROAD	190.98	
SANITARY	188.23	2.75

	ELEV.	COVER
ROAD	186.77	
SANITARY	184.44	2.33

	ELEV.	COVER
ROAD	189.97	
SANITARY	186.27	3.70
STORM	188.14	1.82

	ELEV.	COVER
ROAD	189.59	
SANITARY	186.09	3.51
STORM	187.66	1.94

	ELEV.	COVER
ROAD	190.36	
SANITARY	186.74	3.62
STORM	188.40	1.96

	ELEV.	COVER
ROAD	189.84	
SANITARY	186.37	3.47
STORM	187.99	1.85

	ELEV.	COVER
ROAD	189.74	
SANITARY	186.64	3.10
STORM	188.30	1.44

	ELEV.	COVER
ROAD	190.76	
SANITARY	185.82	4.94
STORM	189.15	1.61

	ELEV.	COVER
ROAD	190.22	
SANITARY	186.22	4.00
STORM	188.97	1.25

	ELEV.	COVER
ROAD	190.10	
SANITARY	187.10	3.00
STORM	188.96	1.15

	ELEV.	COVER
ROAD	188.39	
SANITARY	185.37	3.02
STORM	187.49	0.90

	ELEV.	COVER
ROAD	189.97	
SANITARY	184.41	5.56
STORM	188.94	1.04

H.P.	ELEV.	COVER
ROAD	190.09	
SANITARY	184.78	5.31

H.P.	ELEV.	COVER
ROAD	190.98	
SANITARY	188.23	2.75

Legend

- PROPERTY LINE
- EXISTING URBAN BOUNDARY
- BLOCK 3A LIMIT
- BLOCK PLAN AREA 9 LIMIT
- STAGE 1 DRAFT PLAN LIMITS
- EXISTING ENBRIDGE GAS EASEMENT (APPROXIMATE LOCATION)
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- FUTURE STORM SEWER
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY SEWER TRUNK
- FUTURE SANITARY SEWER
- EXISTING WATERMAIN (200mm UNLESS NOTED)
- PROPOSED WATERMAIN (200mm UNLESS NOTED)
- FUTURE WATERMAIN
- PROPOSED SLOPE (3:1 UNLESS NOTED OTHERWISE)

LP	ELEV.	COVER
ROAD	300.82	
STORM	297.88	2.8
SANITARY	297.11	3.4

ROAD STATUS (LP = LOW POINT, HP = HIGH POINT)
ROAD ELEVATION
COVER OVER SEWER (TO OBVERT)
SEWER OBVERT ELEVATION

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 4250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

0.	STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15
Revision		By	Appd	YYYY.MM.DD
File Name:	161414394_C-100_101UG-Con	WJE	WJE	SAK	2024.08.19
		Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

Title
PRELIMINARY SERVICING PLAN

Project No.
161414473

Scale
1:1000 (0, 10, 30, 50m)

Revision
0

Drawing No.
C-100

SEE DRAWING C-100

EXISTING 600mmø CULVERT

	ELEV.	COVER
ROAD	188.39	
SANITARY	185.37	3.02
STORM	187.49	0.90

STREET A

H.P.	ELEV.	COVER
ROAD	190.09	
SANITARY	184.78	5.31

	ELEV.	COVER
ROAD	189.97	
SANITARY	184.41	5.56
STORM	188.94	1.04

KINGMA PROPERTY

H.P.	ELEV.	COVER
ROAD	190.98	
SANITARY	188.23	2.75

	ELEV.	COVER
ROAD	189.77	
SANITARY	184.88	4.89
STORM	188.67	1.11

H.P.	ELEV.	COVER
ROAD	190.68	
SANITARY	187.93	2.75

	ELEV.	COVER
ROAD	189.57	
SANITARY	184.48	5.09
STORM	188.47	1.11

H.P.	ELEV.	COVER
ROAD	190.30	
SANITARY	187.55	2.75

ULTIMATELY THE WESTERN PORTION OF BLOCK AREA 9 AND THE PORT DAVIDSON ROAD RIGHT-OF-WAY DRAINAGE IS TO BE DIRECTED SOUTHWARD AND TO AN OFF-SITE POND LOCATED ON THE WEST SIDE OF PORT DAVIDSON ROAD. SEWERS WITHIN PORT DAVIDSON ROAD RIGHT-OF-WAY WOULD BE DESIGNED BY OTHERS.

EXISTING RESIDENTIAL

FUTURE SANITARY PUMPING STATION (APPROX. LOCATION)

	ELEV.	COVER
ROAD	187.22	
SANITARY	179.56	7.66
STORM	186.11	1.12

STREET D

STREET B

STREET A

	ELEV.	COVER
ROAD	190.76	
SANITARY	185.82	4.94
STORM	189.15	1.61

	ELEV.	COVER
ROAD	190.22	
SANITARY	186.22	4.00
STORM	188.97	1.25

LOCKBRIDGE DEVELOPMENT INC.-PH.2

H.P.	ELEV.	COVER
ROAD	190.94	
SANITARY	187.88	3.06

STREET G

	ELEV.	COVER
ROAD	190.58	
SANITARY	185.34	5.24
STORM	188.93	1.65

	ELEV.	COVER
ROAD	190.18	
SANITARY	184.91	5.27
STORM	188.67	1.52

	ELEV.	COVER
ROAD	190.52	
SANITARY	187.36	3.16
STORM	189.20	1.32

EXISTING RESIDENTIAL

STREET C

STREET H

STREET I

	ELEV.	COVER
ROAD	189.39	
SANITARY	180.52	8.87
STORM	188.29	1.10

H.P.	ELEV.	COVER
ROAD	189.71	
SANITARY	180.16	9.56

H.P.	ELEV.	COVER
ROAD	190.28	
SANITARY	181.37	8.90

	ELEV.	COVER
ROAD	190.00	
SANITARY	181.97	8.03
STORM	188.44	1.56

	ELEV.	COVER
ROAD	190.34	
SANITARY	182.92	7.42
STORM	188.87	1.47

	ELEV.	COVER
ROAD	189.21	
SANITARY	183.29	5.92
STORM	188.28	0.93

	ELEV.	COVER
ROAD	189.41	
SANITARY	184.59	4.82

EXISTING RESIDENTIAL

EXISTING WOODLOT

LANDS OWNED BY OTHERS

PORT DAVIDSON ROAD

P.S.

KEY PLAN Scale : NTS

N

Legend

- PROPERTY LINE
- EXISTING URBAN BOUNDARY
- BLOCK 3A LIMIT
- BLOCK PLAN AREA 9 LIMIT
- STAGE 1 DRAFT PLAN LIMITS
- EXISTING ENBRIDGE GAS EASEMENT (APPROXIMATE LOCATION)
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- FUTURE STORM SEWER
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY SEWER TRUNK
- FUTURE SANITARY SEWER
- EXISTING WATERMAIN (200mm UNLESS NOTED)
- PROPOSED WATERMAIN (200mm UNLESS NOTED)
- FUTURE WATERMAIN
- PROPOSED SLOPE (3:1 UNLESS NOTED OTHERWISE)

ROAD STATUS (LP = LOW POINT, HP = HIGH POINT)
ROAD ELEVATION
COVER OVER SEWER (TO OBVERT)
SEWER OBVERT ELEVATION

LP	ELEV.	COVER
ROAD	300.82	
STORM	297.88	2.8
SANITARY	297.11	3.4

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 4250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

0.	STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15
Revision		By	Appd	YYYY.MM.DD
File Name:	161414394_C-100_101UG-Con	WJE	WJE	SAK 2024.08.19
		Dwn.	Dsgn.	Chkd. YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

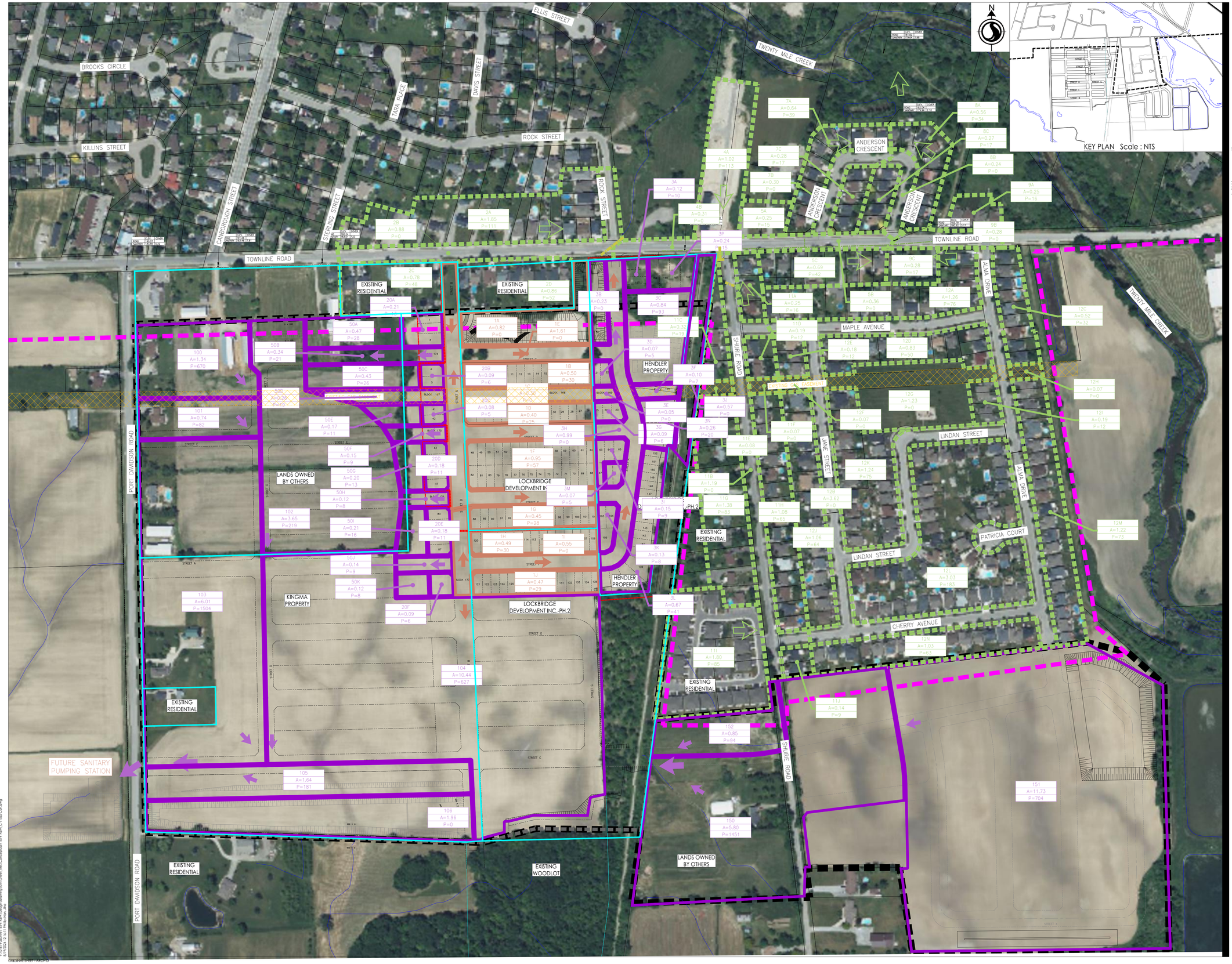
Title
PRELIMINARY SERVICING PLAN

Project No.
161414473

Scale
1:1000 (0, 10, 30, 50m)

Revision
0

Drawing No.
C-101



Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 6250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

Legend

- PROPERTY LINE
- EXISTING URBAN BOUNDARY
- BLOCK 3A LIMIT
- BLOCK PLAN AREA 9 LIMIT
- STAGE 1 DRAFT PLAN LIMIT
- EXISTING ENBRIDGE GAS EASEMENT (APPROXIMATE LOCATION)

EXISTING

- 2A / A=1.85 / P=111 — EXISTING CATCHMENT NUMBER / EXISTING AREA (Ha) / EX. POPULATION (FROM WEST LINCOLN MANUAL)
  SINGLE HOUSES = 60 p/ha
  SEMI-DETACHED HOUSES = 75 p/ha
  LOW DENSITY (TOWNHOUSES) = 110 p/ha
- EXISTING AREA BOUNDARY
- EXISTING FLOW DIRECTION

PROPOSED

- 2E / A=0.13 / P=3 — PROPOSED CATCHMENT NUMBER / PROPOSED AREA (Ha) / PROP. POPULATION (FROM WEST LINCOLN MANUAL)
  SINGLE HOUSES = 60 p/ha
  LOW DENSITY (TOWNHOUSES) = 110 p/ha
  MEDIUM DENSITY = 250 p/ha
  COMMERCIAL = 120-750 p/ha (ASSUMING 500)
- PROPOSED AREA BOUNDARY
- PROPOSED FLOW DIRECTION

FUTURE

- 27 / A=6.31 / P=537 — FUTURE CATCHMENT NUMBER / FUTURE AREA (Ha) / FUT. POPULATION (FROM WEST LINCOLN MANUAL)
  SINGLE HOUSES = 60 p/ha
  LOW DENSITY (TOWNHOUSES) = 110 p/ha
  MEDIUM DENSITY = 250 p/ha
- FUTURE AREA BOUNDARY
- FUTURE FLOW DIRECTION

Revision	By	Appd	YYYY.MM.DD
0. STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15

File Name: 161414394_C-110SS-Con	Dwn.	Dsgn.	Chkd.	
	WJE	WJE	SAK	2024.08.16 YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

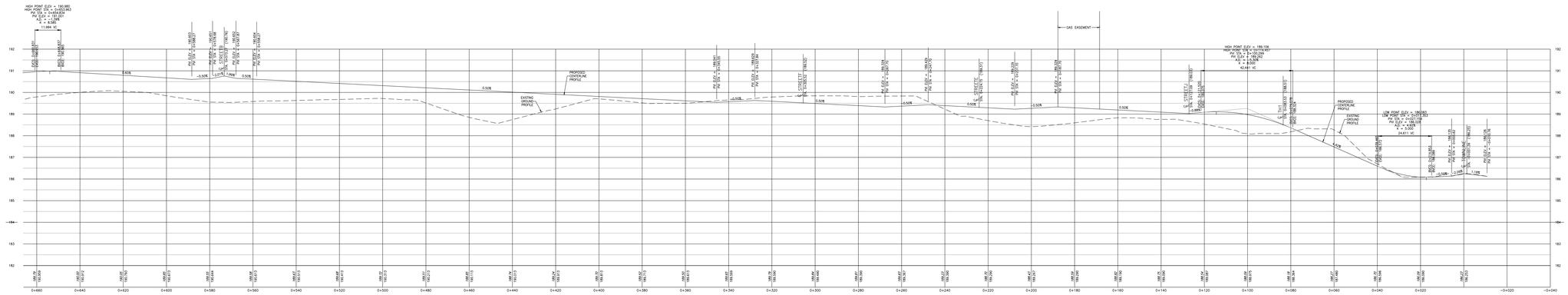
Title
EXTERNAL SANITARY DRAINAGE AREA PLAN

Project No. 161414473

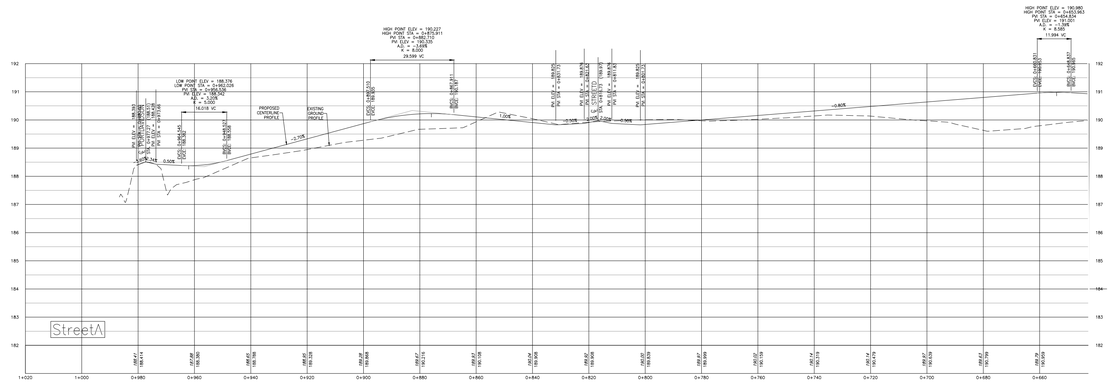
Scale 1:2000 (0, 20, 60, 100m)

Revision 0

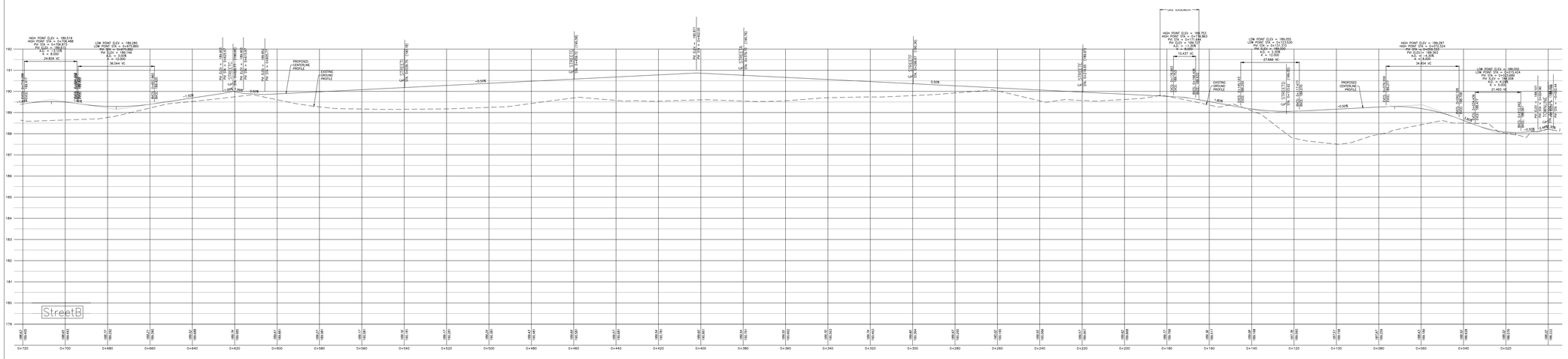
Drawing No. **C-110**



STREET A



STREET A



STREET B

V:\2161\Active\161414394_lockbridge\drawing\civil\street_files\Concept\161414394_C-200S-Con.dwg
8/19/2024 12:17:29 PM By: hsm, phs

ORIGINAL SHEET - ARCH D

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEVS ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 6250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

0. STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15
Revision	By	Appd	YYYY.MM.DD
File Name: 161414394_C-200ST-Con	WJE	WJE	SAK	2024.08.19
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

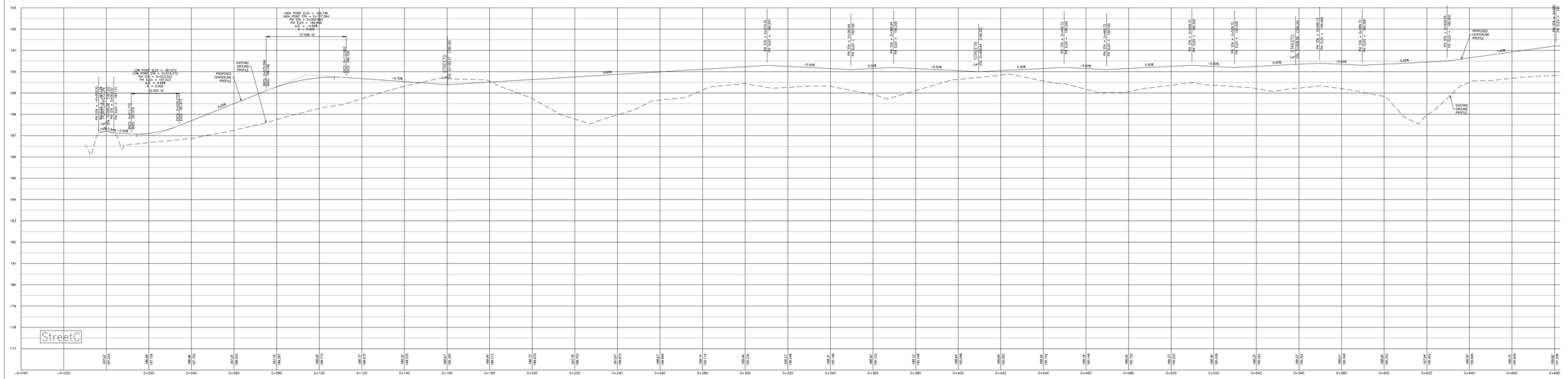
Title
CONCEPTUAL ROAD PROFILES
STREETS A & B

Project No.
161414473

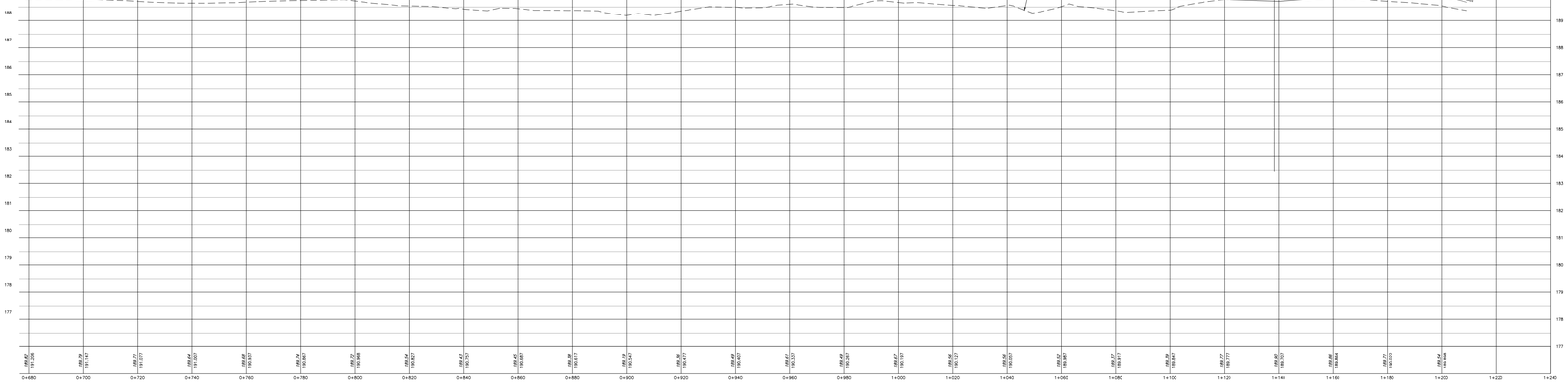
Scale
1:1000H 0 10 30 50m
1:100V 0 1 3 5m

Revision
0

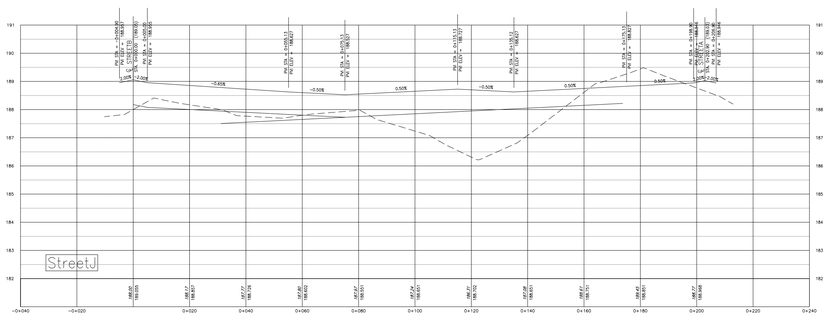
Drawing No.
C-200



STREET C



STREET C



STREET J

V:\01414\active\161414394\drawing\plot\sheet_files\Concept\sch\161414394_C-201ST-Con.dwg
8/19/2024 12:18:38 PM By: Hon, Jing

ORIGINAL SHEET - ARCH D

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 6250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

0.	STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15
Revision		By	Appd	YYYY.MM.DD
File Name:	161414394_C-201ST-Con	WJE	WJE	SAK	2024.08.19
		Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

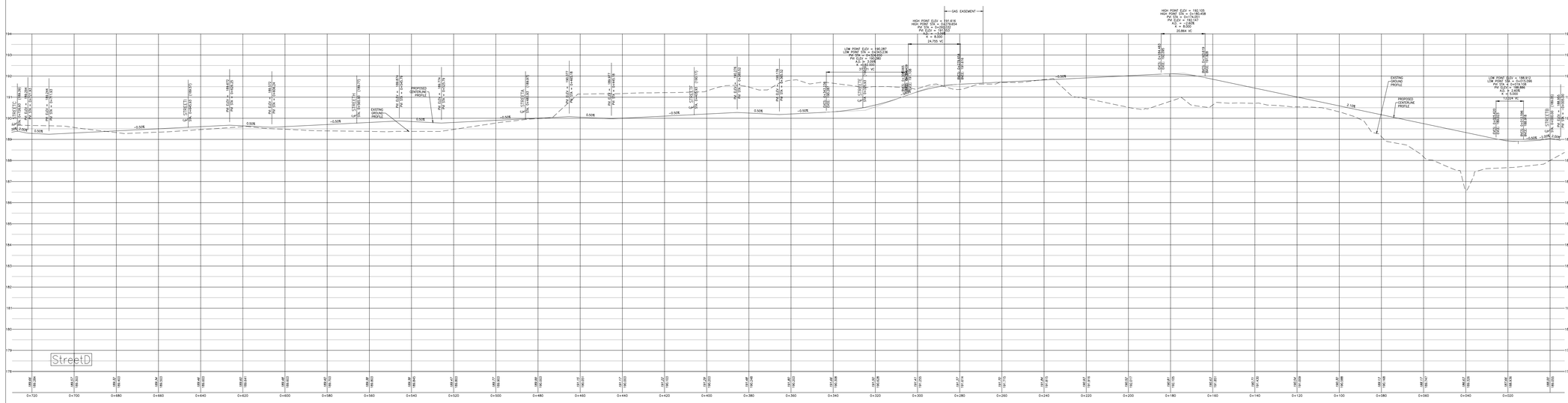
Title
CONCEPTUAL ROAD PROFILES
STREETS C & J

Project No.
161414473

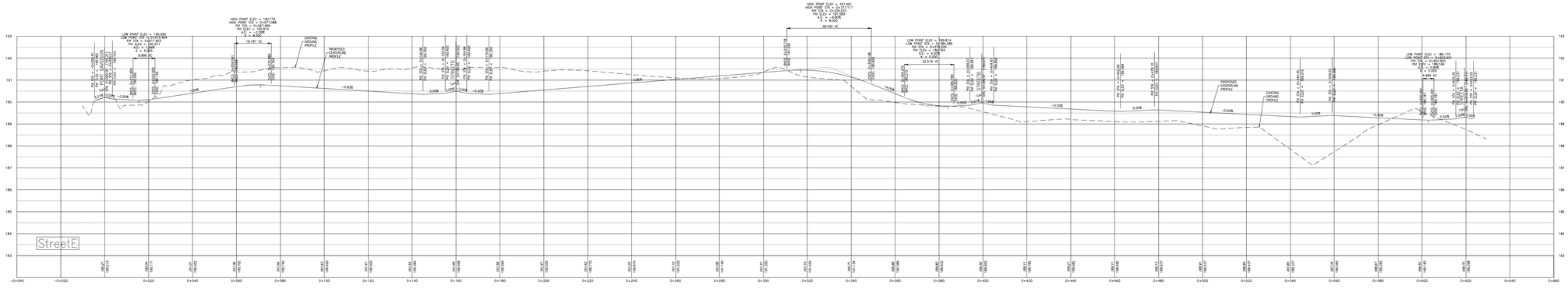
Scale
1:1000H 0 10 30 50m
1:100V 0 1 3 5m

Revision
0

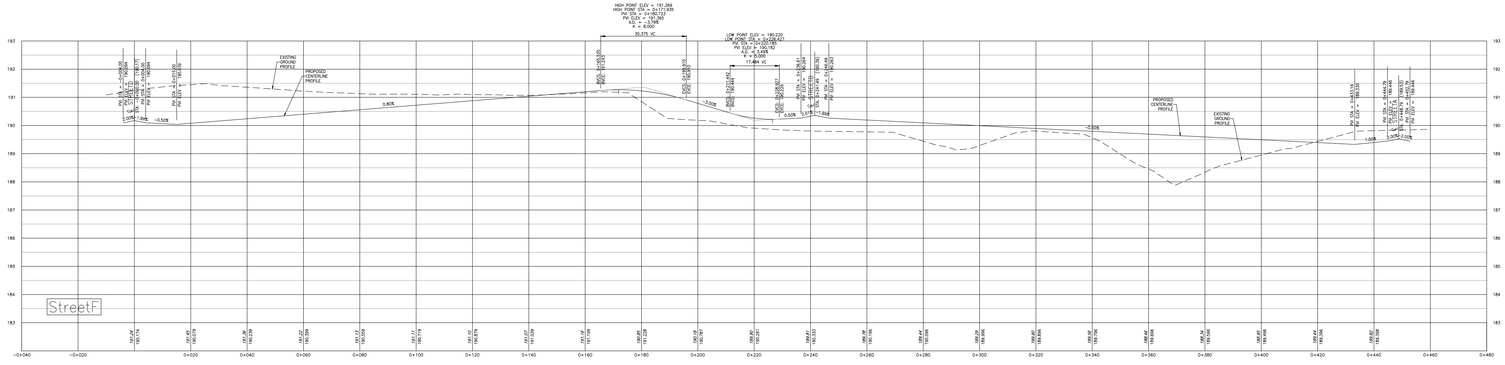
Drawing No.
C-201



STREET D



STREET E



STREET F

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 6250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

0.	STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15
Revision		By	Appd	YYYY.MM.DD
File Name: 161414394_C-202ST-Con		WJE	WJE	SAK	2024.08.19
		Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

Title
CONCEPTUAL ROAD PROFILES
STREETS D, E & F

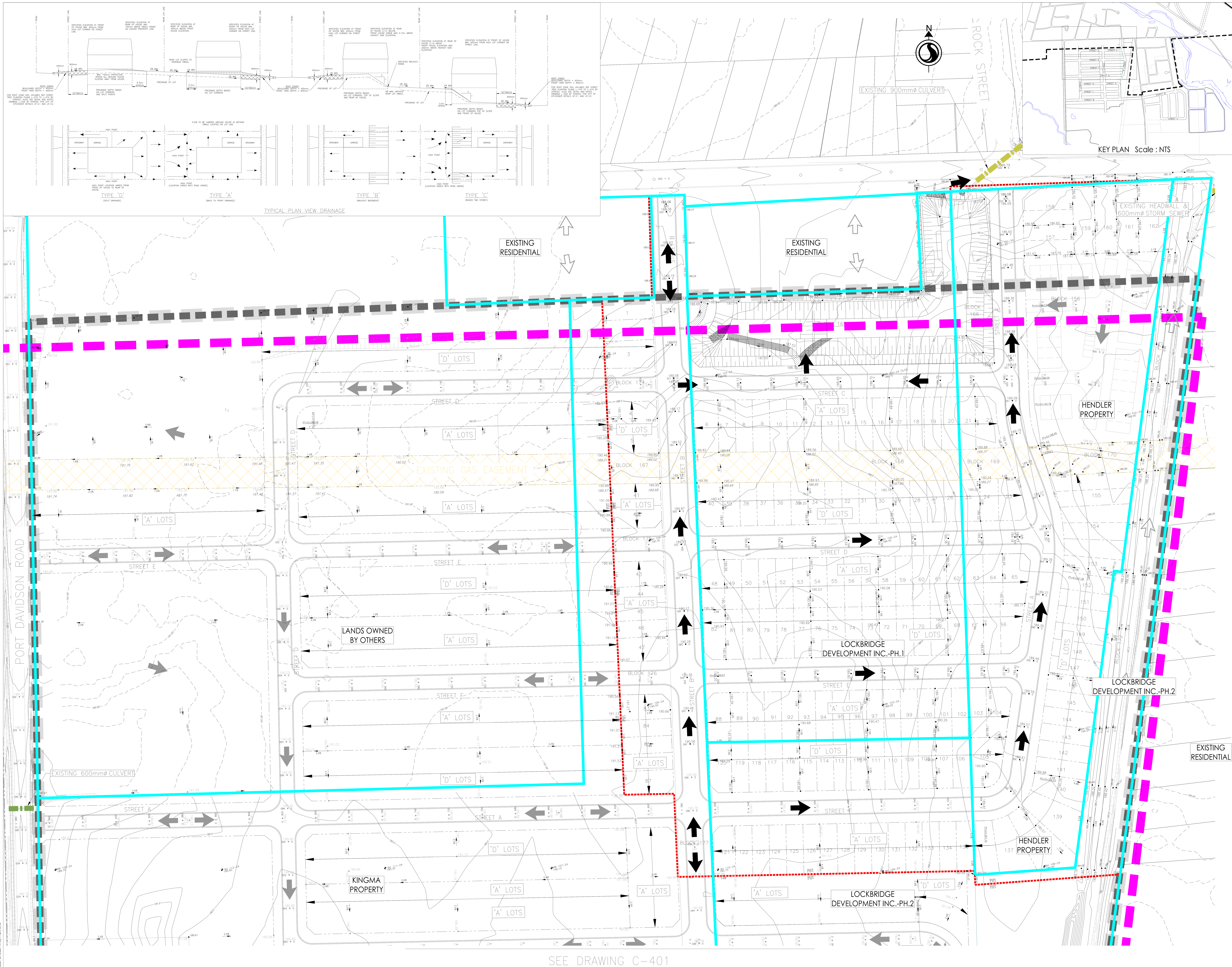
Project No.
161414473

Scale
1:1000H 0 10 30 50m
1:100V 0 1 3 5m

Revision
0

Drawing No.
C-202

ORIGINAL SHEET - ARCH D



ORIGINAL SHEET - ARCH D

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 6250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE, ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

Legend

- PROPERTY LINE
- EXISTING URBAN BOUNDARY
- BLOCK 3A LIMIT
- BLOCK AREA 9 LIMIT
- STAGE 1 DRAFT PLAN LIMITS
- EXISTING ENBRIDGE GAS EASEMENT (APPROXIMATE LOCATION)
- EXISTING DRIPLINE (SURVEYED BY STANTEC AND REVIEWED BY CITY/REGION JULY 6, 2022)
- STANTEC 5.0m DRIPLINE SETBACK
- 180.75 (EX) — EXISTING ELEVATION
- 181.25 — PROPOSED ELEVATION
- 5.0% 2.0% — FLOW DIRECTION AND GRADE
- 185.00 — EXISTING CONTOUR
- 185.00 — EXISTING CONTOUR (FROM S.W.O.O.P. 2010)
- PROPOSED SLOPE (3:1 UNLESS NOTED OTHERWISE)
- OVERLAND FLOW DIRECTION
- EXISTING OVERLAND FLOW DIRECTION
- FUT. OVERLAND FLOW DIRECTION
- EXSITING TREE
- (HP)/(LP) — HIGH POINT/LOW POINT LOCATION
- BH/MW 101–24 (IDENTIFICATION NUMBER, INSTALL YEAR) HGW 291.69 187.80 — BOREHOLE/MONITORING WELL (WITH GROUND ELEVATION, AND HIGH GROUND WATER ELEVATION)
- A/D/WO — PROPOSED UNIT TYPE (BACK TO FRONT/SPLIT/WALKOUT)

0. STAGE 1 DRAFT PLAN SUBMISSION		JH	KBL	2024.08.15
Revision		By	Appd	YYYY.MM.DD
File Name: 161414394_C-400_401GP-Con	WJE	WJE	SAK	2024.08.15
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project

LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

Title

PRELIMINARY GRADING PLAN

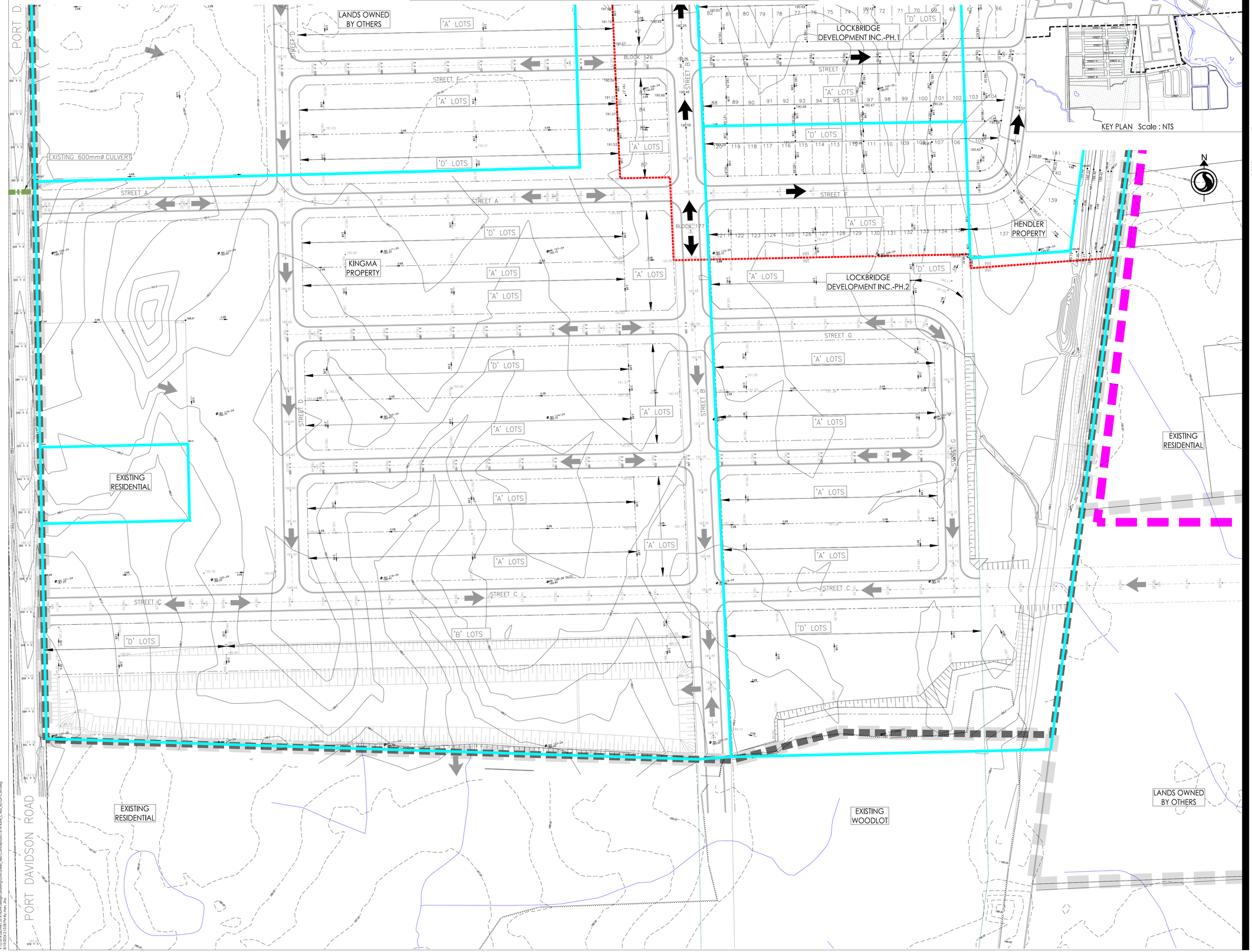
Project No. 161414473

Scale 1:1000 (0 10 30 50m)

Revision 0

Drawing No. **C-400**

SEE DRAWING C-400



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 4250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

Legend

- PROPERTY LINE
- EXISTING URBAN BOUNDARY
- BLOCK 3A LIMIT
- BLOCK AREA 9 LIMIT
- STAGE 1 DRAFT PLAN LIMITS
- EXISTING ENBRIDGE GAS EASEMENT (APPROXIMATE LOCATION)
- EXISTING DRIPLINE (SURVEYED BY STANTEC AND REVIEWED BY CITY/REGION JULY 6, 2022)
- STANTEC 5.0m DRIPLINE SETBACK
- 180.75 (EX) — EXISTING ELEVATION
- 181.25 — PROPOSED ELEVATION
- 2.0% 2.0% — FLOW DIRECTION AND GRADE
- 185.00 — EXISTING CONTOUR
- 185.00 — EXISTING CONTOUR (FROM S.W.O.O.P. 2010)
- PROPOSED SLOPE (3:1 UNLESS NOTED OTHERWISE)
- OVERLAND FLOW DIRECTION
- EXISTING OVERLAND FLOW DIRECTION
- FUT. OVERLAND FLOW DIRECTION
- EXISTING TREE
- (HP) / (LP) — HIGH POINT/LOW POINT LOCATION (IDENTIFICATION NUMBER / INITIAL YEAR)
- BH/MW 101-24 EL=291.69 187.80 — BOREHOLE/MONITORING WELL (WITH GROUND ELEVATION, AND HIGH GROUND WATER ELEVATION)
- A / D / WO — PROPOSED UNIT TYPE (BACK TO FRONT/SPLIT/WALKOUT)

0.	STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15
Revision		By	Appd	YYYY.MM.DD
File Name:	161414394_C-400_401GP-Con	WJE	WJE	SAK	2024.08.15
		Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

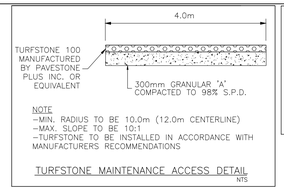
Title
PRELIMINARY GRADING PLAN

Project No.
161414473

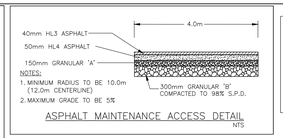
Scale
1:1000 (0, 10, 30, 50m)

Revision
0

Drawing No.
C-401

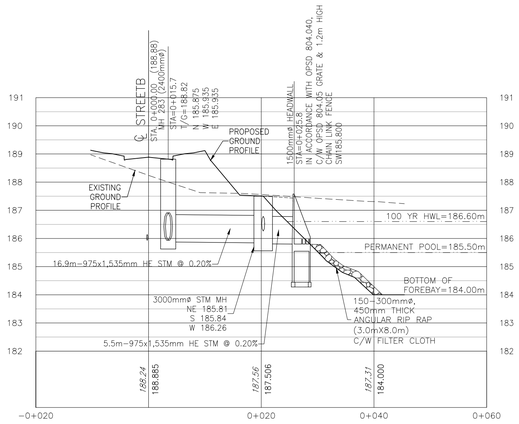


TURFSTONE MAINTENANCE ACCESS DETAIL
NTS



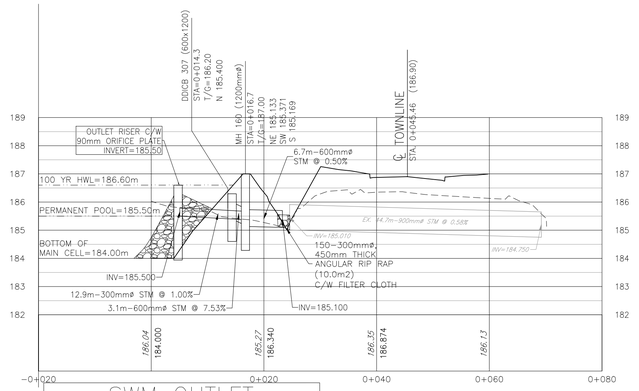
ASPHALT MAINTENANCE ACCESS DETAIL
NTS

NOTE: POND TO BE LINED UP TO PERMANENT POOL ELEVATION. A GEOTECHNICAL CONSULTANT IS TO DETERMINE THE THICKNESS OF THE POND LINER (T.B.D AT TIME OF POND GRADING)



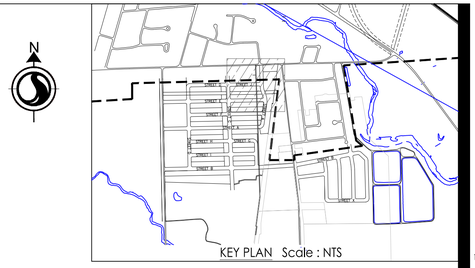
SWM INLET
[CROSS-SECTION A-A]

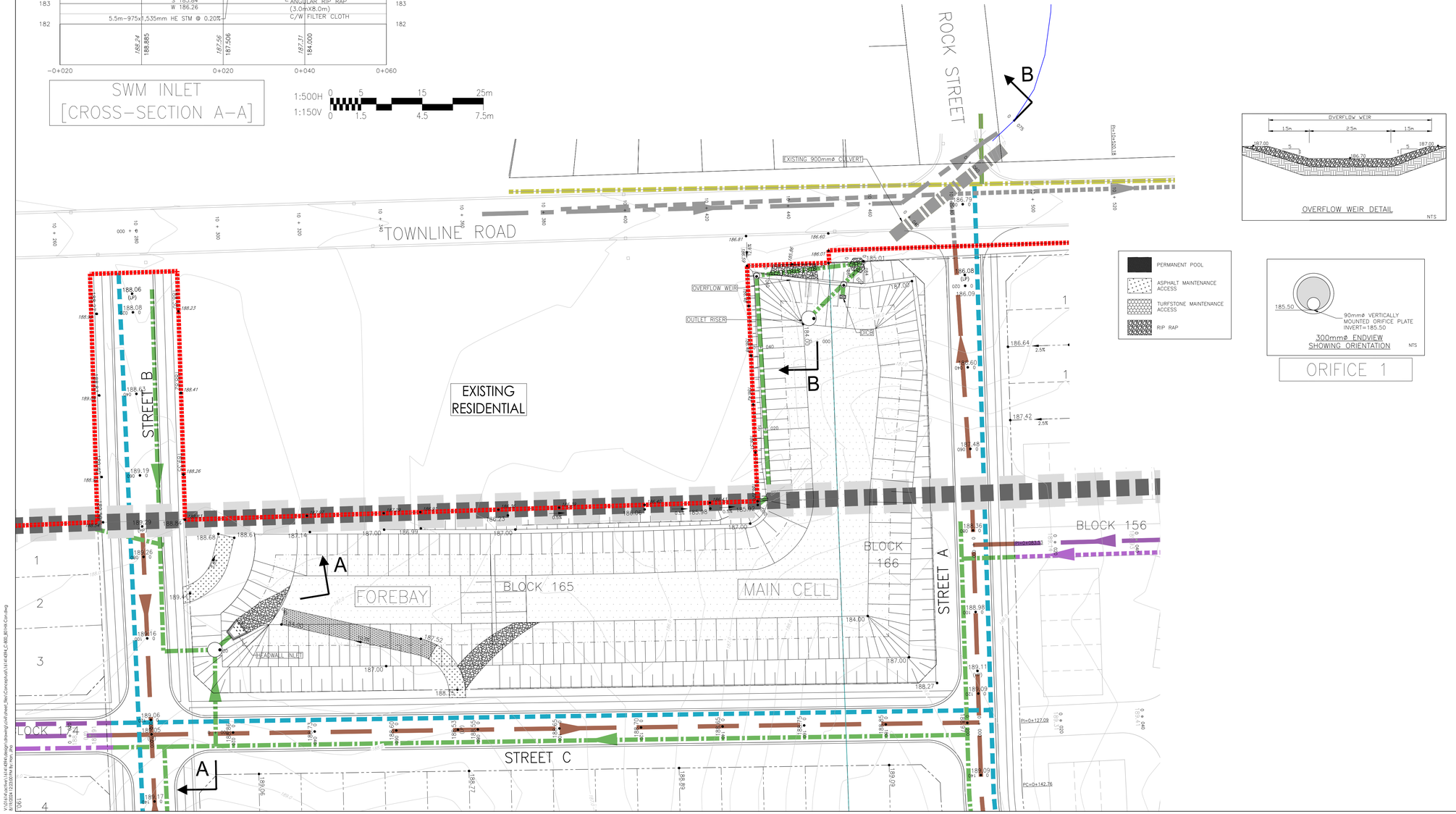
1:500H 0 5 15 25m
1:150V 0 1.5 4.5 7.5m



SWM OUTLET
[CROSS-SECTION B-B]

1:500H 0 5 15 25m
1:150V 0 1.5 4.5 7.5m





OVERFLOW WEIR DETAIL
NTS

PERMANENT POOL
ASPHALT MAINTENANCE ACCESS
TURFSTONE MAINTENANCE ACCESS
RIP RAP

ORIFICE 1

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 6250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE, ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

Legend

- PROPERTY LINE
- BLOCK 3A LIMIT
- BLOCK PLAN AREA 9 LIMIT
- STAGE 1 DRAFT PLAN LIMITS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- FUTURE STORM SEWER
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- FUTURE WATERMAIN

0.	STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15
Revision		By	Appd	YYYY.MM.DD
File Name:	161414394_C-800_801HX-Con	WJE	WJE	SAK	2024.08.19
		Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

Title
PRELIMINARY SWM FACILITY PLAN - NORTH

Project No. 161414473
Scale 1:500 (0 5 15 25m)
Revision 0
Drawing No. **C-800**

ORIGINAL SHEET - ARCH D

Stantec

EARTHWORKS

SMITHVILLE 3A

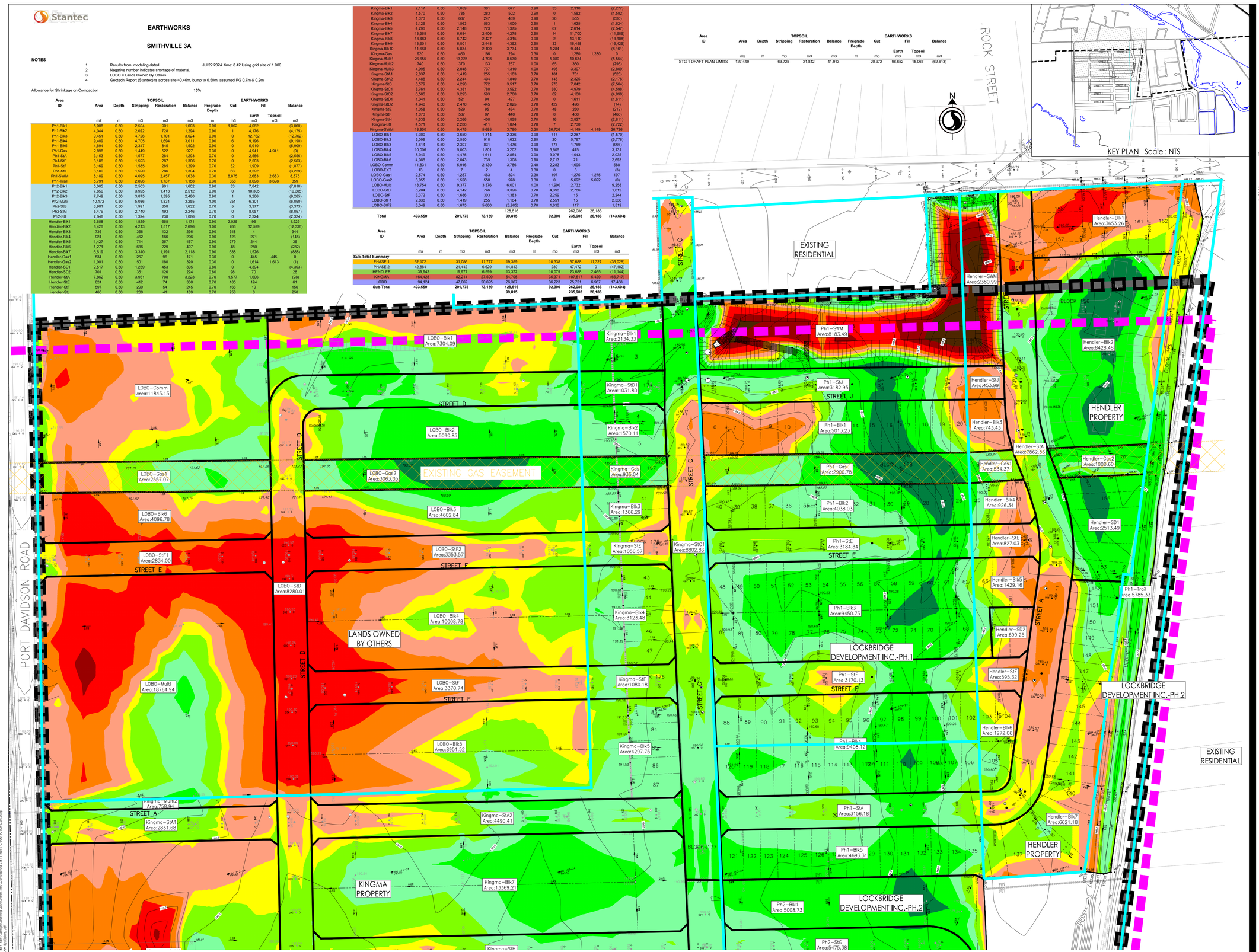
NOTES

1. Results from modeling dated Jul 22 2024 time: 8.42 Using grid size of 1.000
2. Negative number indicates shortage of material.
3. LOBO = Lands Owned By Others
4. Geotech Report (Stantec) to across site ~0.46m, bump to 0.50m, assumed PG 0.7m & 0.9m

Allowance for Shrinkage on Compaction **10%**

Area ID	Area	Depth	TOPSOIL Stripping	TOPSOIL Restoration	TOPSOIL Balance	Pregrade Depth	EARTHWORKS Cut	EARTHWORKS Fill	EARTHWORKS Earth	EARTHWORKS Topsoil	EARTHWORKS Balance
	m2	m	m3	m3	m3	m	m3	m3	m3	m3	m3
Ph1-Blk1	5,008	0.50	2,504	901	1,603	0.90	1,002	4,062			(3,060)
Ph1-Blk2	4,044	0.50	2,022	728	1,294	0.90	1	4,176			(4,175)
Ph1-Blk3	9,451	0.50	4,726	1,701	3,024	0.90	0	12,762			(12,762)
Ph1-Blk4	9,409	0.50	4,705	1,694	3,011	0.90	0	9,196			(9,190)
Ph1-Blk5	4,694	0.50	2,347	845	1,502	0.90	0	5,910			(5,909)
Ph1-Gas	2,898	0.50	1,449	522	927	0.30	0	4,941	4,941	0	(0)
Ph1-SIA	3,153	0.50	1,577	284	1,293	0.70	0	2,556			(2,556)
Ph1-SIE	3,186	0.50	1,593	287	1,306	0.70	0	2,503			(2,503)
Ph1-SIF	3,169	0.50	1,585	285	1,299	0.70	32	1,909			(1,877)
Ph1-SIJ	3,180	0.50	1,590	286	1,304	0.70	63	3,292			(3,229)
Ph1-SWM	8,189	0.50	4,095	2,457	1,638	0.30	8,875	2,683	2,683	8,875	
Ph1-Trail	5,791	0.50	2,896	1,737	1,158	0.30	358	3,698	3,698		359
Ph2-Blk1	5,005	0.50	2,503	901	1,602	0.90	33	7,842			(7,810)
Ph2-Blk2	7,850	0.50	3,925	1,413	2,512	0.90	0	10,305			(10,305)
Ph2-Blk3	7,749	0.50	3,875	1,395	2,480	0.90	1	9,266			(9,265)
Ph2-Multi	10,172	0.50	5,086	1,831	3,255	1.00	251	6,301			(6,050)
Ph2-StB	3,981	0.50	1,991	358	1,632	0.70	5	3,377			(3,373)
Ph2-StG	5,479	0.50	2,740	493	2,246	0.70	0	8,057			(8,057)
Ph2-StI	2,648	0.50	1,324	238	1,086	0.70	0	2,324			(2,324)
Hendler-Blk1	3,658	0.50	1,829	658	1,171	0.90	2,025	96			1,929
Hendler-Blk2	8,426	0.50	4,213	1,517	2,696	1.00	263	12,599			(12,336)
Hendler-Blk3	736	0.50	368	132	236	0.90	348	4			344
Hendler-Blk4	924	0.50	462	166	296	0.90	123	271			(148)
Hendler-Blk5	1,427	0.50	714	257	457	0.90	279	244			35
Hendler-Blk6	1,271	0.50	636	229	407	0.90	48	280			(232)
Hendler-Blk7	6,619	0.50	3,310	1,191	2,118	0.90	638	1,526			(888)
Hendler-Gas1	534	0.50	267	96	171	0.30	0	445	445	0	
Hendler-Gas2	1,001	0.50	501	180	320	0.30	0	1,614	1,613	1	(1)
Hendler-SD1	2,517	0.50	1,259	453	805	0.80	0	4,394			(4,393)
Hendler-SD2	351	0.50	176	126	224	0.80	98	70			28
Hendler-StA	7,862	0.50	3,931	708	3,223	0.70	1,577	1,606			(28)
Hendler-StE	824	0.50	412	74	338	0.70	185	124			61
Hendler-StF	597	0.50	299	54	245	0.70	166	10			156
Hendler-StJ	460	0.50	230	41	189	0.70	258	0			258
Kingma-Blk1	2,117	0.50	1,059	381	677	0.90	33	2,310			(2,277)
Kingma-Blk2	1,570	0.50	785	283	502	0.90	0	1,582			(1,582)
Kingma-Blk3	1,373	0.50	687	247	439	0.90	26	555			(530)
Kingma-Blk4	3,126	0.50	1,563	563	1,000	0.90	1	1,625			(1,624)
Kingma-Blk5	4,296	0.50	2,148	773	1,375	0.90	67	2,614			(2,547)
Kingma-Blk7	13,368	0.50	6,684	2,406	4,278	0.90	14	11,700			(11,686)
Kingma-Blk8	13,483	0.50	6,742	2,427	4,315	0.90	2	13,110			(13,108)
Kingma-Blk9	13,601	0.50	6,801	2,448	4,352	0.90	33	16,458			(16,425)
Kingma-Blk10	11,668	0.50	5,834	2,100	3,734	0.90	1,284	9,444			(8,161)
Kingma-Gas	920	0.50	460	166	294	0.30	0	1,280	1,280	0	
Kingma-Multi1	26,855	0.50	13,328	4,798	8,530	1.00	5,080	10,634			(5,554)
Kingma-Multi2	740	0.50	370	133	237	1.00	65	360			(295)
Kingma-Multi3	4,095	0.50	2,048	737	1,310	1.00	498	3,307			(2,809)
Kingma-StA1	2,837	0.50	1,419	255	1,163	0.70	181	701			(520)
Kingma-StA2	4,488	0.50	2,244	404	1,840	0.70	148	2,325			(2,176)
Kingma-StB	8,579	0.50	4,290	772	3,517	0.70	278	7,842			(7,564)
Kingma-StC1	8,761	0.50	4,381	788	3,592	0.70	380	4,979			(4,598)
Kingma-StC2	6,586	0.50	3,293	593	2,700	0.70	62	4,160			(4,098)
Kingma-StD1	1,041	0.50	521	94	427	0.70	0	1,611			(1,611)
Kingma-StD2	4,940	0.50	2,470	445	2,025	0.70	422	496			(74)
Kingma-StE	1,058	0.50	529	95	434	0.70	48	260			(212)
Kingma-StF	1,073	0.50	537	97	440	0.70	0	460			(460)
Kingma-StH	4,532	0.50	2,266	408	1,858	0.70	16	2,827			(2,811)
Kingma-StI	4,571	0.50	2,286	411	1,874	0.70	7	2,730			(2,722)
Kingma-SWM	18,950	0.50	9,475	5,685	3,790	0.30	26,726	4,149	4,149	26,726	
LOBO-Blk1	7,300	0.50	3,650	1,314	2,336	0.90	717	2,287			(1,570)
LOBO-Blk2	5,099	0.50	2,550	918	1,632	0.90	20	5,797			(5,778)
LOBO-Blk3	4,614	0.50	2,307	831	1,476	0.90	775	1,769			(993)
LOBO-Blk4	10,006	0.50	5,003	1,801	3,202	0.90	3,606	475			3,131
LOBO-Blk5	8,949	0.50	4,475	1,611	2,864	0.90	3,078	1,043			2,035
LOBO-Blk6	4,086	0.50	2,043	735	1,308	0.90	2,713	21			2,693
LOBO-Comm	11,831	0.50	5,916	2,130	3,786	0.40	2,283	1,695			588
LOBO-EXT	13	0.50	7	2	4	0.30	0	3			(3)
LOBO-Gas1	2,574	0.50	1,287	463	824	0.30	197	1,275	1,275		197
LOBO-Gas2	3,055	0.50	1,528	550	978	0.30	0	5,692	5,692		(0)
LOBO-Multi	18,754	0.50	9,377	3,376	6,001	1.00	11,990	2,732			9,258
LOBO-StD	8,284	0.50	4,142	746	3,396	0.70	4,398	2,786			1,612
LOBO-StF	3,372	0.50	1,686	303	1,383	0.70	2,259	15			2,244
LOBO-StF1	2,838	0.50	1,419	255	1,164	0.70	2,551	15			2,536
LOBO-StF2	3,349	0.50	1,675	5,660	(3,985)	0.70	1,636	117			1,519
Total	**403,550**		**201,775**	**73,159**	**99,815**		**128,616 99,815**		**92,300**	**262,086 235,903**	**26,183 (143,604)**

Area ID	Area	Depth	TOPSOIL Stripping	TOPSOIL Restoration	TOPSOIL Balance	Pregrade Depth	EARTHWORKS Cut	EARTHWORKS Fill	EARTHWORKS Earth	EARTHWORKS Topsoil	EARTHWORKS Balance
	m2	m	m3	m3	m3	m	m3	m3	m3	m3	m3
Sub-Total Summary											
PHASE 1	62,172		31,086	11,727	19,359		10,338	57,688	11,322		(36,028)
PHASE 2	42,884		21,442	6,629	14,813		289	47,472	0		(47,182)
HENDLER	39,942		19,971	6,599	13,372		10,079	23,688	2,465		(11,144)
KINGMA	164,428		82,214	27,509	54,705		35,371	107,517	5,429		(66,717)
LOBO	94,124		47,062	20,695	26,367		32,223	25,721	5,967		17,468
Sub-Total	**403,550**		**201,775**	**73,159**	**128,616 99,815**		**92,300**	**262,086 235,903**	**26,183**		**(143,604)**



SEE DRAWING C-901

V:\2161\Active\161414394\design\drawing\civil\sheet_files\Concept\161414394_C-900_901CF-Con.dwg
Fri 6/20/25 8:38:21 AM By: Dales, Jeff

ORIGINAL SHEET - ARCH D

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 6250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED JANUARY 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED JANUARY 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
1	-4.23	-3.00	1482.11	
2	-3.00	-2.00	9485.86	
3	-2.00	-1.00	22977.96	
4	-1.00	-0.50	27287.21	
5	-0.50	-0.10	46457.80	
6	-0.10	0.10	33875.77	
7	0.10	0.50	64909.08	
8	0.50	1.00	96881.15	
9	1.00	2.00	90811.64	
10	2.00	3.53	8878.40	

0. STAGE 1 DRAFT PLAN SUBMISSION		JH	KBL	2024.08.15
Revision		By	Appd	YYYY.MM.DD
File Name: 161414394_C-900_901CF-Con		WJE	WJE	SAK 2024.07.22
		Dwn.	Dsgn.	Chkd. YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK AREA 9
SMITHVILLE 3A

Smithville, ON

Title
CONCEPTUAL CUT/FILL PLAN

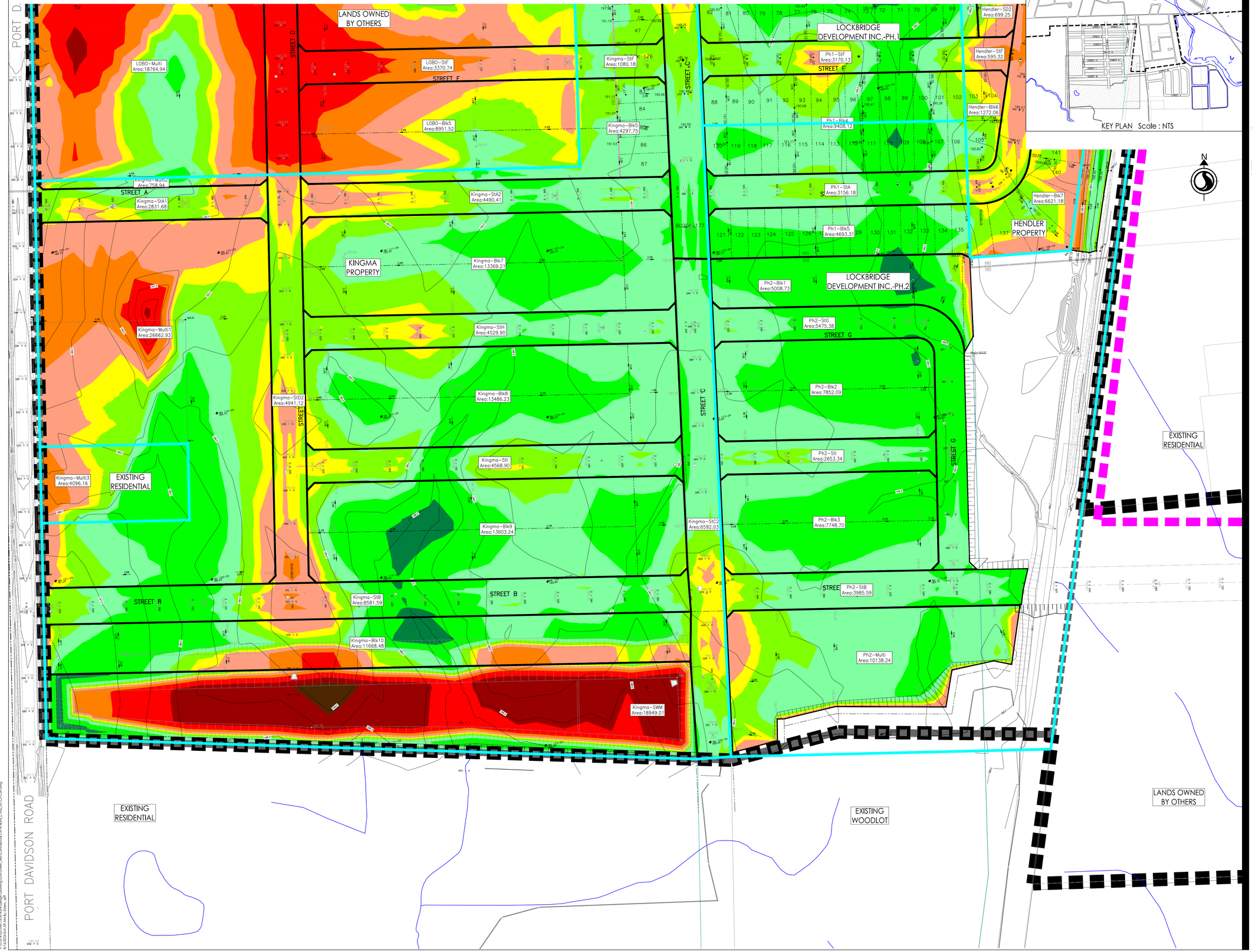
Project No. 161414473

Scale 1:1000 (0, 10, 30, 50m)

Revision 0

Drawing No. **C-900**

SEE DRAWING C-900



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 6250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED JANUARY 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED JANUARY 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Area	Color
1	-4.23	-3.00	1482.11	
2	-3.00	-2.00	9485.86	
3	-2.00	-1.00	22977.96	
4	-1.00	-0.50	27287.21	
5	-0.50	-0.10	46457.80	
6	-0.10	0.10	33875.77	
7	0.10	0.50	64909.08	
8	0.50	1.00	96881.15	
9	1.00	2.00	90811.64	
10	2.00	3.53	8878.40	

0	STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15
Revision		By	Appd	YYYY.MM.DD
File Name: 161414394_C-900_901CF-Con		WJE	WJE	SAK	2024.07.22
		Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK AREA 9
SMITHVILLE 3A

Smithville, ON

Title
CONCEPTUAL CUT/FILL PLAN

Project No. 161414473

Scale 1:1000 (0 10 30 50m)

Revision 0

Drawing No. **C-901**

V:\01414\active\161414394\design\drawings\civil\sheet_files\Concept.cut\161414394_C-900_901CF-Con.dwg
Fri Oct 25 2024 8:41:07 AM By: Eblais, Jeff

ORIGINAL SHEET - ARCH D

APPENDIX D
Watermain Background

Figure 3.A.1 Existing Water System

Niagara Region

2021 Water and Wastewater Master Servicing Plan Update

Existing Water Infrastructure

- Chlorine Facility
- Elevated Tank
- Fluoride Station
- Pumping Station
- Reservoir
- Standpipe
- Water Treatment Plant
- Region Mains
- Local Mains
- Private

Water Pressure Zones (HGL)

148 | 149 | 154 | 163 | 193 | 210 | 216 | 225 | 239

Other Features

- Township of Wainfleet
- Waterbodies
- Urban Area Boundary

Figure 3.A.1
Grimsby System
Existing Water Infrastructure

BluePlan ENGINEERING

December 2022
621016-W-001
WKID: 26917

APPENDIX E
SANITARY ANALYSIS

- APPENDIX E-1 Figure 4.A.1 Existing Wastewater System
- APPENDIX E-2 Sanitary Sewer Design Sheet
- APPENDIX E-3 Gravity Initial First Phase Sanitary Servicing Analysis Brief
- APPENDIX E-4 CIV 09 Data Chart and Flow Monitoring
- APPENDIX E-5 Sanitary Design – CIV 09 Monitoring Flow and Theoretical Sanitary Flow from the Proposed Site
- APPENDIX E-6 Sanitary Design – Existing Built-Up Area Intensification

APPENDIX E-1

FIGURE 4.A.1 EXISTING WASTEWATER SYSTEM

Niagara Region

2016 MASTER SERVICING PLAN

Old Orchard Pumping Station
Lake Street Pumping Station
Woodsview Pumping Station
Lakewood Garden Pumping Station
Biggar Lagoon Pumping Station
Roberts Road Pumping Station
Bal Harbour Pumping Station
Baker Road W.W.T.P.
Ontario Street Pumping Station
Laurie Avenue Pumping Station
Victoria Avenue Pumping Station
Bridgeport Pumping Station
Jordan Valley Pumping Station
Campden Pumping Station
Streamside Pumping Station
Smithville Pumping Station

Lake Ontario
City of Hamilton
Town of Grimsby
Township of West Lincoln
Town of Lincoln
Town of Pelham

N

0 2 4 Kilometers

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Wastewater Facilities

- Wastewater Treatment Plant
- Combined Sewage Detention Facility
- Lagoon
- Odour Control Facility
- Leachate Pumping Station

Pumping Stations
- Regional
- Municipal
- Private

Wastewater Network
- Regional
- Local
- Private
- Forcemain

Wastewater Catchments*

*Catchment limits are shown based on property boundaries and are within 100 m of sewers.

- Baker Road W.W.T.P.
- Bal Harbour
- Biggar Lagoon
- Bridgeport
- Campden
- Jordan Valley
- Lake Street
- Lakewood Garden
- Laurie Avenue
- Old Orchard
- Ontario Street
- Roberts Road
- Smithville
- Streamside
- Victoria Avenue
- Woodsview

Figure 4.A.1

Existing Wastewater System

Baker Road WWTP

BluePlan Engineering

June 2017

715023-WW-2-Existing System (Baker Road)

NAD 1983 UTM Zone 17N

APPENDIX E-2

SANITARY SEWER DESIGN
SHEET

Stantec

Lockbridge Development Inc
Smithville 3A
People/Hectare (p/ha)

DATE: August 16, 2024
DESIGNED BY: WJE
CHECKED BY: SAK

SANITARY SEWER DESIGN SHEET

FILE NUMBER: N/A
Project Number 161414394

Design Parameters

Mininum Velocity= 0.600 m/s
n= 0.013
Max Peak Factor= 5.000
Min Peak Factor= 2.000

Residential: 255 L/day/Person
0.0030 L/s/Person
Comercial: 1.500 L/s/Ha
Industrial: 1.000 L/s/Ha
Institutional: 0.375 L/s/Ha
Infiltration: 0.286 L/s/Ha

LOCATION			RESIDENTIAL AREA AND POPULATION								COMMERCIAL			INDUSTRIAL			INSTITUTIONAL				INFILTRATION				PIPE SELECTION						
Street	U/S	D/S	Area ID	Residential Area (ha)	Population Density (P/ha)	Population (P)	Cummulative Area (ha)	Cumulative Population (min)	Peak Factor	Peak Flow L/s	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Total C+I+I Flow (L/s)	Total Area (ha)	Accumulated Area (ha)	Flow (L/s)	Total Flow (L/s)	Length Design (m)	Design Size (mm)	Slope Design (%)	Full Capacity (L/s)	Full Velocity (m/s)	Actual Velocity (m/s)	Q_a/Q_c (%)
Townline Road			2A	1.85	60	111																									
			2B	0.88	0	0																									
			2C	0.78	60	48																									
			2D	0.86	60	52																									
	72	71		4.37		211	4.37	211	4.14	2.58			0.00			0.00			0.00	0.00	4.37	4.37	1.250	3.83	95.7	200	0.60	25.41	0.81	0.92	15.1%
	71						4.37	211					0.00			0.00			0.00	0.00											
Our Site			1A	0.82	0	0																									
3A (Subject Property)			1B	0.50	60	30																									
			1C	0.30	0	0																									
			1D	0.40	60	25																									
			1E	1.61	0	0																									
			1F	0.95	60	57																									
			1G	0.45	60	28																									
			1H	0.49	60	30																									
			1I	0.55	0	0																									
			1J	0.47	60	29																									
Kingma			20A	0.21	60	13																									
			20B	0.09	60	6																									
			20C	0.08	60	5																									
			20D	0.18	60	11																									
			20E	0.18	60	11																									
	284	142		7.28		245	7.28	245	4.11	2.98			0.00			0.00			0.00	0.00	7.28	7.28	2.082	5.06	52.7	200	0.50	23.19	0.74	0.84	21.8%
	142						7.28	245					0.00			0.00			0.00	0.00											
Hendler			3A	0.12	75	10																									
			3B	0.23	0	0																									
			3C	0.84	110	93																									
			3D	0.07	60	5																									
			3E	0.05	0	0																									
			3F	0.10	60	7																									
			3G	0.09	60	6																									
			3H	0.99	0	0																									
			3I	0.15	60	9																									
			3J	0.57	0	0																									
			3K	0.13	60	8																									
			3L	0.67	60	41																									
			3M	0.07	75	5																									
			3N	0.26	75	20																									
			3P	0.24	60	15																									
	267	142		4.58		219	4.58	219	4.13	2.67			0.00			0.00			0.00	0.00	4.58	4.58	1.310	3.98	65.4	200	1.00	32.80	1.04	1.19	12.1%
	142						4.58	219					0.00			0.00			0.00	0.00											
Outlet from Our Site	142	71					11.86	464	3.99	5.47			0.00			0.00			0.00	0.00	0.00	11.86	3.392	8.86	77.0	200	0.49	22.96	0.73	0.83	38.6%
	71																														
Townline Road			4A	1.02	110	113																									
			4B	0.31	0	0																									
	71	70		1.33		113	17.56	788	3.86	8.99			0.00			0.00			0.00	0.00	1.33	17.56	5.022	14.01	68.9	200	0.60	25.41	0.81	0.92	55.1%
	70	69					17.56	788	3.86	8.99			0.00			0.00			0.00	0.00	0.00	17.56	5.022	14.01	67.4	200	1.70	42.76	1.36	1.55	32.8%
	69						17.56	788					0.00			0.00			0.00	0.00											

Stantec

Lockbridge Development Inc
Smithville 3A
People/Hectare (p/ha)

DATE: August 16, 2024
DESIGNED BY: WJE
CHECKED BY: SAK

SANITARY SEWER DESIGN SHEET

FILE NUMBER: N/A
Project Number 161414394

Design Parameters

Mininum Velocity=	0.600	m/s		
n=	0.013		Residential:	255 L/day/Person
Max Peak Factor=	5.000			0.0030 L/s/Person
Min Peak Factor=	2.000		Comercial:	1.500 L/s/Ha
			Industrial:	1.000 L/s/Ha
			Institutional:	0.375 L/s/Ha
			Infiltration:	0.286 L/s/Ha

LOCATION			RESIDENTIAL AREA AND POPULATION								COMMERCIAL			INDUSTRIAL			INSTITUTIONAL				INFILTRATION				PIPE SELECTION						
Street	U/S	D/S	Area ID	Residential Area (ha)	Population Density (P/ha)	Population (P)	Cummulative Area (ha)	Cumulative Population (min)	Peak Factor	Peak Flow L/s	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Total C+I+I Flow (L/s)	Total Area (ha)	Accumulated Area (ha)	Flow (L/s)	Total Flow (L/s)	Length Design (m)	Design Size (mm)	Slope Design (%)	Full Capacity (L/s)	Full Velocity (m/s)	Actual Velocity (m/s)	Q_a/Q_c (%)
Shurie Road			11A	0.25	60	16																									
			11B	1.19	0	0																									
			11C	0.32	60	19																									
			11D	0.19	60	12																									
			11E	0.08	0	0																									
			11F	0.07	0	0																									
			11G	1.38	60	83																									
			11H	1.08	60	65																									
			11I	1.80	75	135																									
			11J	0.14	60	9																									
	93	69		6.50		339	6.50	339	4.06	4.06			0.00			0.00			0.00	0.00	6.50	6.50	1.859	5.92	85.8	200	0.55	24.32	0.77	0.88	24.3%
	69						6.50	339					0.00			0.00			0.00	0.00											
Townline Road			5A	0.25	60	15																									
			5B	0.36	0	0																									
			5C	0.69	60	42																									
	69	77		1.30		57	25.36	1184	3.75	13.11			0.00			0.00			0.00	0.00	1.30	25.36	7.253	20.36	119.5	200	0.49	22.96	0.73	0.83	88.7%
	77	76					25.36	1184	3.75	13.11			0.00			0.00			0.00	0.00	0.00	25.36	7.253	20.36	84.4	200	1.09	34.24	1.09	1.24	59.5%
	76						25.36	1184					0.00			0.00			0.00	0.00											
Townline Road			9A	0.25	60	16																									
			9B	0.28	0	0																									
			9C	0.28	60	17																									
			12A	1.26	60	76																									
			12B	3.62	0	0																									
			12C	0.52	60	32																									
			12D	0.83	60	50																									
			12E	0.18	60	12																									
			12F	0.07	0	0																									
			12G	1.23	0	0																									
			12H	0.07	0	0																									
			12I	0.19	60	12																									
			12J	1.06	60	64																									
			12K	1.24	60	75																									
			12L	3.03	60	183																									
			12M	1.22	60	73																									
			12N	1.03	60	63																									
	78	76		16.36		673	16.36	673	3.90	7.76			0.00			0.00			0.00	0.00	16.36	16.36	4.679	12.43	111.6	200	0.46	22.24	0.71	0.81	55.9%
	76						16.36	673					0.00			0.00			0.00	0.00											
Anderson Crescent			8A	0.56	60	34																									
			8B	0.24	0	0																									
			8C	0.27	60	17																									
	76	85		1.07		51	42.79	1908	3.60	20.28			0.00			0.00			0.00	0.00	1.07	42.79	12.238	32.52	95.3	250	0.37	36.17	0.74	0.84	89.9%
	85	84					42.79	1908	3.60	20.28			0.00			0.00			0.00	0.00	0.00	42.79	12.238	32.52	16.5	250	0.63	47.20	0.96	1.10	68.9%
	84	83					42.79	1908	3.60	20.28			0.00			0.00			0.00	0.00	0.00	42.79	12.238	32.52	10.3	250	0.87	55.47	1.13	1.29	58.6%
	83						42.79	1908					0.00			0.00			0.00	0.00											
Anderson Crescent			7A	0.64	60	39																									
			7B	0.30	0	0																									
			7C	0.28	60	17																									
	87	86		1.22		56	1.22	56	4.30	0.71			0.00			0.00			0.00	0.00	1.22	1.22	0.349	1.06	80.2	200	1.18	35.63	1.13	1.29	3.0%
	86	83					1.22	56	4.30	0.71			0.00			0.00			0.00	0.00	0.00	1.22	0.349	1.06	54.0	200	0.73	28.02	0.89	1.02	3.8%
	83						1.22	56					0.00			0.00			0.00	0.00											
North to SPS	83	82					44.01	1964	3.59	20.82			0.00			0.00			0.00	0.00	0.00	44.01	12.587	33.41	43.8	250	0.32	33.64	0.69	0.78	99.3%
	82	81					44.01	1964	3.59	20.82			0.00			0.00			0.00	0.00	0.00	44.01	12.587	33.41	87.5	250	0.35	35.18	0.72	0.82	95.0%
	81	80					44.01	1964	3.59	20.82			0.00			0.00			0.00	0.00	0.00	44.01	12.587	33.41	113.5	250	0.27	30.90	0.63	0.72	108.1%
	80	79					44.01	1964	3.59	20.82			0.00			0.00			0.00	0.00	0.00	44.01	12.587	33.41	13.1	250	1.38	69.86	1.42	1.62	47.8%
	79						44.01	1964					0.00			0.00			0.00	0.00											

APPENDIX E-3

GRAVITY INITIAL FIRST PHASE SANITARY SERVICING ANALYSIS BRIEF

Stantec Consulting Ltd.
100-300 Hagey Boulevard, Waterloo ON N2L 0A4

October 6, 2023
File: 1614-14394/29

DIGITAL SUBMISSION ONLY

Attention: Mr. Mike DiPaola, P.Eng.
Director of Public Works

Township of West Lincoln
318 Canborough St.
Box 400
Smithville ON L0R 2A0

Dear Mr. DiPaola,

Reference: Smithville 3A – Gravity Initial First Phase Sanitary Servicing Analysis

Introduction

This narrative has been provided to prepare a brief synopsis of the functional sanitary analysis for the proposed initial first phase subject lands that will discharge by gravity to the existing Townline Road Sanitary Sewer System. Eventually, the flow will discharge to the existing Smithville Sanitary Pumping Station (SPS) via Anderson Crescent and Twenty Mile Creek Crossing. The analysis concentrates specifically on the initial "first phase" of the subject land flows and sanitary route system it takes to Smithville SPS.

Background

Smithville is expanding their urban boundary and the subject lands within Phase 3A. Per the Master Community Plan (MCP) produced by AECOM in April 2023, a portion of the Smithville Phase 3A Lands can discharge by gravity to Smithville SPS rather than to the proposed new pumping station on Port Davidson Road.

Sanitary Pumping Station and Sanitary Sewer Capacity

A MCP was completed for the expansion of Smithville's Urban Boundary in April 2023. A portion of the subject lands can discharge by gravity to the existing Smithville SPS located on 226 Saint Catharines Street, just North of Twenty Mile Creek. From the 2017 Region of Niagara's Master Servicing Plan, the available capacity is 120 L/s.

The initial "first phase" of the subject lands will discharge eventually to the existing Smithville SPS by using the existing sanitary sewers along Townline Road, Anderson and a creek crossing under Twenty Mile Creek. The existing sanitary sewers range from 200-250 mm dia. sewers. The sanitary sewer that was installed under Twenty Mile Creek is 250 mm PVC dia. sewer completed with a +/- 500 mm dia. steel casing pipe at a grade/slope of 0.28%. The capacity of the sewer running under the creek is 31.47m^3/s.

AECOM has noted through Landsmith's correspondence (see appendix A) that the existing creek crossing can be surcharged to up to 100% capacity and that this is better for the pipe performance based on better scouring of the pipe.

Reference: Smithville 3A – Initial First Phase Gravity Sanitary Servicing Analysis

Sanitary Servicing Flow

To determine the initial "first phase" design flow within Smithville 3A, we used the West Lincoln Municipal Engineering Standards 2022. Sanitary Sewer design is a "population per area" based on an approximation of zoning with different densities per an assumed zoning.

The following densities are included within the Development Manual:

LAND USE	DENSITY (ppha)
Single Houses	60
Semi-Detached Houses	75
Low Density (Townhouses, Maisonettes, etc.)	110
Medium Density	250
Parks	12 – 25
Schools and Institutional Uses	75 – 125
Commercial/Industrial	120 – 750

The above table could be used to ensure a conservative design sizing within the proposed initial first phase lands and existing lands discharging to the Smithville SPS via existing sanitary sewers.

Reviewing the Township of West Lincoln and Region of Niagara Design Standards, the sanitary flow is calculated using 275L/c/day. As noted in AECOM's and Landsmith's correspondence email (Appendix A), the Region changed their per capita flow generation for sanitary to 255L/c/d. For the purpose of this analysis, we used 275L/c/day to be conservative.

The sanitary design and the design area plans for the subject lands and existing lands that discharge south of the Smithville SPS are designed with discrete areas for the right-of-ways such that these areas could be used for the infiltration calculations without adding sanitary flow to the design. See Drawing C-110 and attached design sheet (Appendix B).

Using this method for the existing lands and proposed interim subject land (approximately 7.36 ha), creates a discharge of 31.38 L/s and produces a population of 1736 people under the creek. As previously mentioned, the total peak to the pumping sanitary is 120 L/s and pipe capacity of the 250 mm dia. sewer crossing under the creek is 31.47 L/s. The projected flow is 99.7% of the pipe capacity, which is in accordance with AECOM allowing the crossing under the creek to surcharge up to 100% capacity of the pipe.

Conclusions

Based on the above analysis, proposed zoning for the initial first phase of the subject lands generates a sanitary flow that can be accommodated to the newly updated Smithville SPS and sewer under the Twenty Mile Creek.

7.36 ha of the subject lands can discharge by gravity to the existing sewer without surcharging the sewers and following the recommendations of MCP.

Please contact the undersigned if there are any questions.

Reference: Smithville 3A – Initial First Phase Gravity Sanitary Servicing Analysis

Sincerely,

STANTEC CONSULTING LTD.

Stephen Kapolnas, P.Eng.
Project Manager
Community Development
Phone: 519.585.7365
stephen.kapolnas@stantec

Attachments: Appendix A – AECOM's and Landsmith's Email Correspondence
Appendix B – Sanitary Design Calculations and Design Area Plan C-110

c. Mr. Don Manson, Samper Developments
Ms. Suzanne Mammel, Stantec Consulting Ltd.

APPENDIX A

AECOM'S AND LANDSMITH'S EMAIL CORRESPONDENCE

From: Andrew Smith
To: 38timberlee@gmail.com; Fred vanderVelde
Subject: Smithville South Lands -
Date: Friday, March 3, 2023 10:14:00 AM
Attachments: image001.png

Guys,

There was a question as to how much land could be accommodated by the current sanitary system.

Our analysis contained in the FSR was based on using the existing sanitary sewers on Townline Road and Anderson Crescent and the existing creek crossing. Based on not exceeding 85% capacity of the sanitary sewer pipe, 18 acres of land (7.59 hectares) could be serviced immediately.

Since the time of my original FSR better information has become available through the work of AECOM.

First – the Region has changed their per capita flow generation for sanitary to 255 L/Cap/D – based on this lower flow rate and same criteria 27.2 acres (11.2 hectares) could be developed immediately.

Second – AECOM have noted that the existing creek crossing can be surcharged to up to 100% capacity and that this is better for the pipe performance based on better scouring of the pipe – based on the ability to surcharge this run of sanitary sewer up to 69 acres (28 hectares) could be added to the Townline road sanitary sewer immediately.

These are the options for using the existing sewers, however our strategy of providing a new gravity connection across the creek and through Rock Street park to Townline road is still on the table, and is now being promoted by other developers in the south as their preferred option. This would open up the balance of the lands without the need for a pumping station in the south.

AECOM notes an areas of the south lands being servicing immediately through the existing system, however they are noting upgrades to be required on the Townline Road and Anderson Crescent sanitary sewers at a cost of ~$800,000.00 – however based on our analysis we do not think that would be necessary immediately unless you wanted to go beyond the 69 acres.

The question was raised regarding capacity at the sanitary pumping station, and this is a fair question – the Region and AECOM have been very guarded about the actual available capacity. The Region's Wastewater Master Servicing Plan in 2016 notes that the firm capacity of the SPS is 120 L/s while the peak wet weather flow is 200 L/s. However, the analysis of the Region did not account for the fact that there is a 600 cubic meter holding tank which cuts the peaks off the flows being received by the station.

AECOM uses a different method of calculation and determines that the peak wet weather flow is 145.7 Lps – which is greater than the firm capacity of the station. However the report does not account for how the holding tank cuts off the peak flows.

This is something we can look into further with the Region. There is capacity at the station, but it is unclear how much capacity is available. They continue to do infill development in other areas, and the north-west quadrant continues to move forward in advance of any further upgrades to the pumping station.

The Township is also working on an inflow and infiltration reduction program which is intended to significantly decrease the wet weather flows to the SPS. Note that AECOM notes the dry weather flows to the SPS to be only 20 L/s for the whole community – the rest is from rainfall events.

The proposed flows from the south lands based strictly on using the existing system would be between 10-15 Lps depending on how large the area is included.

The forcemain to Grimsby has 175 L/s capacity – so well above the sanitary pump station capacity at present.

Some additional research with the Region regarding the actual performance of the SPS may be in order.

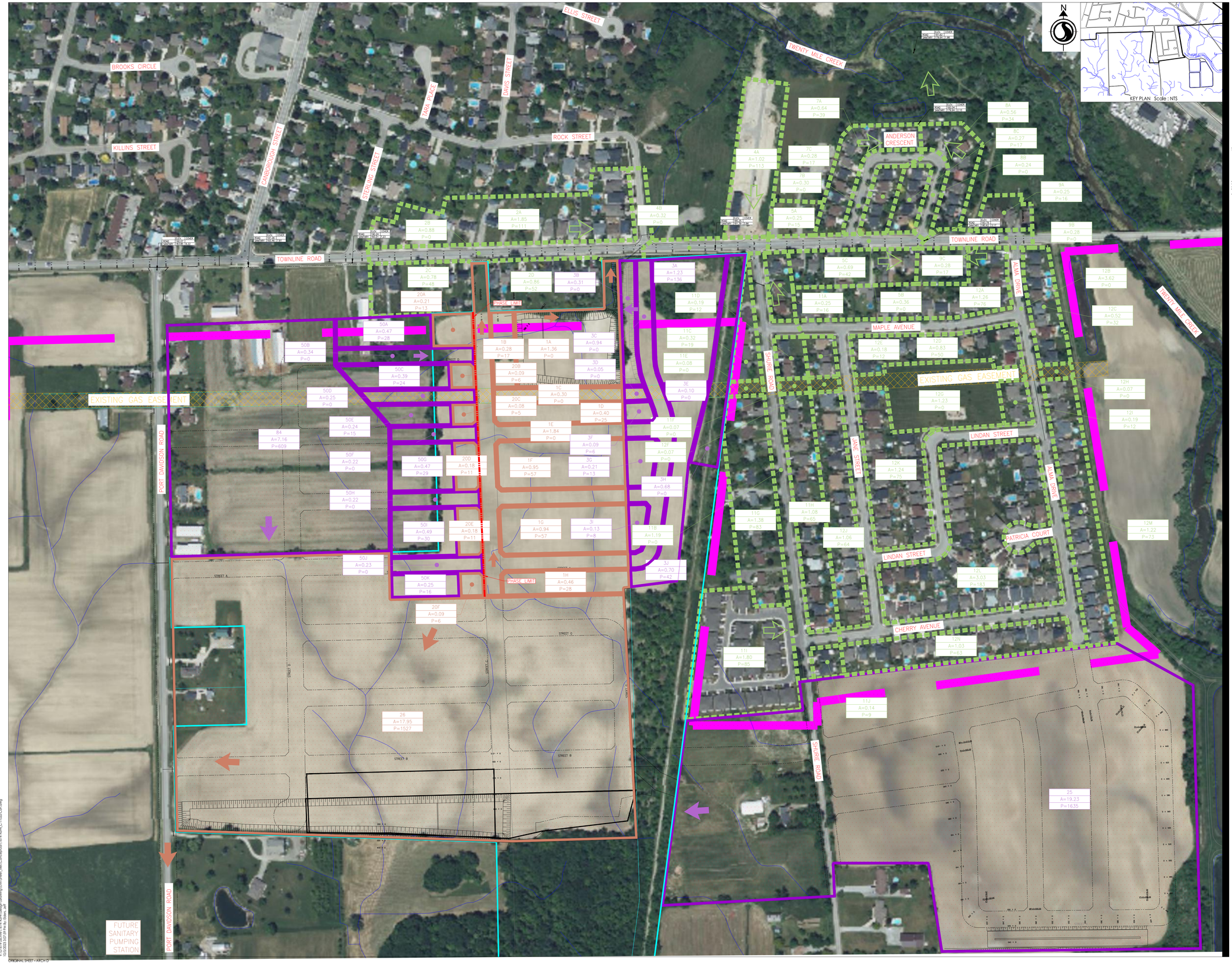
I have attached the latest AECOM report to this email together with some of the scenarios for use of the existing sanitary system to get flows to the sanitary pump station.

Best Regards,

Andrew Smith, P. Eng.
LandSmith Engineering & Consulting Ltd.
1059 Upper James Street, Unit 207
Hamilton, ON L9C 3A6
289-309-3632 (Office)
289-775-9374 (Cell)

APPENDIX B

SANITARY DESIGN CALCULATIONS AND DESIGN AREA PLAN C-110



Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes

1. ELEVS ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
   BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 6250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE. ELEV: 182.679
   BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. DRAFT PLAN PREPARED BY XXX, DATED XXX.
3. CALCULATED PLAN PREPARED BY XXX, DATED XXX.
4. TOPOGRAPHICAL SURVEY PREPARED BY STANTEC CONSULTING LTD.#####, DATED XXX. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM M.N.R. TOPOGRAPHIC INFORMATION (2010).

Legend

PROPERTY LINE

EXISTING URBAN BOUNDARY

EXISTING

2A
A=1.85
P=111

EXISTING CATCHMENT NUMBER
EXISTING AREA (Ha)
EX. POPULATION (FROM WEST LINCOLN MANUAL)
SINGLE HOUSES = 60 p/ha
SEMI-DETACHED HOUSES = 75 p/ha
APPROX. MIX (SINGLES/TOWNHOUSES)= 85 p/ha
LOW DENSITY (TOWNHOUSES) = 110 p/ha

EXISTING AREA BOUNDARY

EXISTING FLOW DIRECTION

PROPOSED

2E
A=0.13
P=3

PROPOSED CATCHMENT NUMBER
PROPOSED AREA (Ha)
PROP. POPULATION (FROM WEST LINCOLN MANUAL)
SINGLE HOUSES = 60 p/ha
APPROX. MIX (SINGLES/TOWNHOUSES)= 85 p/ha
LOW DENSITY (TOWNHOUSES) = 110 p/ha

PROPOSED AREA BOUNDARY

PROPOSED FLOW DIRECTION

FUTURE

27
A=6.31
P=537

FUTURE CATCHMENT NUMBER
FUTURE AREA (Ha)
FUT. POPULATION (FROM WEST LINCOLN MANUAL)
SINGLE HOUSES = 60 p/ha
APPROX. MIX (SINGLES/TOWNHOUSES)= 85p /ha
LOW DENSITY (TOWNHOUSES) = 110 p/ha

FUTURE AREA BOUNDARY

FUTURE FLOW DIRECTION

PROPOSED/FUTURE RIGHT-OF-WAYS WERE APPROXIMATELY MATCHED TO THOSE SHOWN IN THE TOWNSHIP OF WEST LINCOLN OFFICIAL PLAN, SCHEDULE 'E-10' SOUTH COMMUNITY AREA LAND USE PLAN, DATED AUGUST 2022, FOUND WITHIN APPENDIX A OF THE LANDSMITH FSR MENTIONED ABOVE.

AREAS PROPOSED TO DRAIN TO THE FUTURE SANITARY PUMPING STATION ON PORT DAVIDSON ROAD.

EXISTING GAS EASEMENT (APPROXIMATE LOCATION)

Revision	By	Appd	YYYY.MM.DD

File Name: 161414394_C-110SS-Con	WJE	WJE	SAK	2023.10.05
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
1734234 ONTARIO LIMITED

SMITHVILLE 3A

Smithville, ON

Title
EXTERNAL SANITARY DRAINAGE AREA PLAN

Project No. 161414394

Scale 1:2000 (0, 20, 60, 100m)

Revision -----

Sheet --- of ###

Drawing No. **C-110**

Stantec

1734234 Ontario Limited
Smithville 3A Initial First Phase
People/Hectare (p/ha)

DATE: October 6, 2023
DESIGNED BY: WJE
CHECKED BY: SAK

SANITARY SEWER DESIGN SHEET

FILE NUMBER: N/A
Project Number 161414394

Design Parameters

Mininum Velocity=	0.600 m/s	Residential:	275 L/day/Person
			0.0032 L/s/Person
n=	0.013	Comercial:	1.500 L/s/Ha
Max Peak Factor=	5.000	Industrial:	1.000 L/s/Ha
Min Peak Factor=	2.000	Institutional:	0.375 L/s/Ha
		Infiltration:	0.286 L/s/Ha

LOCATION			RESIDENTIAL AREA AND POPULATION								COMMERCIAL			INDUSTRIAL			INSTITUTIONAL				INFILTRATION				PIPE SELECTION						
Street	U/S	D/S	Area ID	Residential Area (ha)	Population Density (P/ha)	Population (P)	Cummulative Area (ha)	Cumulative Population (min)	Peak Factor	Peak Flow L/s	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Total C+I+I Flow (L/s)	Total Area (ha)	Accumulated Area (ha)	Flow (L/s)	Total Flow (L/s)	Length Design (m)	Design Size (mm)	Slope Design (%)	Full Capacity (L/s)	Full Velocity (m/s)	Actual Velocity (m/s)	Q_A/Q_C (%)
Townline Road			2A	1.85	60	111																									
			2B	0.88	0	0																									
			2C	0.78	60	48																									
			2D	0.86	60	52																									
	72	183		4.37		211	4.37	211	4.14	2.78			0.00			0.00			0.00	0.00	4.37	4.37	1.250	4.03	49.1	200	0.60	25.41	0.81	0.92	15.9%
	183						4.37	211					0.00			0.00			0.00	0.00											
Our Site			1A	1.36	0	0																									
			1B	0.28	60	17																									
			1C	0.30	0	0																									
			1D	0.40	60	25																									
			1E	1.84	0	0																									
			1F	0.95	60	57																									
			1G	0.94	60	57																									
			1H	0.46	60	28																									
			20A	0.21	60	13																									
			20B	0.09	60	6																									
			20C	0.08	60	5																									
			20D	0.18	60	11																									
			20E	0.18	60	11																									
			20F	0.09	60	6																									
	94	142		7.36		236	7.36	236	4.12	3.10			0.00			0.00			0.00	0.00	7.36	7.36	2.105	5.20	154.6	200	0.50	23.19	0.74	0.84	22.4%
	142						7.36	236					0.00			0.00			0.00	0.00											
Outlet from Our Site	142	183					7.36	236	4.12	3.10			0.00			0.00			0.00	0.00	0.00	7.36	2.105	5.20	75.9	200	0.50	23.19	0.74	0.84	22.4%
Townline Road	183	71					11.73	447	4.00	5.69			0.00			0.00			0.00	0.00	0.00	11.73	3.355	9.04	46.6	200	0.60	25.41	0.81	0.92	35.6%
Townline Road			4A	1.02	110	113																									
			4B	0.32	0	0																									
	71	70		1.34		113	13.07	560	3.95	7.04			0.00			0.00			0.00	0.00	1.34	13.07	3.738	10.78	68.9	200	0.60	25.41	0.81	0.92	42.4%
	70	69					13.07	560	3.95	7.04			0.00			0.00			0.00	0.00	0.00	13.07	3.738	10.78	67.5	200	1.70	42.76	1.36	1.55	25.2%
	69						13.07	560					0.00			0.00			0.00	0.00											
Shurie Road			11A	0.25	60	16																									
			11B	1.19	0	0																									
			11C	0.32	60	19																									
			11D	0.19	60	12																									
			11E	0.08	0	0																									
			11F	0.07	0	0																									
			11G	1.38	60	83																									
			11H	1.08	60	65																									
			11I	1.80	75	135																									
			11J	0.14	60	9																									
	93	69		6.50		339	6.50	339	4.06	4.38			0.00			0.00			0.00	0.00	6.50	6.50	1.859	6.23	85.5	200	0.55	24.32	0.77	0.88	25.6%
	69						6.50	339					0.00			0.00			0.00	0.00											

Stantec

1734234 Ontario Limited
Smithville 3A Initial First Phase
People/Hectare (p/ha)

DATE: October 6, 2023
DESIGNED BY: WJE
CHECKED BY: SAK

SANITARY SEWER DESIGN SHEET

FILE NUMBER: N/A
Project Number 161414394

Design Parameters

Mininum Velocity=	0.600	m/s	
n=	0.013		
Max Peak Factor=	5.000		
Min Peak Factor=	2.000		

Residential:	275	L/day/Person
	0.0032	L/s/Person
Comercial:	1.500	L/s/Ha
Industrial:	1.000	L/s/Ha
Institutional:	0.375	L/s/Ha
Infiltration:	0.286	L/s/Ha

LOCATION			RESIDENTIAL AREA AND POPULATION								COMMERCIAL			INDUSTRIAL			INSTITUTIONAL				INFILTRATION				PIPE SELECTION					
Street	U/S	D/S	Area ID	Residential Area (ha)	Population Density (P/ha)	Population (P)	Cummulative Area (ha)	Cumulative Population (min)	Peak Factor	Peak Flow L/s	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Total C+I+I Flow (L/s)	Total Area (ha)	Accumulated Area (ha)	Flow (L/s)	Total Flow (L/s)	Length Design (m)	Design Size (mm)	Slope Design (%)	Full Capacity (L/s)	Full Velocity (m/s)	Actual Velocity (m/s)	Q_A/Q_C (%)
Townline Road			5A	0.25	60	15																									
			5B	0.36	0	0																									
			5C	0.69	60	42																									
	69	77		1.30		57	20.87	956	3.81	11.60			0.00			0.00			0.00	0.00	1.30	20.87	5.969	17.57	122.7	200	0.49	22.96	0.73	0.83	76.5%
	77	76					20.87	956	3.81	11.60			0.00			0.00			0.00	0.00	0.00	20.87	5.969	17.57	85.2	200	1.09	34.24	1.09	1.24	51.3%
	76						20.87	956					0.00			0.00			0.00	0.00											
Townline Road			9A	0.25	60	16																									
			9B	0.28	0	0																									
			9C	0.28	60	17																									
			12A	1.26	60	76																									
			12B	3.62	0	0																									
			12C	0.52	60	32																									
			12D	0.83	60	50																									
			12E	0.18	60	12																									
			12F	0.07	0	0																									
			12G	1.23	0	0																									
			12H	0.07	0	0																									
			12I	0.19	60	12																									
			12J	1.06	60	64																									
			12K	1.24	60	75																									
			12L	3.03	60	183																									
			12M	1.22	60	73																									
			12N	1.03	60	63																									
	78	76		16.36		673	16.36	673	3.90	8.36			0.00			0.00			0.00	0.00	16.36	16.36	4.679	13.04	35.4	200	0.49	22.96	0.73	0.83	56.8%
	76						16.36	673					0.00			0.00			0.00	0.00											
Anderson Crescent			8A	0.56	60	34																									
			8B	0.24	0	0																									
			8C	0.27	60	17																									
	76	85		1.07		51	38.30	1680	3.64	19.48			0.00			0.00			0.00	0.00	1.07	38.30	10.954	30.44	96.2	250	0.36	35.68	0.73	0.83	85.3%
	85	84					38.30	1680	3.64	19.48			0.00			0.00			0.00	0.00	0.00	38.30	10.954	30.44	16.5	250	0.63	47.20	0.96	1.10	64.5%
	84	83					38.30	1680	3.64	19.48			0.00			0.00			0.00	0.00	0.00	38.30	10.954	30.44	10.3	250	0.87	55.47	1.13	1.29	54.9%
	83						38.30	1680					0.00			0.00			0.00	0.00											
Anderson Crescent			7A	0.64	60	39																									
			7B	0.30	0	0																									
			7C	0.28	60	17																									
	87	86		1.22		56	1.22	56	4.30	0.77			0.00			0.00			0.00	0.00	1.22	1.22	0.349	1.12	80.2	200	1.18	35.63	1.13	1.29	3.1%
	86	83					1.22	56	4.30	0.77			0.00			0.00			0.00	0.00	0.00	1.22	0.349	1.12	56.8	200	0.69	27.24	0.87	0.99	4.1%
	83						1.22	56					0.00			0.00			0.00	0.00											
North to SPS	83	82					39.52	1736	3.63	20.07			0.00			0.00			0.00	0.00	0.00	39.52	11.303	31.38	42.7	250	0.33	34.16	0.70	0.79	91.8%
	82	81					39.52	1736	3.63	20.07			0.00			0.00			0.00	0.00	0.00	39.52	11.303	31.38	87.4	250	0.35	35.18	0.72	0.82	89.2%
	81	80					39.52	1736	3.63	20.07			0.00			0.00			0.00	0.00	0.00	39.52	11.303	31.38	104.7	250	0.28	31.47	0.64	0.73	99.7%
	80	79					39.52	1736	3.63	20.07			0.00			0.00			0.00	0.00	0.00	39.52	11.303	31.38	15.0	250	1.20	65.14	1.33	1.51	48.2%
	79						39.52	1736					0.00			0.00			0.00	0.00											

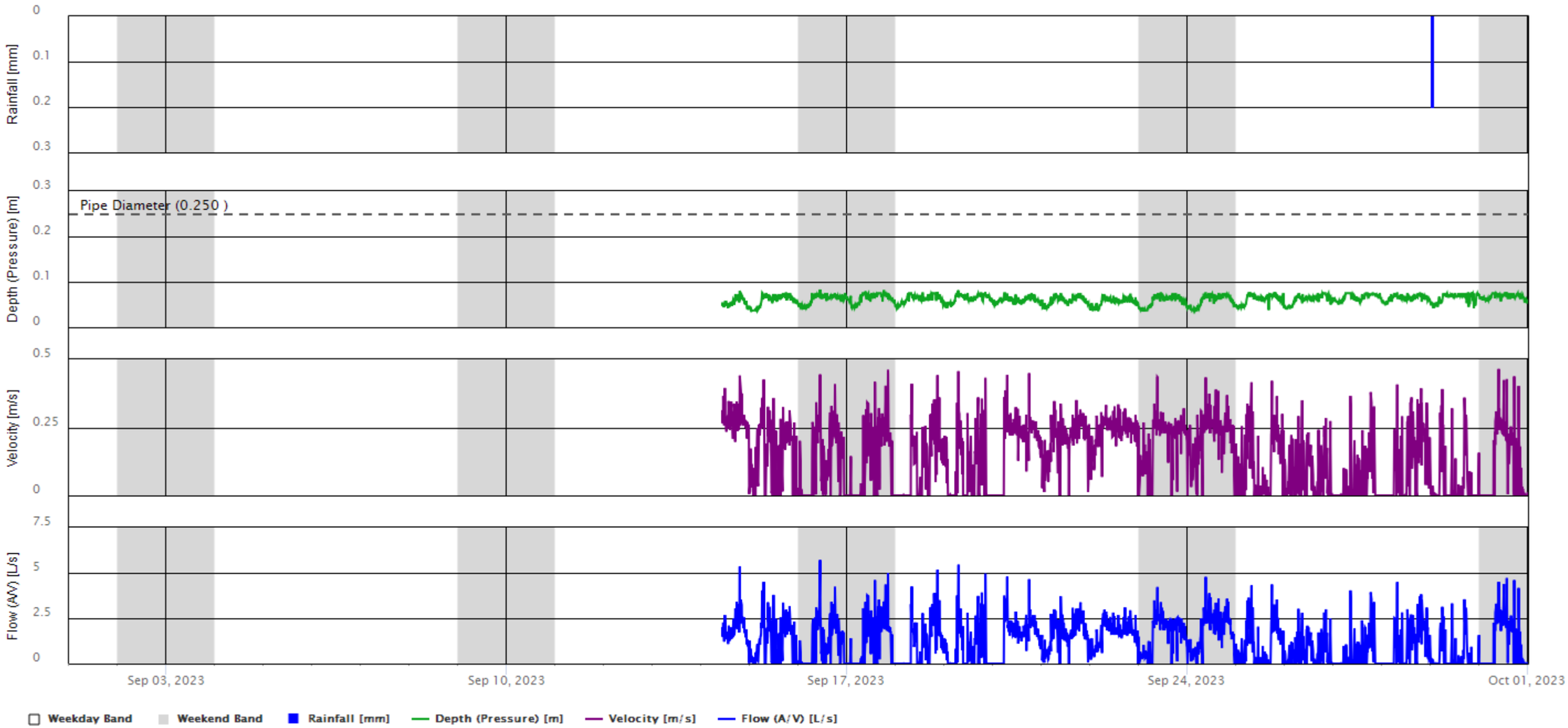
APPENDIX E-4

CIV 09 DATA CHART AND FLOW MONITORING

Data Chart

Station: CIV_09 (MH DY06345)

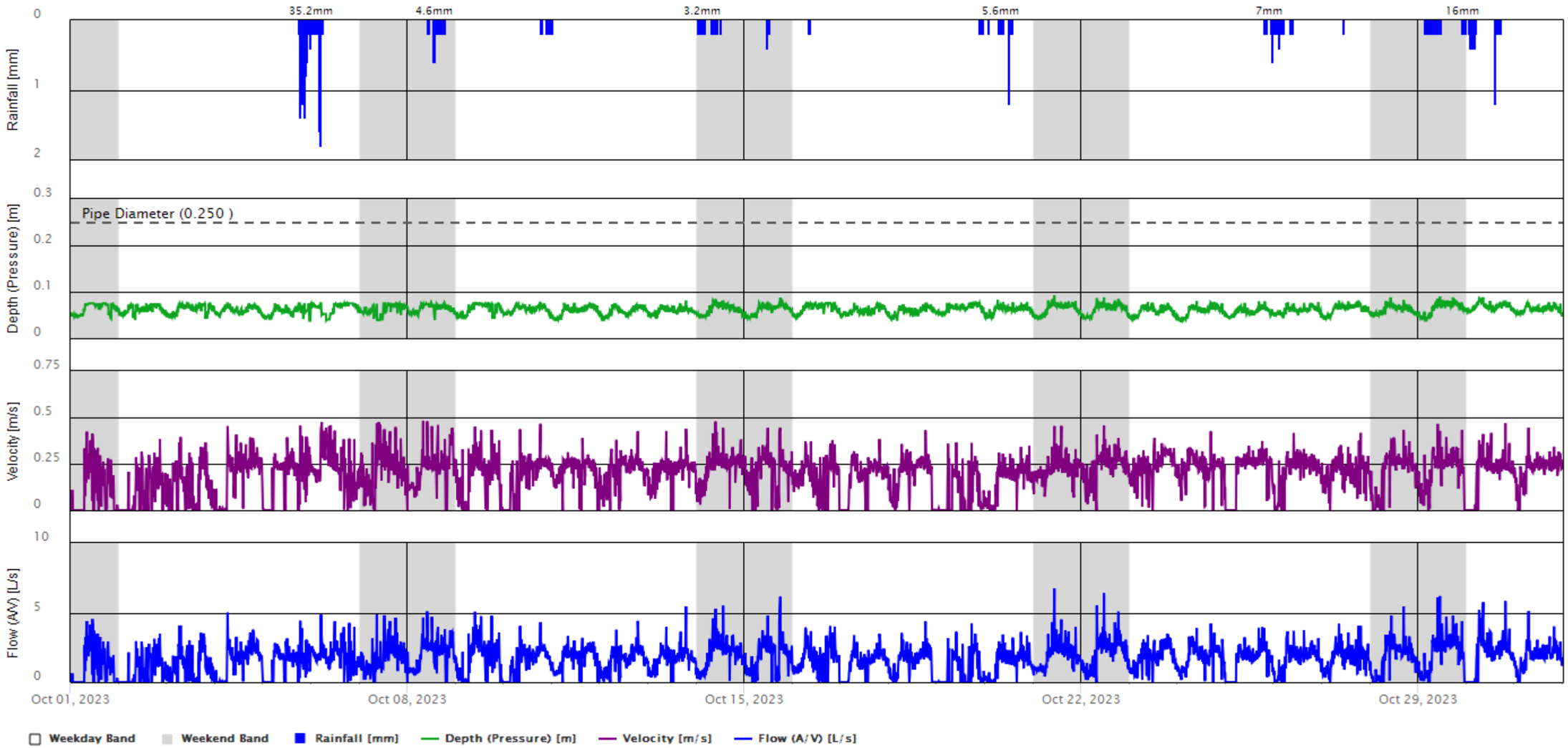
Sep 01, 2023 – Sep 30, 2023



Data Chart

Station: CIV_09 (MH DY06345)

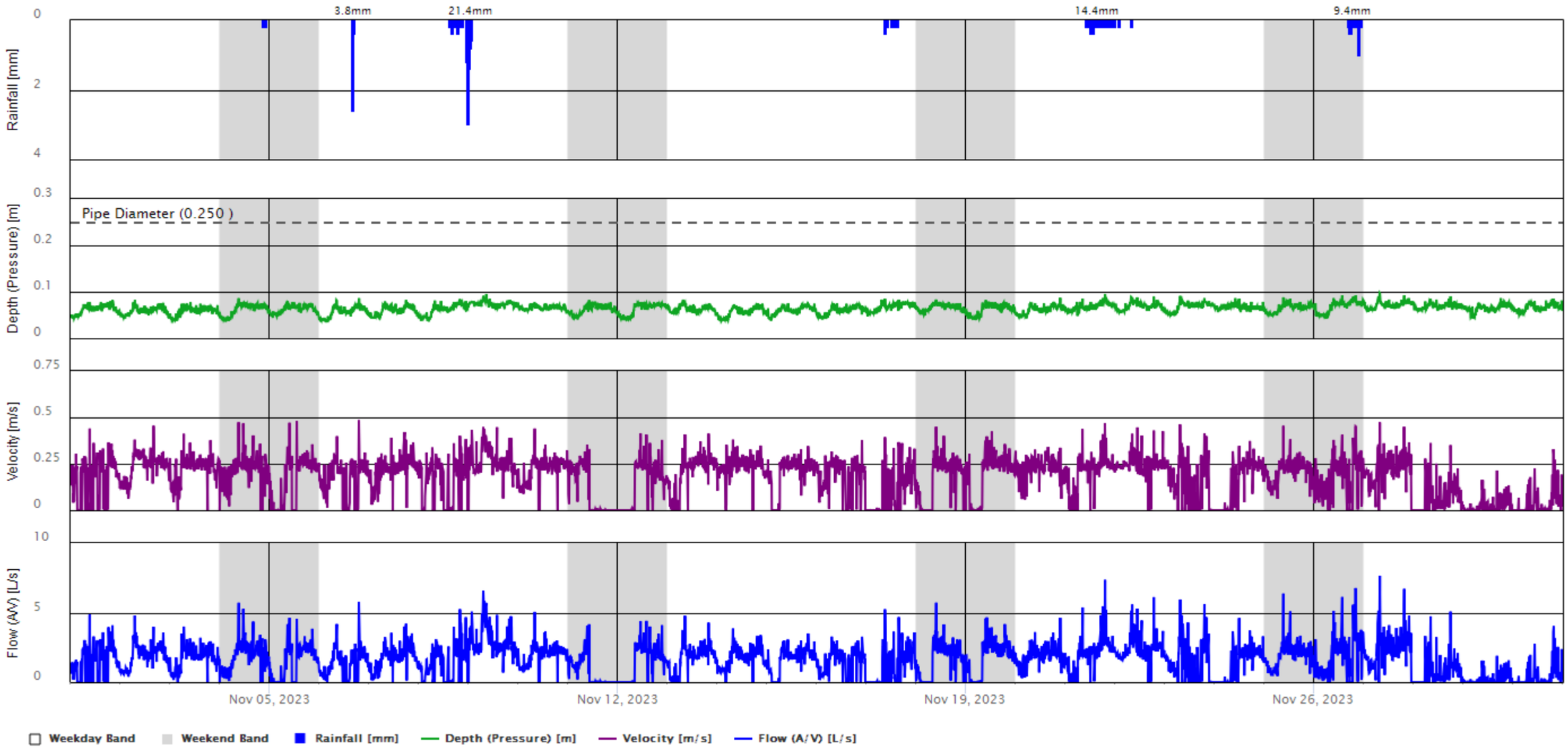
Oct 01, 2023 – Oct 31, 2023



Data Chart

Station: CIV_09 (MH DY06345)

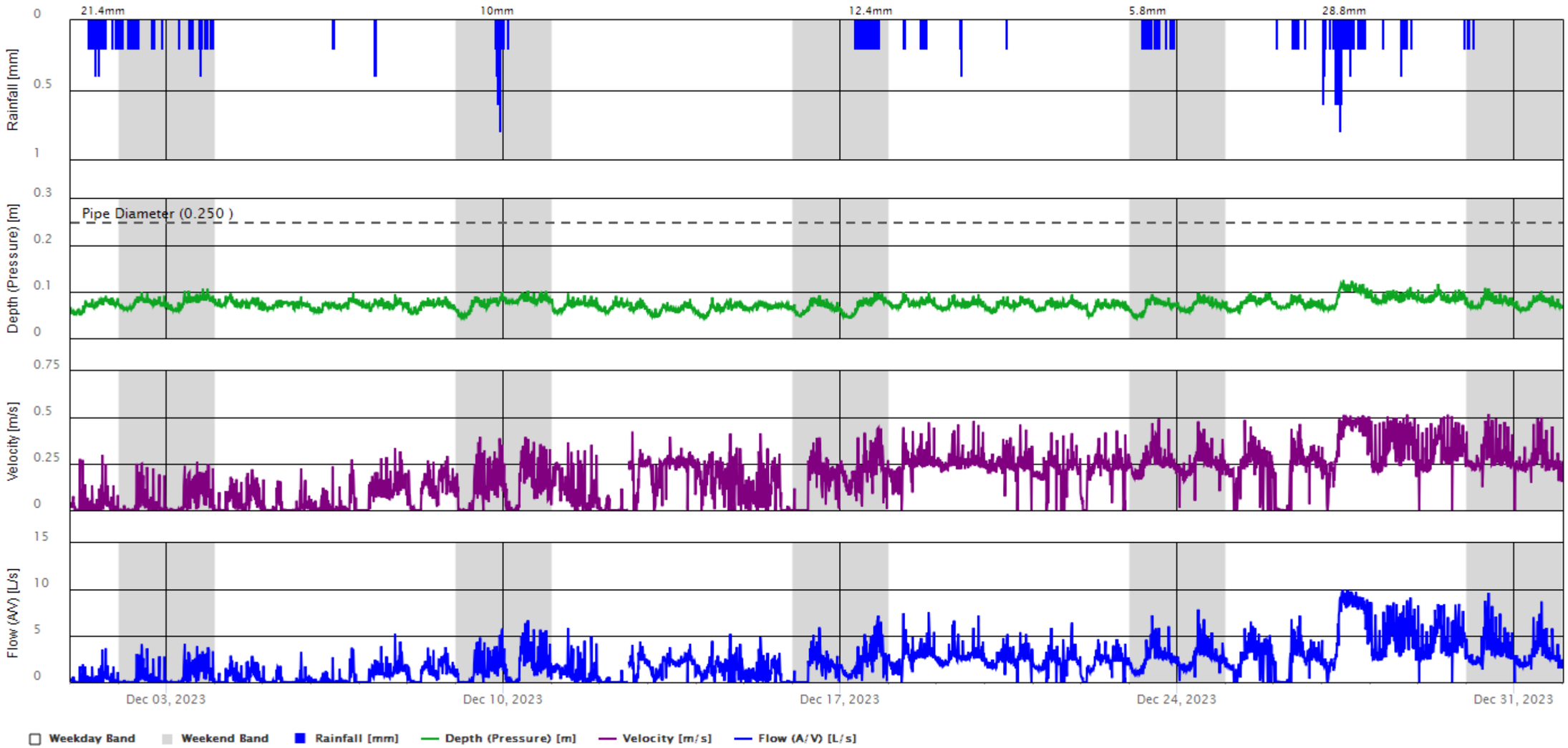
Nov 01, 2023 – Nov 30, 2023



Data Chart

Station: CIV_09 (MH DY06345)

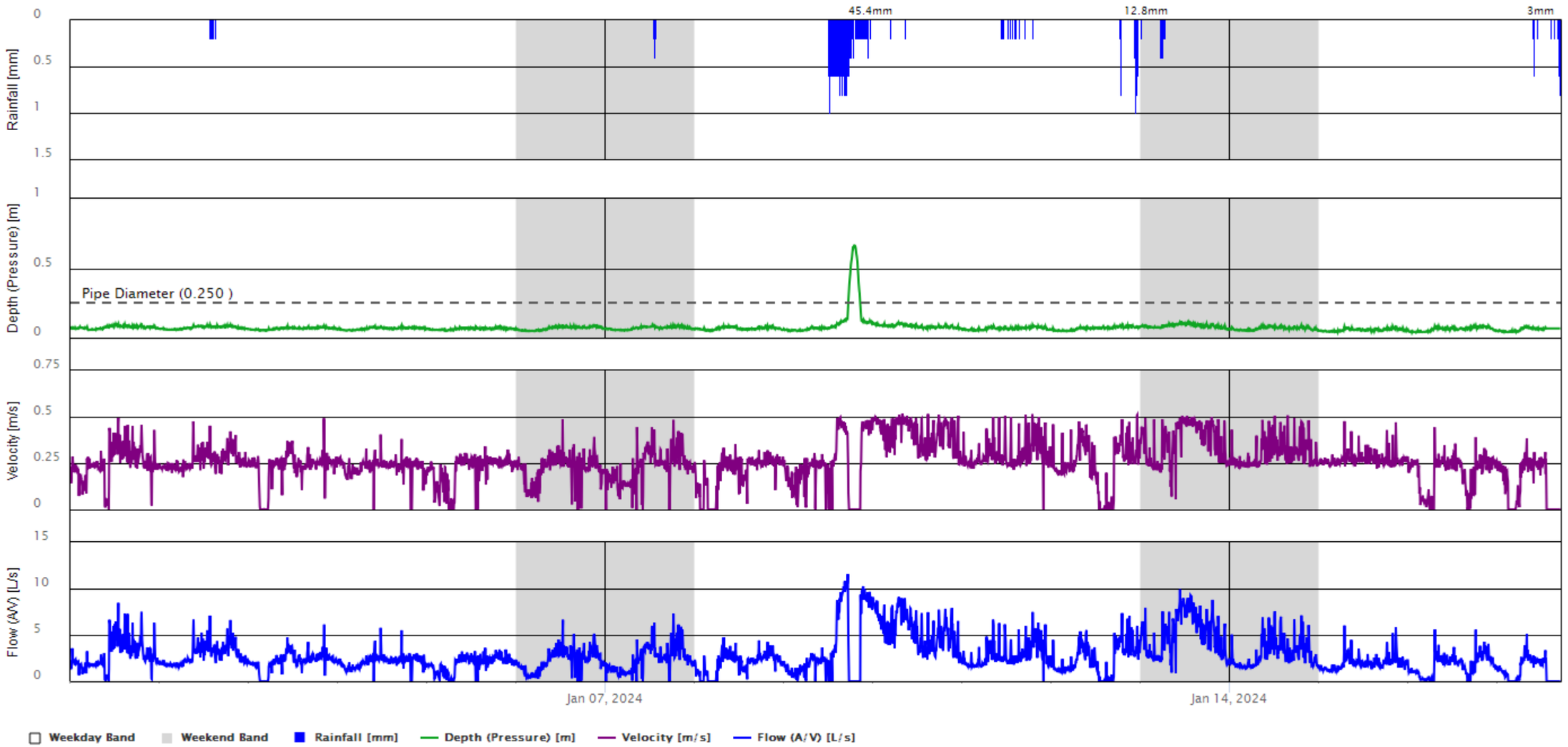
Dec 01, 2023 – Dec 31, 2023



Data Chart

Station: CIV_09 (MH DY06345)

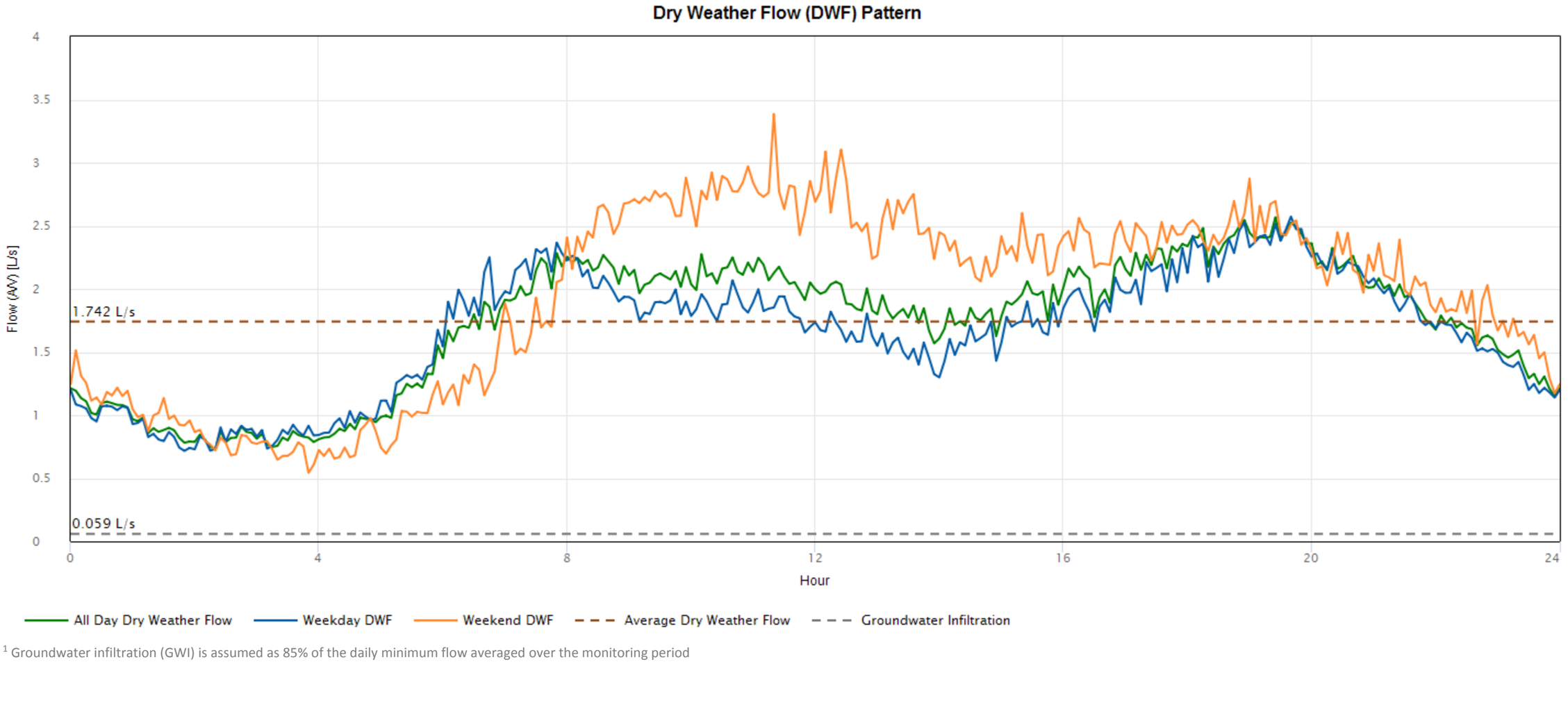
Jan 01, 2024 – Jan 17, 2024



Sanitary Report

Station: CIV_09 (MH DY06345)

Average Dry Weather Flow (L/s)	Average Dry Weather Flow (L/c/d)	Average Daily Minimum Dry Weather Flow (L/s)	Average Daily Peak Dry Weather Flow (L/s)
1.742	364.370	0.070	4.746
Peaking Factor	**Groundwater Infiltration (L/s)[1]**	**Groundwater Infiltration (L/ha/d)**	**% of GWI in Average DWF**
2.725	0.059	142.618	3.402



[1] Groundwater infiltration (GWI) is assumed as 85% of the daily minimum flow averaged over the monitoring period

I/I Analysis Table

Station: CIV_09 (MH DY06345)

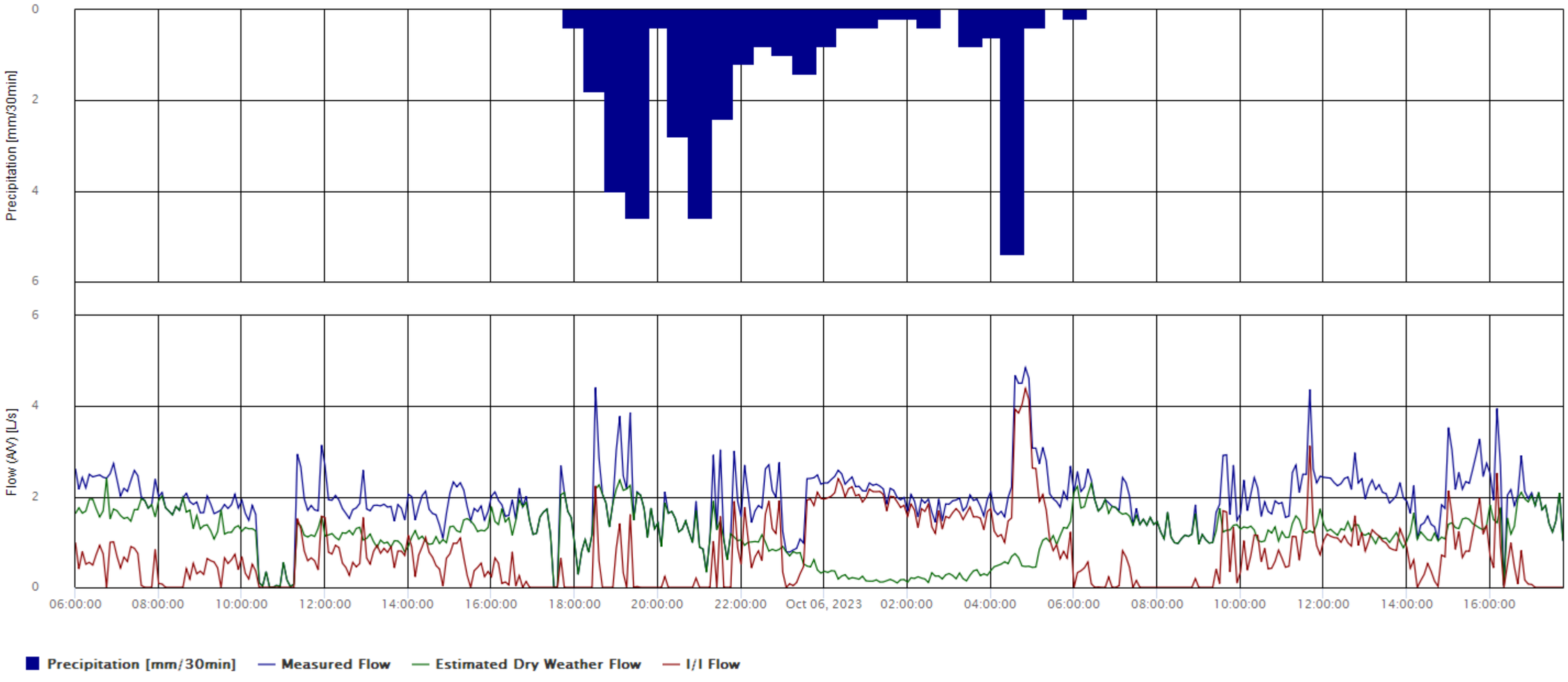
	Event[1]	Total Precipitation (mm)	Duration (hours)	Peak Intensity Over Tc at Station (mm/hr)		CIV_09 (MH DY06345)		
						Peak I/I Flow (L/s)	Peak I/I Rate (L/s/ha)	Volumetric Runoff Coefficient (CV%)
Measured Storms	Oct 05, 2023	35.20	11.75	10.80	Flow KPIs	4.39	0.12	0.61 %
	Oct 29, 2023	16.00	37.42	4.80		3.49	0.10	1.27 %
	Nov 08, 2023	21.40	10.50	12.80		4.63	0.13	1.30 %
	Nov 21, 2023	14.40	22.25	3.60		4.94	0.14	2.81 %
	Dec 01, 2023	21.40	62.00	2.80		2.14	0.06	0.24 %
	Dec 17, 2023	12.40	11.50	2.00		4.67	0.13	1.50 %
	Dec 26, 2023	28.80	66.67	6.40		7.97	0.22	7.22 %
	Jan 09, 2024	45.40	20.50	8.00		9.12	0.25	2.75 %
	Jan 12, 2024	12.80	12.00	10.40		6.53	0.18	4.92 %
	Average	**23.09**	**28.29**	**6.84**		**5.32**	**0.15**	**2.51 %**
	Maximum	**45.40**	**66.67**	**12.80**		**9.12**	**0.25**	**7.22 %**

[1] An event is a storm with a minimum volume of 15mm and a minimum inter-event dry period of 12 hours

I/I Analysis Graph

Station: CIV_09 (MH DY06345)

Infiltration/Inflow Event Analysis
Oct 05, 2023 06:00 – Oct 06, 2023 17:45, Total Precipitation: 35.2 mm



Infiltration/Inflow Event Analysis
Station: CIV_09 (MH DY06345)
Oct 05, 2023 06:00 – Oct 06, 2023 17:45, Total Precipitation: 35.20 mm (12,636,794.30 L)

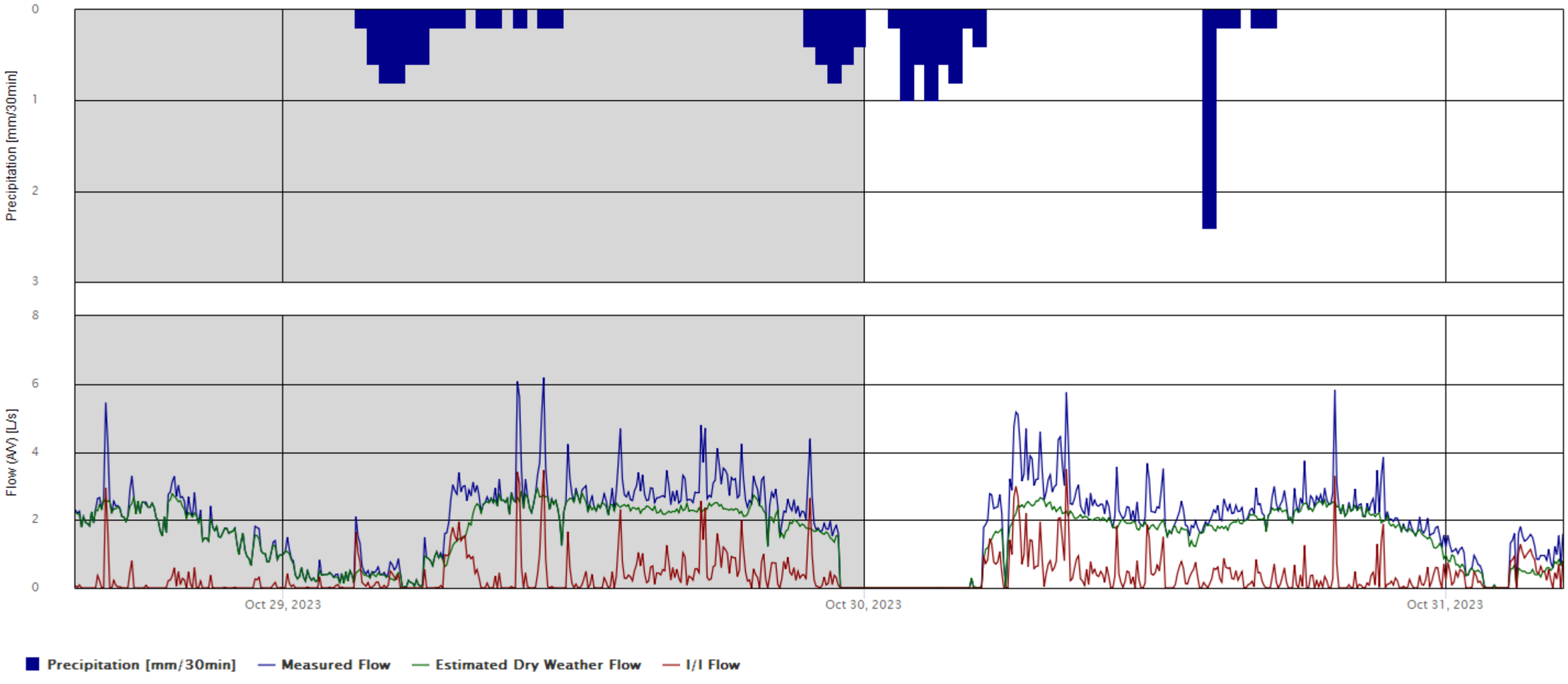
Station Details		Storm Details			
Catchment Area	35.90 ha	**Total Precipitation**	35.20 mm (12,636,794.30 L)	**Duration of Storm**	11.75 hr
Time of Concentration (Tc) [1]	30 min	**Peak Precipitation Intensity Over Tc** [2]	10.80 mm/hr	**Return Period over Tc** [3]	< 2 Yr
Measured Flow		**I/I Flow**			
Time of Peak Measured Flow	Oct 06, 2023 04:50	**Time of Peak I/I Flow (TD)**	Oct 06, 2023 04:50	**Estimated Dry Weather Flow at TD**	0.46 L/s
Peak Measured Flow	4.85 L/s	**Peak I/I Flow** [4]	4.39 L/s	**Peak I/I Rate** [5]	0.12 L/s/ha
Peak Measured Depth	0.08 m	**Total I/I Flow Volume during event**	76,792.60 L	**Volumetric Coefficient (Cv%)** [6]	0.61%
Total Measured Flow Volume during Event	170,469.40 L	**Peak I/I Coefficient** [7]	0.0041	**Hourly Wet-Weather Peaking Factor** [8]	3.22
		Instantaneous Wet-Weather Peaking Factor [9]	4.44		

[1] Time of Concentration (Tc): The estimated time for the flow to travel from the furthest point in the upstream area to the point of monitoring, assume flow is travelling at 1.00 m/s
[2] Peak Precipitation Intensity Over Tc: The peak rainfall intensity for the duration of the storm with the time interval defined by time of concentration
[3] Return Period over Tc: The estimated time to elapse before a storm of equal or greater intensity will likely occur again, based on design storm criteria
[4] Peak I/I Flow: The greatest difference captured between measured flow and estimated dry weather flow, Peak I/I Flow = Maximum (Measured Flow – Estimated Dry Weather Flow)
[5] Peak I/I Rate: A normalized peak I/I flow based on catchment area size, Peak I/I Rate = Peak I/I Flow / Catchment Area
[6] Volumetric Coefficient (Cv%): The ratio of total I/I volume and total rainfall volume, Cv% = Total I/I Flow Volume / Total Precipitation Volume * 100%
[7] Peak I/ I Coefficient: The ratio of peak I/I flow and peak rainfall intensity, Peak I/ I Coefficient = Peak I/I Flow / (Peak Rainfall Intensity over Tc * Catchment Area)
[8] Hourly Wet-Weather Peaking Factor: The ratio of peak hourly wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Hourly Wet-Weather Measured Flow / Average Dry-Weather Flow
[9] Instantaneous Wet-Weather Peaking Factor: The ratio of peak wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Wet-Weather Measured Flow / Average Dry-Weather Flow

I/I Analysis Graph

Station: CIV_09 (MH DY06345)

Infiltration/Inflow Event Analysis
Oct 28, 2023 15:25 – Oct 31, 2023 04:50, Total Precipitation: 16 mm



Infiltration/Inflow Event Analysis
Station: CIV_09 (MH DY06345)
Oct 28, 2023 15:25 – Oct 31, 2023 04:50, Total Precipitation: 16.00 mm (5,743,999.30 L)

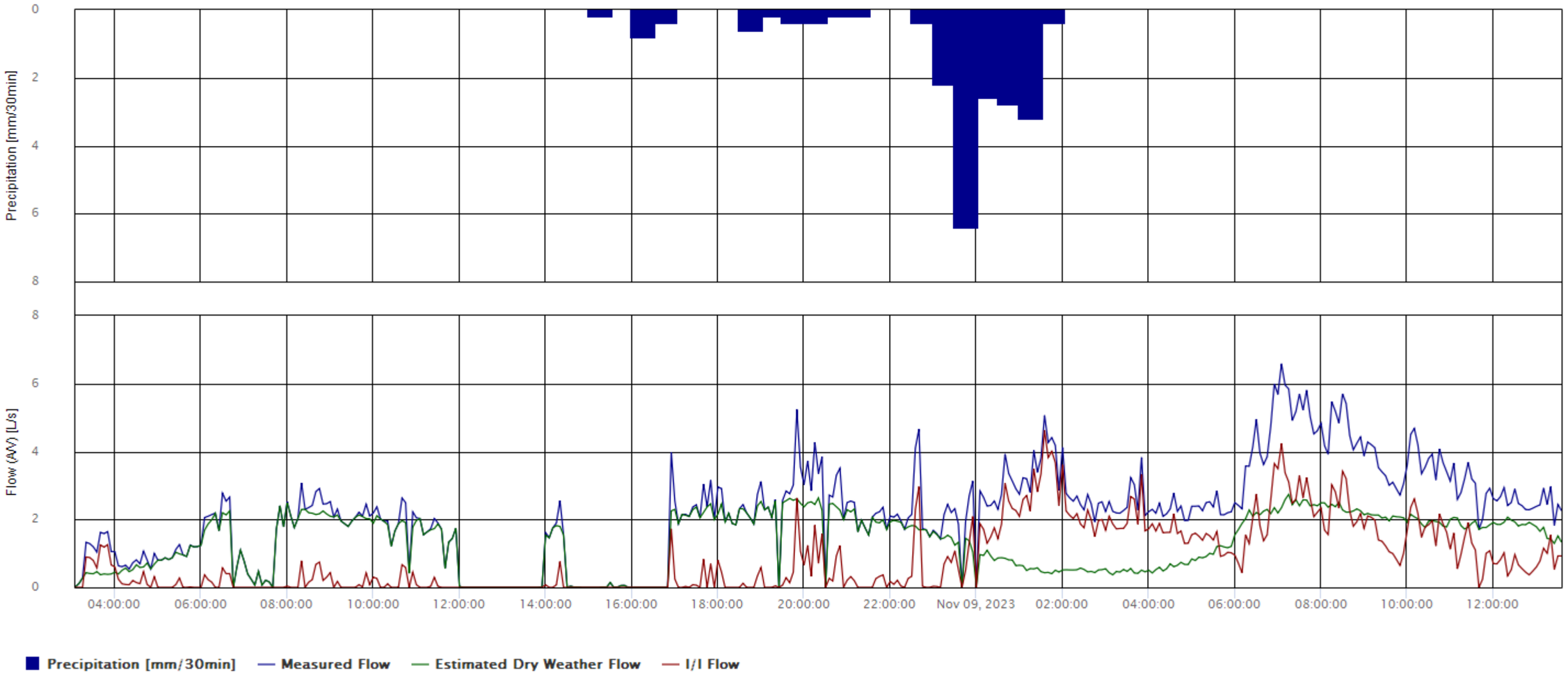
Station Details		Storm Details			
Catchment Area	35.90 ha	**Total Precipitation**	16.00 mm (5,743,999.30 L)	**Duration of Storm**	37.42 hr
Time of Concentration (Tc) [1]	30 min	**Peak Precipitation Intensity Over Tc** [2]	4.80 mm/hr	**Return Period over Tc** [3]	< 2 Yr
Measured Flow		**I/I Flow**			
Time of Peak Measured Flow	Oct 29, 2023 10:45	**Time of Peak I/I Flow (TD)**	Oct 30, 2023 08:20	**Estimated Dry Weather Flow at TD**	2.26 L/s
Peak Measured Flow	6.19 L/s	**Peak I/I Flow** [4]	3.49 L/s	**Peak I/I Rate** [5]	0.10 L/s/ha
Peak Measured Depth	0.09 m	**Total I/I Flow Volume during event**	72,989.40 L	**Volumetric Coefficient (Cv%)** [6]	1.27%
Total Measured Flow Volume during Event	350,752.30 L	**Peak I/I Coefficient** [7]	0.0073	**Hourly Wet-Weather Peaking Factor** [8]	2.54
		Instantaneous Wet-Weather Peaking Factor [9]	3.97		

[1] Time of Concentration (Tc): The estimated time for the flow to travel from the furthest point in the upstream area to the point of monitoring, assume flow is travelling at 1.00 m/s
[2] Peak Precipitation Intensity Over Tc: The peak rainfall intensity for the duration of the storm with the time interval defined by time of concentration
[3] Return Period over Tc: The estimated time to elapse before a storm of equal or greater intensity will likely occur again, based on design storm criteria
[4] Peak I/I Flow: The greatest difference captured between measured flow and estimated dry weather flow, Peak I/I Flow = Maximum (Measured Flow – Estimated Dry Weather Flow)
[5] Peak I/I Rate: A normalized peak I/I flow based on catchment area size, Peak I/I Rate = Peak I/I Flow / Catchment Area
[6] Volumetric Coefficient (Cv%): The ratio of total I/I volume and total rainfall volume, Cv% = Total I/I Flow Volume / Total Precipitation Volume * 100%
[7] Peak I/ I Coefficient: The ratio of peak I/I flow and peak rainfall intensity, Peak I/ I Coefficient = Peak I/I Flow / (Peak Rainfall Intensity over Tc * Catchment Area)
[8] Hourly Wet-Weather Peaking Factor: The ratio of peak hourly wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Hourly Wet-Weather Measured Flow / Average Dry-Weather Flow
[9] Instantaneous Wet-Weather Peaking Factor: The ratio of peak wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Wet-Weather Measured Flow / Average Dry-Weather Flow

I/I Analysis Graph

Station: CIV_09 (MH DY06345)

Infiltration/Inflow Event Analysis
Nov 08, 2023 03:05 – Nov 09, 2023 13:35, Total Precipitation: 21.4 mm



Infiltration/Inflow Event Analysis
Station: CIV_09 (MH DY06345)
Nov 08, 2023 03:05 – Nov 09, 2023 13:35, Total Precipitation: 21.40 mm (7,682,598.60 L)

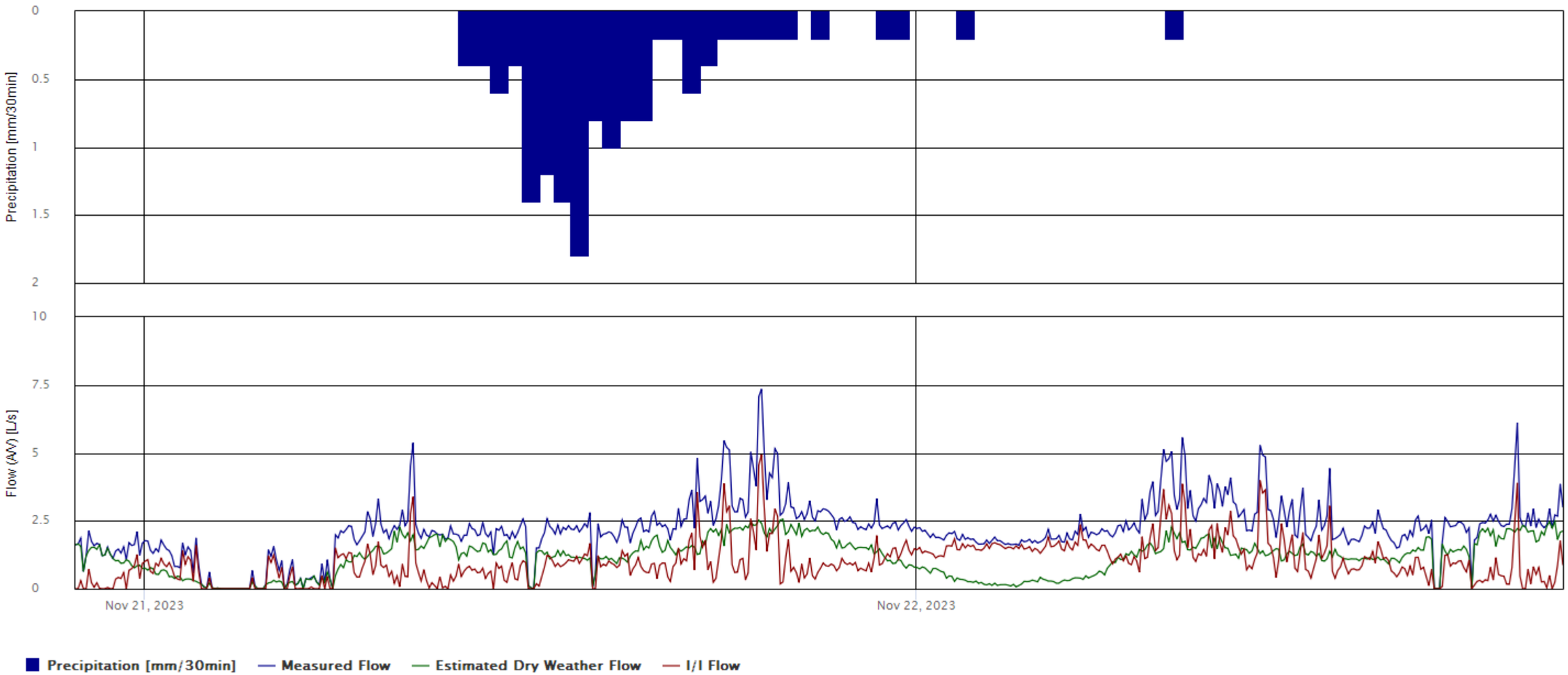
Station Details		Storm Details			
Catchment Area	35.90 ha	**Total Precipitation**	21.40 mm (7,682,598.60 L)	**Duration of Storm**	10.50 hr
Time of Concentration (Tc) [1]	30 min	**Peak Precipitation Intensity Over Tc** [2]	12.80 mm/hr	**Return Period over Tc** [3]	< 2 Yr
Measured Flow		**I/I Flow**			
Time of Peak Measured Flow	Nov 09, 2023 07:05	**Time of Peak I/I Flow (TD)**	Nov 09, 2023 01:35	**Estimated Dry Weather Flow at TD**	0.43 L/s
Peak Measured Flow	6.58 L/s	**Peak I/I Flow** [4]	4.63 L/s	**Peak I/I Rate** [5]	0.13 L/s/ha
Peak Measured Depth	0.09 m	**Total I/I Flow Volume during event**	99,756.80 L	**Volumetric Coefficient (Cv%)** [6]	1.30%
Total Measured Flow Volume during Event	220,739.10 L	**Peak I/I Coefficient** [7]	0.0036	**Hourly Wet-Weather Peaking Factor** [8]	3.73
		Instantaneous Wet-Weather Peaking Factor [9]	4.42		

[1] Time of Concentration (Tc): The estimated time for the flow to travel from the furthest point in the upstream area to the point of monitoring, assume flow is travelling at 1.00 m/s
[2] Peak Precipitation Intensity Over Tc: The peak rainfall intensity for the duration of the storm with the time interval defined by time of concentration
[3] Return Period over Tc: The estimated time to elapse before a storm of equal or greater intensity will likely occur again, based on design storm criteria
[4] Peak I/I Flow: The greatest difference captured between measured flow and estimated dry weather flow, Peak I/I Flow = Maximum (Measured Flow – Estimated Dry Weather Flow)
[5] Peak I/I Rate: A normalized peak I/I flow based on catchment area size, Peak I/I Rate = Peak I/I Flow / Catchment Area
[6] Volumetric Coefficient (Cv%): The ratio of total I/I volume and total rainfall volume, Cv% = Total I/I Flow Volume / Total Precipitation Volume * 100%
[7] Peak I/ I Coefficient: The ratio of peak I/I flow and peak rainfall intensity, Peak I/ I Coefficient = Peak I/I Flow / (Peak Rainfall Intensity over Tc * Catchment Area)
[8] Hourly Wet-Weather Peaking Factor: The ratio of peak hourly wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Hourly Wet-Weather Measured Flow / Average Dry-Weather Flow
[9] Instantaneous Wet-Weather Peaking Factor: The ratio of peak wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Wet-Weather Measured Flow / Average Dry-Weather Flow

I/I Analysis Graph

Station: CIV_09 (MH DY06345)

Infiltration/Inflow Event Analysis
Nov 20, 2023 21:50 – Nov 22, 2023 20:05, Total Precipitation: 14.4 mm



Infiltration/Inflow Event Analysis
Station: CIV_09 (MH DY06345)
Nov 20, 2023 21:50 – Nov 22, 2023 20:05, Total Precipitation: 14.40 mm (5,169,600.00 L)

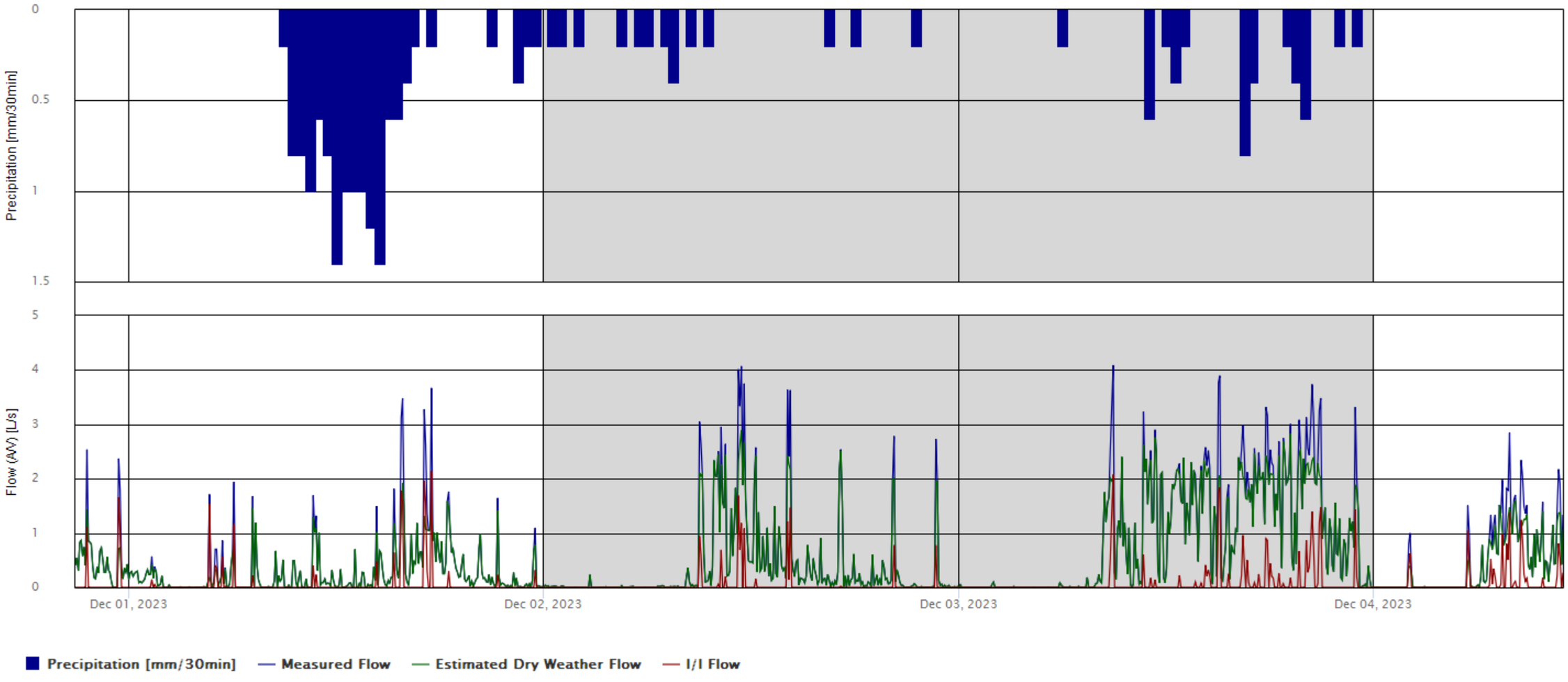
Station Details		Storm Details			
Catchment Area	35.90 ha	**Total Precipitation**	14.40 mm (5,169,600.00 L)	**Duration of Storm**	22.25 hr
Time of Concentration (Tc) [1]	30 min	**Peak Precipitation Intensity Over Tc** [2]	3.60 mm/hr	**Return Period over Tc** [3]	< 2 Yr
Measured Flow		**I/I Flow**			
Time of Peak Measured Flow	Nov 21, 2023 19:10	**Time of Peak I/I Flow (TD)**	Nov 21, 2023 19:10	**Estimated Dry Weather Flow at TD**	2.41 L/s
Peak Measured Flow	7.35 L/s	**Peak I/I Flow** [4]	4.94 L/s	**Peak I/I Rate** [5]	0.14 L/s/ha
Peak Measured Depth	0.09 m	**Total I/I Flow Volume during event**	145,026.30 L	**Volumetric Coefficient (Cv%)** [6]	2.81%
Total Measured Flow Volume during Event	306,943.40 L	**Peak I/I Coefficient** [7]	0.0138	**Hourly Wet-Weather Peaking Factor** [8]	3.64
		Instantaneous Wet-Weather Peaking Factor [9]	5.61		

[1] Time of Concentration (Tc): The estimated time for the flow to travel from the furthest point in the upstream area to the point of monitoring, assume flow is travelling at 1.00 m/s
[2] Peak Precipitation Intensity Over Tc: The peak rainfall intensity for the duration of the storm with the time interval defined by time of concentration
[3] Return Period over Tc: The estimated time to elapse before a storm of equal or greater intensity will likely occur again, based on design storm criteria
[4] Peak I/I Flow: The greatest difference captured between measured flow and estimated dry weather flow, Peak I/I Flow = Maximum (Measured Flow – Estimated Dry Weather Flow)
[5] Peak I/I Rate: A normalized peak I/I flow based on catchment area size, Peak I/I Rate = Peak I/I Flow / Catchment Area
[6] Volumetric Coefficient (Cv%): The ratio of total I/I volume and total rainfall volume, Cv% = Total I/I Flow Volume / Total Precipitation Volume * 100%
[7] Peak I/ I Coefficient: The ratio of peak I/I flow and peak rainfall intensity, Peak I/ I Coefficient = Peak I/I Flow / (Peak Rainfall Intensity over Tc * Catchment Area)
[8] Hourly Wet-Weather Peaking Factor: The ratio of peak hourly wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Hourly Wet-Weather Measured Flow / Average Dry-Weather Flow
[9] Instantaneous Wet-Weather Peaking Factor: The ratio of peak wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Wet-Weather Measured Flow / Average Dry-Weather Flow

I/I Analysis Graph

Station: CIV_09 (MH DY06345)

Infiltration/Inflow Event Analysis
Nov 30, 2023 20:55 – Dec 04, 2023 10:55, Total Precipitation: 21.4 mm



Infiltration/Inflow Event Analysis
Station: CIV_09 (MH DY06345)
Nov 30, 2023 20:55 – Dec 04, 2023 10:55, Total Precipitation: 21.40 mm (7,682,600.00 L)

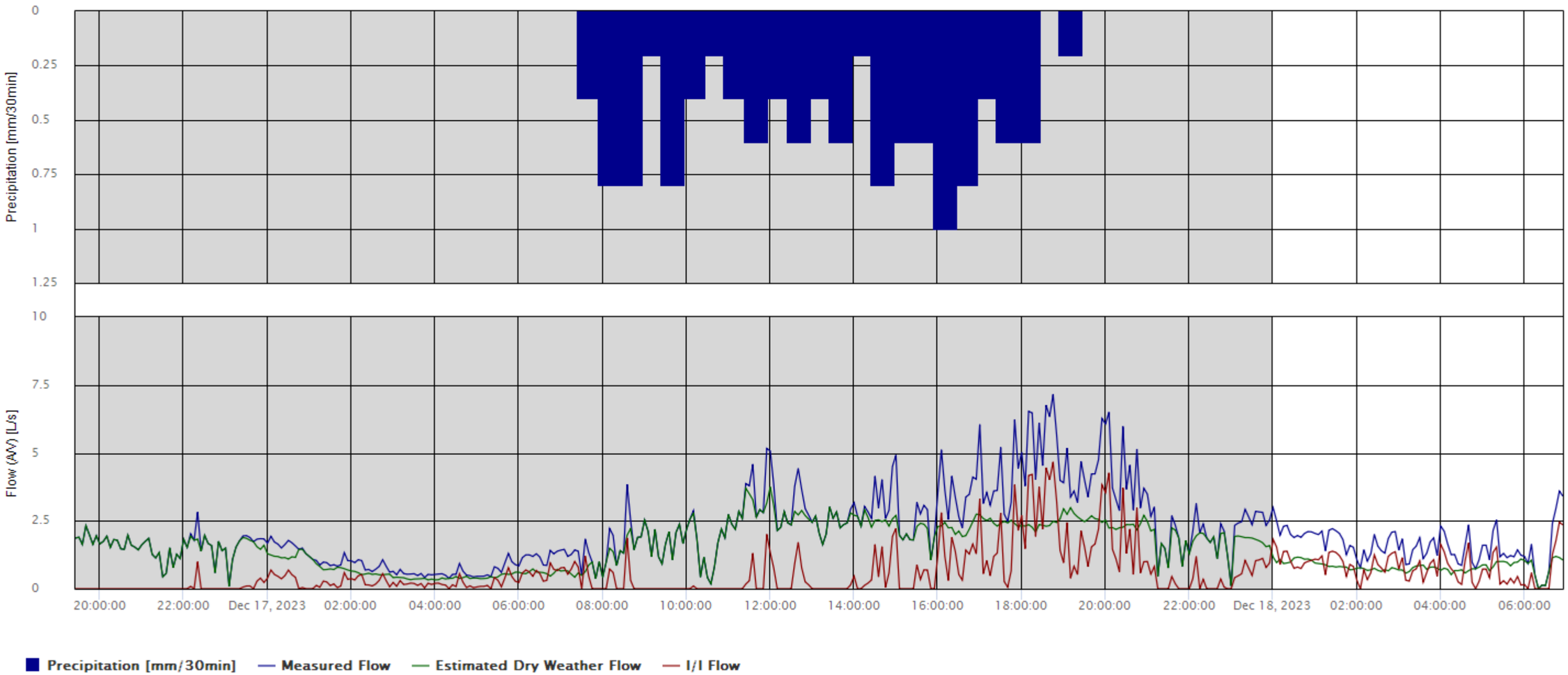
Station Details		Storm Details			
Catchment Area	35.90 ha	**Total Precipitation**	21.40 mm (7,682,600.00 L)	**Duration of Storm**	62.00 hr
Time of Concentration (Tc) [1]	30 min	**Peak Precipitation Intensity Over Tc** [2]	2.80 mm/hr	**Return Period over Tc** [3]	< 2 Yr
Measured Flow		**I/I Flow**			
Time of Peak Measured Flow	Dec 03, 2023 08:55	**Time of Peak I/I Flow (TD)**	Dec 01, 2023 17:30	**Estimated Dry Weather Flow at TD**	1.53 L/s
Peak Measured Flow	4.09 L/s	**Peak I/I Flow** [4]	2.14 L/s	**Peak I/I Rate** [5]	0.06 L/s/ha
Peak Measured Depth	0.11 m	**Total I/I Flow Volume during event**	18,365.60 L	**Volumetric Coefficient (Cv%)** [6]	0.24%
Total Measured Flow Volume during Event	158,085.70 L	**Peak I/I Coefficient** [7]	0.0077	**Hourly Wet-Weather Peaking Factor** [8]	5.22
		Instantaneous Wet-Weather Peaking Factor [9]	7.81		

[1] Time of Concentration (Tc): The estimated time for the flow to travel from the furthest point in the upstream area to the point of monitoring, assume flow is travelling at 1.00 m/s
[2] Peak Precipitation Intensity Over Tc: The peak rainfall intensity for the duration of the storm with the time interval defined by time of concentration
[3] Return Period over Tc: The estimated time to elapse before a storm of equal or greater intensity will likely occur again, based on design storm criteria
[4] Peak I/I Flow: The greatest difference captured between measured flow and estimated dry weather flow, Peak I/I Flow = Maximum (Measured Flow – Estimated Dry Weather Flow)
[5] Peak I/I Rate: A normalized peak I/I flow based on catchment area size, Peak I/I Rate = Peak I/I Flow / Catchment Area
[6] Volumetric Coefficient (Cv%): The ratio of total I/I volume and total rainfall volume, Cv% = Total I/I Flow Volume / Total Precipitation Volume * 100%
[7] Peak I/ I Coefficient: The ratio of peak I/I flow and peak rainfall intensity, Peak I/ I Coefficient = Peak I/I Flow / (Peak Rainfall Intensity over Tc * Catchment Area)
[8] Hourly Wet-Weather Peaking Factor: The ratio of peak hourly wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Hourly Wet-Weather Measured Flow / Average Dry-Weather Flow
[9] Instantaneous Wet-Weather Peaking Factor: The ratio of peak wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Wet-Weather Measured Flow / Average Dry-Weather Flow

I/I Analysis Graph

Station: CIV_09 (MH DY06345)

Infiltration/Inflow Event Analysis
Dec 16, 2023 19:25 – Dec 18, 2023 06:55, Total Precipitation: 12.4 mm



Infiltration/Inflow Event Analysis
Station: CIV_09 (MH DY06345)
Dec 16, 2023 19:25 – Dec 18, 2023 06:55, Total Precipitation: 12.40 mm (4,451,600.00 L)

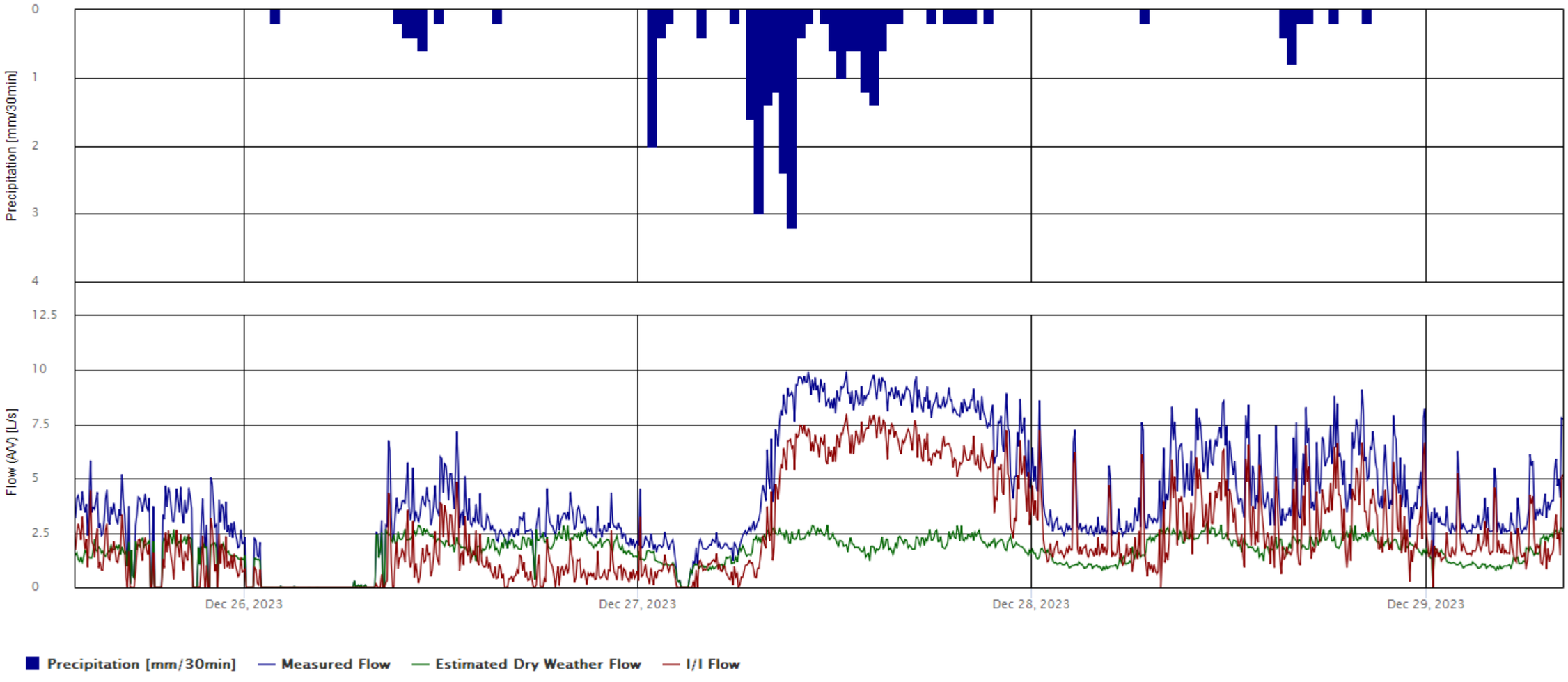
Station Details		Storm Details			
Catchment Area	35.90 ha	**Total Precipitation**	12.40 mm (4,451,600.00 L)	**Duration of Storm**	11.50 hr
Time of Concentration (Tc) [1]	30 min	**Peak Precipitation Intensity Over Tc** [2]	2.00 mm/hr	**Return Period over Tc** [3]	< 2 Yr
Measured Flow		**I/I Flow**			
Time of Peak Measured Flow	Dec 17, 2023 18:45	**Time of Peak I/I Flow (TD)**	Dec 17, 2023 18:45	**Estimated Dry Weather Flow at TD**	2.49 L/s
Peak Measured Flow	7.15 L/s	**Peak I/I Flow** [4]	4.67 L/s	**Peak I/I Rate** [5]	0.13 L/s/ha
Peak Measured Depth	0.10 m	**Total I/I Flow Volume during event**	66,712.80 L	**Volumetric Coefficient (Cv%)** [6]	1.50%
Total Measured Flow Volume during Event	212,634.30 L	**Peak I/I Coefficient** [7]	0.0234	**Hourly Wet-Weather Peaking Factor** [8]	3.27
		Instantaneous Wet-Weather Peaking Factor [9]	4.16		

[1] Time of Concentration (Tc): The estimated time for the flow to travel from the furthest point in the upstream area to the point of monitoring, assume flow is travelling at 1.00 m/s
[2] Peak Precipitation Intensity Over Tc: The peak rainfall intensity for the duration of the storm with the time interval defined by time of concentration
[3] Return Period over Tc: The estimated time to elapse before a storm of equal or greater intensity will likely occur again, based on design storm criteria
[4] Peak I/I Flow: The greatest difference captured between measured flow and estimated dry weather flow, Peak I/I Flow = Maximum (Measured Flow – Estimated Dry Weather Flow)
[5] Peak I/I Rate: A normalized peak I/I flow based on catchment area size, Peak I/I Rate = Peak I/I Flow / Catchment Area
[6] Volumetric Coefficient (Cv%): The ratio of total I/I volume and total rainfall volume, Cv% = Total I/I Flow Volume / Total Precipitation Volume * 100%
[7] Peak I/ I Coefficient: The ratio of peak I/I flow and peak rainfall intensity, Peak I/ I Coefficient = Peak I/I Flow / (Peak Rainfall Intensity over Tc * Catchment Area)
[8] Hourly Wet-Weather Peaking Factor: The ratio of peak hourly wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Hourly Wet-Weather Measured Flow / Average Dry-Weather Flow
[9] Instantaneous Wet-Weather Peaking Factor: The ratio of peak wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Wet-Weather Measured Flow / Average Dry-Weather Flow

I/I Analysis Graph

Station: CIV_09 (MH DY06345)

Infiltration/Inflow Event Analysis
Dec 25, 2023 13:40 – Dec 29, 2023 08:20, Total Precipitation: 28.8 mm



Infiltration/Inflow Event Analysis
Station: CIV_09 (MH DY06345)
Dec 25, 2023 13:40 – Dec 29, 2023 08:20, Total Precipitation: 28.80 mm (10,339,196.80 L)

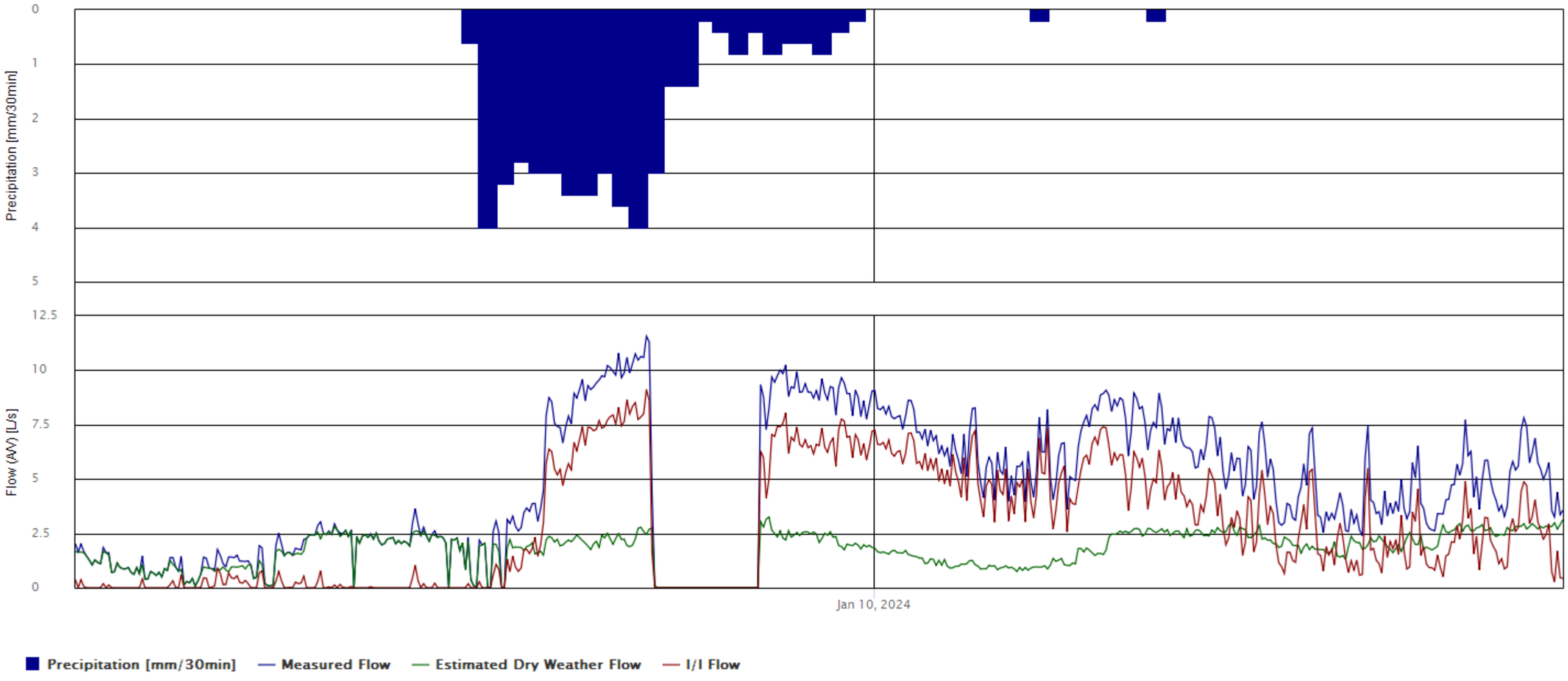
Station Details		Storm Details			
Catchment Area	35.90 ha	**Total Precipitation**	28.80 mm (10,339,196.80 L)	**Duration of Storm**	66.67 hr
Time of Concentration (Tc) [1]	30 min	**Peak Precipitation Intensity Over Tc** [2]	6.40 mm/hr	**Return Period over Tc** [3]	< 2 Yr
Measured Flow		**I/I Flow**			
Time of Peak Measured Flow	Dec 27, 2023 12:40	**Time of Peak I/I Flow (TD)**	Dec 27, 2023 12:40	**Estimated Dry Weather Flow at TD**	1.96 L/s
Peak Measured Flow	9.93 L/s	**Peak I/I Flow** [4]	7.97 L/s	**Peak I/I Rate** [5]	0.22 L/s/ha
Peak Measured Depth	0.13 m	**Total I/I Flow Volume during event**	746,552.80 L	**Volumetric Coefficient (Cv%)** [6]	7.22%
Total Measured Flow Volume during Event	1,229,330.60 L	**Peak I/I Coefficient** [7]	0.0125	**Hourly Wet-Weather Peaking Factor** [8]	5.58
		Instantaneous Wet-Weather Peaking Factor [9]	5.83		

[1] Time of Concentration (Tc): The estimated time for the flow to travel from the furthest point in the upstream area to the point of monitoring, assume flow is travelling at 1.00 m/s
[2] Peak Precipitation Intensity Over Tc: The peak rainfall intensity for the duration of the storm with the time interval defined by time of concentration
[3] Return Period over Tc: The estimated time to elapse before a storm of equal or greater intensity will likely occur again, based on design storm criteria
[4] Peak I/I Flow: The greatest difference captured between measured flow and estimated dry weather flow, Peak I/I Flow = Maximum (Measured Flow – Estimated Dry Weather Flow)
[5] Peak I/I Rate: A normalized peak I/I flow based on catchment area size, Peak I/I Rate = Peak I/I Flow / Catchment Area
[6] Volumetric Coefficient (Cv%): The ratio of total I/I volume and total rainfall volume, Cv% = Total I/I Flow Volume / Total Precipitation Volume * 100%
[7] Peak I/ I Coefficient: The ratio of peak I/I flow and peak rainfall intensity, Peak I/ I Coefficient = Peak I/I Flow / (Peak Rainfall Intensity over Tc * Catchment Area)
[8] Hourly Wet-Weather Peaking Factor: The ratio of peak hourly wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Hourly Wet-Weather Measured Flow / Average Dry-Weather Flow
[9] Instantaneous Wet-Weather Peaking Factor: The ratio of peak wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Wet-Weather Measured Flow / Average Dry-Weather Flow

I/I Analysis Graph

Station: CIV_09 (MH DY06345)

Infiltration/Inflow Event Analysis
Jan 09, 2024 00:05 – Jan 10, 2024 20:35, Total Precipitation: 45.4 mm



Infiltration/Inflow Event Analysis
Station: CIV_09 (MH DY06345)
Jan 09, 2024 00:05 – Jan 10, 2024 20:35, Total Precipitation: 45.40 mm (16,298,586.40 L)

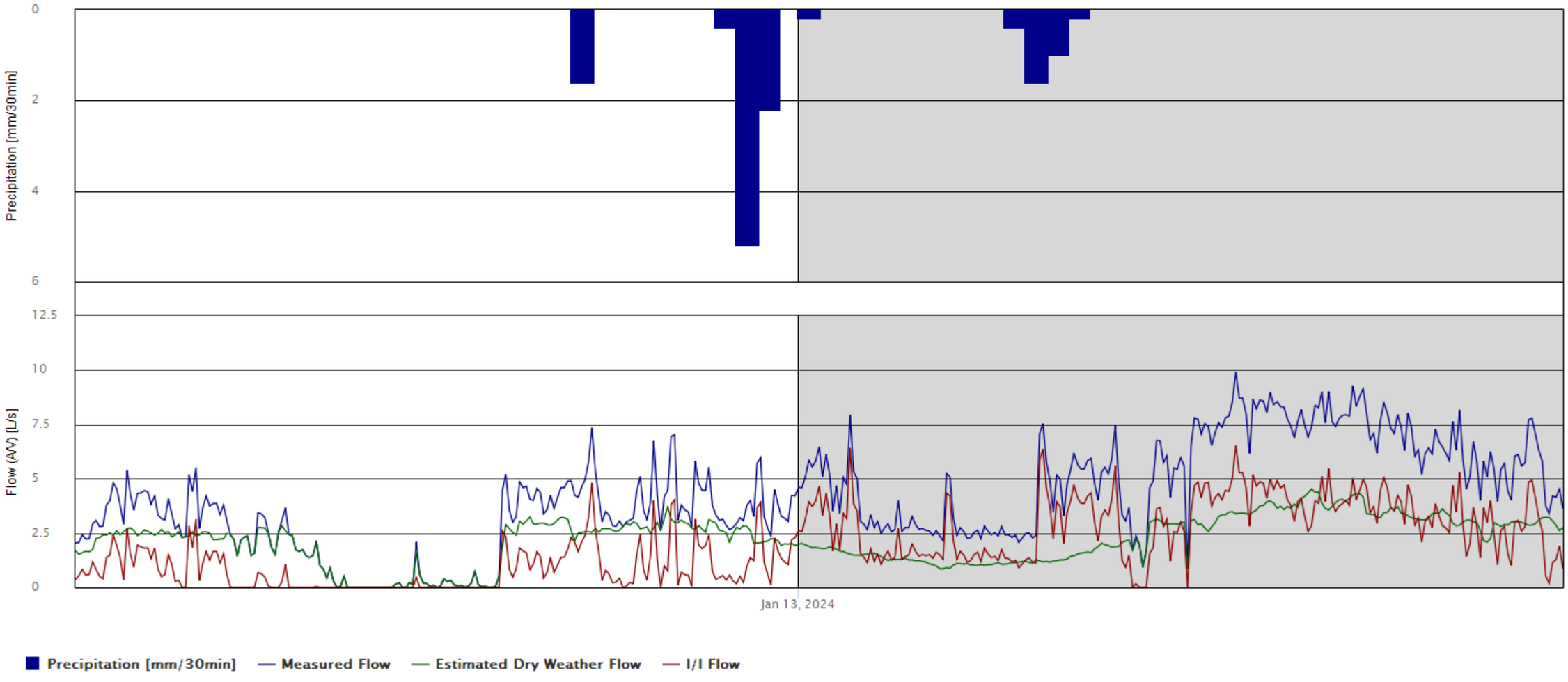
Station Details		Storm Details			
Catchment Area	35.90 ha	**Total Precipitation**	45.40 mm (16,298,586.40 L)	**Duration of Storm**	20.50 hr
Time of Concentration (Tc) [1]	30 min	**Peak Precipitation Intensity Over Tc** [2]	8.00 mm/hr	**Return Period over Tc** [3]	< 2 Yr
Measured Flow		**I/I Flow**			
Time of Peak Measured Flow	Jan 09, 2024 17:10	**Time of Peak I/I Flow (TD)**	Jan 09, 2024 17:10	**Estimated Dry Weather Flow at TD**	2.45 L/s
Peak Measured Flow	11.57 L/s	**Peak I/I Flow** [4]	9.12 L/s	**Peak I/I Rate** [5]	0.25 L/s/ha
Peak Measured Depth	0.66 m	**Total I/I Flow Volume during event**	448,022.40 L	**Volumetric Coefficient (Cv%)** [6]	2.75%
Total Measured Flow Volume during Event	661,510.40 L	**Peak I/I Coefficient** [7]	0.0114	**Hourly Wet-Weather Peaking Factor** [8]	5.79
		Instantaneous Wet-Weather Peaking Factor [9]	6.35		

[1] Time of Concentration (Tc): The estimated time for the flow to travel from the furthest point in the upstream area to the point of monitoring, assume flow is travelling at 1.00 m/s
[2] Peak Precipitation Intensity Over Tc: The peak rainfall intensity for the duration of the storm with the time interval defined by time of concentration
[3] Return Period over Tc: The estimated time to elapse before a storm of equal or greater intensity will likely occur again, based on design storm criteria
[4] Peak I/I Flow: The greatest difference captured between measured flow and estimated dry weather flow, Peak I/I Flow = Maximum (Measured Flow – Estimated Dry Weather Flow)
[5] Peak I/I Rate: A normalized peak I/I flow based on catchment area size, Peak I/I Rate = Peak I/I Flow / Catchment Area
[6] Volumetric Coefficient (Cv%): The ratio of total I/I volume and total rainfall volume, Cv% = Total I/I Flow Volume / Total Precipitation Volume * 100%
[7] Peak I/ I Coefficient: The ratio of peak I/I flow and peak rainfall intensity, Peak I/ I Coefficient = Peak I/I Flow / (Peak Rainfall Intensity over Tc * Catchment Area)
[8] Hourly Wet-Weather Peaking Factor: The ratio of peak hourly wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Hourly Wet-Weather Measured Flow / Average Dry-Weather Flow
[9] Instantaneous Wet-Weather Peaking Factor: The ratio of peak wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Wet-Weather Measured Flow / Average Dry-Weather Flow

I/I Analysis Graph

Station: CIV_09 (MH DY06345)

Infiltration/Inflow Event Analysis
Jan 12, 2024 06:30 – Jan 13, 2024 18:30, Total Precipitation: 12.8 mm



Infiltration/Inflow Event Analysis
Station: CIV_09 (MH DY06345)
Jan 12, 2024 06:30 – Jan 13, 2024 18:30, Total Precipitation: 12.80 mm (4,595,198.60 L)

Station Details		Storm Details			
Catchment Area	35.90 ha	**Total Precipitation**	12.80 mm (4,595,198.60 L)	**Duration of Storm**	12.00 hr
Time of Concentration (Tc) [1]	30 min	**Peak Precipitation Intensity Over Tc** [2]	10.40 mm/hr	**Return Period over Tc** [3]	< 2 Yr
Measured Flow		**I/I Flow**			
Time of Peak Measured Flow	Jan 13, 2024 10:35	**Time of Peak I/I Flow (TD)**	Jan 13, 2024 10:35	**Estimated Dry Weather Flow at TD**	3.38 L/s
Peak Measured Flow	9.91 L/s	**Peak I/I Flow** [4]	6.53 L/s	**Peak I/I Rate** [5]	0.18 L/s/ha
Peak Measured Depth	0.12 m	**Total I/I Flow Volume during event**	225,871.40 L	**Volumetric Coefficient (Cv%)** [6]	4.92%
Total Measured Flow Volume during Event	441,057.50 L	**Peak I/I Coefficient** [7]	0.0063	**Hourly Wet-Weather Peaking Factor** [8]	3.39
		Instantaneous Wet-Weather Peaking Factor [9]	3.99		

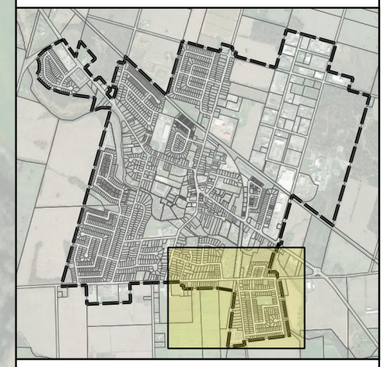
[1] Time of Concentration (Tc): The estimated time for the flow to travel from the furthest point in the upstream area to the point of monitoring, assume flow is travelling at 1.00 m/s
[2] Peak Precipitation Intensity Over Tc: The peak rainfall intensity for the duration of the storm with the time interval defined by time of concentration
[3] Return Period over Tc: The estimated time to elapse before a storm of equal or greater intensity will likely occur again, based on design storm criteria
[4] Peak I/I Flow: The greatest difference captured between measured flow and estimated dry weather flow, Peak I/I Flow = Maximum (Measured Flow – Estimated Dry Weather Flow)
[5] Peak I/I Rate: A normalized peak I/I flow based on catchment area size, Peak I/I Rate = Peak I/I Flow / Catchment Area
[6] Volumetric Coefficient (Cv%): The ratio of total I/I volume and total rainfall volume, Cv% = Total I/I Flow Volume / Total Precipitation Volume * 100%
[7] Peak I/ I Coefficient: The ratio of peak I/I flow and peak rainfall intensity, Peak I/ I Coefficient = Peak I/I Flow / (Peak Rainfall Intensity over Tc * Catchment Area)
[8] Hourly Wet-Weather Peaking Factor: The ratio of peak hourly wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Hourly Wet-Weather Measured Flow / Average Dry-Weather Flow
[9] Instantaneous Wet-Weather Peaking Factor: The ratio of peak wet-weather measured flow and average dry-weather flow, Wet-Weather Peaking Factor = Peak Wet-Weather Measured Flow / Average Dry-Weather Flow

Legend

- Sanitary Sewer
- Forcemain
- Sanitary Manhole
- FM Catchment Area
- Flow Monitor

Sewer Rehabilitation

- Lining
- Spot Repairs



CIVICA
Water Management Solutions

WLI23-0006
West Lincoln Flow Monitoring

CIV-09
Catchment Area

Drawn by: JG Date: 2024-01-24

0 60 120 m

From: Jennifer Bernard
To: Kapolnas, Stephen
Subject: RE: 161414473_Smithville 3A_Sanitary Sewer Flow Monitor
Date: Tuesday, May 14, 2024 2:15:49 PM
Attachments: image989067.PNG
image4cb250.PNG
imagea079a9.PNG
imageee41d5.PNG
Pages from Appendix II - Dry and Wet Weather Flow Monitoring Analysis.pdf
Pages from Appendix III - Maps of Flow Monitoring Locations.pdf

---

Hi Steve,

We completed some sanitary sewer flow monitoring at the end of last year after some lining and other repair work was completed in the system to address I&I. This catchment area was included in the study and found to be below the Regional KPI for extraneous flow, I don't have the raw data but have attached the breakdown provided by our consultant, not sure if this is sufficient information for you? If you want to proceed with more flow monitoring please let me know and we can include our Operations Department.

Thanks,
Jennifer

Our working hours may be different. Please do not feel obligated to reply outside of your working hours. Let's work together to help foster healthy work-life boundaries.

West Lincoln
Respecting our Roots – Realizing our Future

Jennifer Bernard, C.E.T.

Coordinator, Engineering Services

Tel: 905-957-3346 ext 6732
Email: jbernard@westlincoln.ca
Web: www.westlincoln.ca

From: Kapolnas, Stephen <Steve.Kapolnas@stantec.com>
Sent: May 9, 2024 2:03 PM
To: Jennifer Bernard <jbernard@westlincoln.ca>
Subject: 161414473_Smithville 3A_Sanitary Sewer Flow Monitor

Hi Jennifer,

We would like to install a flow monitor in one of the sanitary sewers on Anderson Crescent.

Before we start coordinating the work to install a flow monitor, would the township have any flow monitors already installed or recent information on Anderson Crescent before it discharges to the pumping station or before it crosses under the creek.

Please let us know.

Regards

Steve Kapolnas, P.Eng.
Project Manager

Direct: 519 585-7365
Mobile: 548 255-4369
steve.kapolnas@stantec.com

Stantec
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

APPENDIX E-5

SANITARY DESIGN – CIV 09 MONITORING FLOW AND
THEORETICAL SANITARY FLOW FROM THE PROPOSED SITE

Stantec

Lockbridge Development Inc
Smithville 3A
People/Hectare (p/ha)

DATE: August 16, 2024
DESIGNED BY: WJE
CHECKED BY: SAK

SANITARY SEWER DESIGN SHEET

FILE NUMBER: N/A
Project Number 161414394

Design Parameters

Mininum Velocity= 0.600 m/s
n= 0.013
Max Peak Factor= 5.000
Min Peak Factor= 2.000

Residential: 255 L/day/Person
0.0030 L/s/Person
Comercial: 1.500 L/s/Ha
Industrial: 1.000 L/s/Ha
Institutional: 0.375 L/s/Ha
Infiltration: 0.286 L/s/Ha

LOCATION			RESIDENTIAL AREA AND POPULATION								COMMERCIAL			INDUSTRIAL			INSTITUTIONAL				INFILTRATION				PIPE SELECTION						
Street	U/S	D/S	Area ID	Residential Area (ha)	Population Density (P/ha)	Population (P)	Cummulative Area (ha)	Cumulative Population (min)	Peak Factor	Peak Flow L/s	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Total C+I+I Flow (L/s)	Total Area (ha)	Accumulated Area (ha)	Flow (L/s)	Total Flow (L/s)	Length Design (m)	Design Size (mm)	Slope Design (%)	Full Capacity (L/s)	Full Velocity (m/s)	Actual Velocity (m/s)	Q_a/Q_c (%)
The Flow Monitoring Results has the highest peak flow measured is 11.57L/s on January 9, 2024 to January 10, 2024. The monitoring data that the Township shared can be found in Appendix D4.																														
Existing Sanitary Catchment Area Flowing to CIV 09 is 32.15 ha, Q=11.57L/s																														
Modified Residental Area from 35.12ha to 3.39 ha to achieve a Total Flow of Q=11.57L/s																														
CIV 09	Civ 09	83		3.43	60	940	3.43	940	3.82	10.59			0.00			0.00			0.00	0.00	3.43	3.43	0.980	11.57	54.0	200	0.73	28.02	0.89	1.02	41.3%
	83						3.43	940					0.00			0.00			0.00	0.00											
Theoretical Flow from our Site, Q=8.131L/s discharging to CIV 09 via Townline Road and Anderson Crescent																														
Our Site			1A	0.82	0	0																								
3A (Subject Property)			1B	0.50	60	30																								
			1C	0.30	0	0																								
			1D	0.40	60	25																								
			1E	1.61	0	0																								
			1F	0.95	60	57																								
			1G	0.45	60	28																								
			1H	0.49	60	30																								
			1I	0.55	0	0																								
			1J	0.47	60	29																								
Kingma			20A	0.21	60	13																								
			20B	0.09	60	6																								
			20C	0.08	60	5																								
			20D	0.18	60	11																								
			20E	0.18	60	11																								
	284	142		7.28		245	7.28	245	4.11	2.98			0.00			0.00			0.00	0.00	7.28	7.28	2.082	5.06	52.7	200	0.50	23.19	0.74	0.84	21.8%
	142						7.28	245					0.00			0.00			0.00	0.00											
Hendler			3A	0.12	75	10																								
			3B	0.23	0	0																								
			3C	0.84	110	93																								
			3D	0.07	60	5																								
			3E	0.05	0	0																								
			3F	0.10	60	7																								
			3G	0.09	60	6																								
			3H	0.99	0	0																								
			3I	0.15	60	9																								
			3J	0.57	0	0																								
			3K	0.13	60	8																								
			3L	0.67	60	41																								
			3M	0.07	75	5																								
			3N	0.26	75	20																								
			3P	0.24	60	15																								
	267	142		4.58		219	4.58	219	4.13	2.67			0.00			0.00			0.00	0.00	4.58	4.58	1.310	3.98	65.4	200	1.00	32.80	1.04	1.19	12.1%
	142						4.58	219					0.00			0.00			0.00	0.00											
Outlet from Our Site	142	71					11.86	464	3.99	5.47			0.00			0.00			0.00	0.00	0.00	11.86	3.392	8.86	77.0	200	0.49	22.96	0.73	0.83	38.6%
	71	83					11.86	464	3.99	5.47			0.00			0.00			0.00	0.00	0.00	11.86	3.392	8.86	68.9	200	0.60	25.41	0.81	0.92	34.9%
	83																														
Combining the Theoretical Flow from our Site, Q=8.86L/s and Monitoring Flow from CIV 09, Q=11.57L/s discharging from CIV 09																														
North to SPS	83	82					15.29	1404	3.70	15.33			0.00			0.00			0.00	0.00	0.00	15.29	4.372	19.70	43.8	250	0.32	33.64	0.69	0.78	58.6%
	82	81					15.29	1404	3.70	15.33			0.00			0.00			0.00	0.00	0.00	15.29	4.372	19.70	87.5	250	0.35	35.18	0.72	0.82	56.0%
	81	80					15.29	1404	3.70	15.33			0.00			0.00			0.00	0.00	0.00	15.29	4.372	19.70	113.5	250	0.27	30.90	0.63	0.72	63.8%
	80	79					15.29	1404	3.70	15.33			0.00			0.00			0.00	0.00	0.00	15.29	4.372	19.70	13.1	250	1.38	69.86	1.42	1.62	28.2%
	79						15.29	1404					0.00			0.00			0.00	0.00											

APPENDIX E-6

SANITARY DESIGN – EXISTING BUILT-UP AREA INTENSIFICATION

Stantec

1734234 Ontario Limited
Smithville 3A
People/Hectare (p/ha)

DATE: August 16, 2024
DESIGNED BY: WJE
CHECKED BY: SAK

FILE NUMBER: N/A
Project Number 161414394

SANITARY SEWER DESIGN SHEET

Design Parameters

Mininum Velocity= 0.600 m/s
n= 0.013
Max Peak Factor= 5.000
Min Peak Factor= 2.000

Residential: 255 L/day/Person
0.0030 L/s/Person
Comercial: 1.500 L/s/Ha
Industrial: 1.000 L/s/Ha
Institutional: 0.375 L/s/Ha
Infiltration: 0.286 L/s/Ha

LOCATION			RESIDENTIAL AREA AND POPULATION							COMMERCIAL			INDUSTRIAL			INSTITUTIONAL				INFILTRATION				PIPE SELECTION						
Street	U/S	D/S	Area ID	Residential Area (ha)	Population (P)	Cummulative Area (ha)	Cumulative Population (min)	Peak Factor	Peak Flow L/s	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Total C+I+I Flow (L/s)	Total Area (ha)	Accumulated Area (ha)	Flow (L/s)	Total Flow (L/s)	Length Design (m)	Design Size (mm)	Slope Design (%)	Full Capacity (L/s)	Full Velocity (m/s)	Actual Velocity (m/s)	Q_A/Q_C (%)
Townline Road			2A	1.85	120																									
			2B	0.88	0																									
			2C	0.78	36																									
			2D	0.86	54																									
	72	71		4.37	210	4.37	210	4.14	2.57			0.00			0.00			0.00	0.00	4.37	4.37	1.250	3.82	95.7	200	0.60	25.41	0.81	0.92	15.0%
	71					4.37	210					0.00			0.00			0.00	0.00											
Our Site			1A	0.82	0																									
3A (Subject Property)			1B	0.50	30																									
			1C	0.30	0																									
			1D	0.40	25																									
			1E	1.61	0																									
			1F	0.95	57																									
			1G	0.45	28																									
			1H	0.49	30																									
			1I	0.55	0																									
			1J	0.47	29																									
Kingma			20A	0.21	13																									
			20B	0.09	6																									
			20C	0.08	5																									
			20D	0.18	11																									
			20E	0.18	11																									
	284	142		7.28	245	7.28	245	4.11	2.98			0.00			0.00			0.00	0.00	7.28	7.28	2.082	5.06	52.7	200	0.50	23.19	0.74	0.84	21.8%
	142					7.28	245					0.00			0.00			0.00	0.00											
Hendler			3A	0.12	10																									
			3B	0.23	0																									
			3C	0.84	93																									
			3D	0.07	5																									
			3E	0.05	0																									
			3F	0.10	7																									
			3G	0.09	6																									
			3H	0.99	0																									
			3I	0.15	9																									
			3J	0.57	0																									
			3K	0.13	8																									
			3L	0.67	41																									
			3M	0.07	5																									
			3N	0.26	20																									
			3P	0.24	15																									
	267	142		4.58	219	4.58	219	4.13	2.67			0.00			0.00			0.00	0.00	4.58	4.58	1.310	3.98	65.4	200	1.00	32.80	1.04	1.19	12.1%
	142					4.58	219					0.00			0.00			0.00	0.00											
Outlet from Our Site	142	71				11.86	464	3.99	5.47			0.00			0.00			0.00	0.00	0.00	11.86	3.392	8.86	77.0	200	0.49	22.96	0.73	0.83	38.6%
Townline Road			4A	1.02	144																									
			4B	0.31	0																									
	71	70		1.33	144	17.56	818	3.85	9.31			0.00			0.00			0.00	0.00	1.33	17.56	5.022	14.33	68.9	200	0.60	25.41	0.81	0.92	56.4%
	70	69				17.56	818	3.85	9.31			0.00			0.00			0.00	0.00	0.00	17.56	5.022	14.33	67.4	200	1.70	42.76	1.36	1.55	33.5%
	69					17.56	818					0.00			0.00			0.00	0.00											
Shurie Road			11A	0.25	18																									
			11B	1.19	0																									
			11C	0.32	24																									
			11D	0.19	12																									
			11E	0.08	0																									
			11F	0.07	0																									
			11G	1.38	60																									
			11H	1.08	96																									

Stantec

1734234 Ontario Limited
Smithville 3A
People/Hectare (p/ha)

DATE: August 16, 2024
DESIGNED BY: WJE
CHECKED BY: SAK

FILE NUMBER: N/A
Project Number 161414394

SANITARY SEWER DESIGN SHEET

Design Parameters

Mininum Velocity= 0.600 m/s
n= 0.013
Max Peak Factor= 5.000
Min Peak Factor= 2.000

Residential: 255 L/day/Person
0.0030 L/s/Person
Comercial: 1.500 L/s/Ha
Industrial: 1.000 L/s/Ha
Institutional: 0.375 L/s/Ha
Infiltration: 0.286 L/s/Ha

LOCATION			RESIDENTIAL AREA AND POPULATION							COMMERCIAL			INDUSTRIAL			INSTITUTIONAL				INFILTRATION				PIPE SELECTION						
Street	U/S	D/S	Area ID	Residential Area (ha)	Population (P)	Cummulative Area (ha)	Cumulative Population (min)	Peak Factor	Peak Flow L/s	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Area ID	Area (ha)	Accumulated Area (ha)	Total C+I+I Flow (L/s)	Total Area (ha)	Accumulated Area (ha)	Flow (L/s)	Total Flow (L/s)	Length Design (m)	Design Size (mm)	Slope Design (%)	Full Capacity (L/s)	Full Velocity (m/s)	Actual Velocity (m/s)	Q_A/Q_C (%)
			11I	1.80	240																									
			11J	0.14	12																									
	93	69		6.50	462	6.50	462	3.99	5.44			0.00			0.00			0.00	0.00	6.50	6.50	1.859	7.30	85.8	200	0.55	24.32	0.77	0.88	30.0%
	69					6.50	462					0.00			0.00			0.00	0.00											
Townline Road			5A	0.25	12																									
			5B	0.36	0																									
			5C	0.69	48																									
	69	77		1.30	60	25.36	1340	3.71	14.69			0.00			0.00			0.00	0.00	1.30	25.36	7.253	21.94	119.5	200	0.49	22.96	0.73	0.83	95.6%
	77	76				25.36	1340	3.71	14.69			0.00			0.00			0.00	0.00	0.00	25.36	7.253	21.94	84.4	200	1.09	34.24	1.09	1.24	64.1%
	76					25.36	1340					0.00			0.00			0.00	0.00											
Townline Road			9A	0.25	24																									
			9B	0.28	0																									
			9C	0.28	12																									
			12A	1.26	84																									
			12B	3.62	0																									
			12C	0.52	54																									
			12D	0.83	84																									
			12E	0.18	18																									
			12F	0.07	0																									
			12G	1.23	0																									
			12H	0.07	0																									
			12I	0.19	12																									
			12J	1.06	90																									
			12K	1.24	108																									
			12L	3.03	270																									
			12M	1.22	114																									
			12N	1.03	102																									
	78	76		16.36	972	16.36	972	3.81	10.92			0.00			0.00			0.00	0.00	16.36	16.36	4.679	15.60	111.6	200	0.46	22.24	0.71	0.81	70.1%
	76					16.36	972					0.00			0.00			0.00	0.00											
Anderson Crescent			8A	0.56	54																									
			8B	0.24	0																									
			8C	0.27	30																									
	76	85		1.07	84	42.79	2396	3.52	24.92			0.00			0.00			0.00	0.00	1.07	42.79	12.238	37.15	95.3	250	0.37	36.17	0.74	0.84	102.7%
	85	84				42.79	2396	3.52	24.92			0.00			0.00			0.00	0.00	0.00	42.79	12.238	37.15	16.5	250	0.63	47.20	0.96	1.10	78.7%
	84	83				42.79	2396	3.52	24.92			0.00			0.00			0.00	0.00	0.00	42.79	12.238	37.15	10.3	250	0.87	55.47	1.13	1.29	67.0%
	83					42.79	2396					0.00			0.00			0.00	0.00											
Anderson Crescent			7A	0.64	72																									
			7B	0.30	0																									
			7C	0.28	30																									
	87	86		1.22	102	1.22	102	4.24	1.28			0.00			0.00			0.00	0.00	1.22	1.22	0.349	1.63	80.2	200	1.18	35.63	1.13	1.29	4.6%
	86	83				1.22	102	4.24	1.28			0.00			0.00			0.00	0.00	0.00	1.22	0.349	1.63	54.0	200	0.73	28.02	0.89	1.02	5.8%
	83					1.22	102					0.00			0.00			0.00	0.00											
North to SPS	83	82				44.01	2498	3.51	25.87			0.00			0.00			0.00	0.00	0.00	44.01	12.587	38.46	43.8	250	0.32	33.64	0.69	0.78	114.3%
	82	81				44.01	2498	3.51	25.87			0.00			0.00			0.00	0.00	0.00	44.01	12.587	38.46	87.5	250	0.35	35.18	0.72	0.82	109.3%
	81	80				44.01	2498	3.51	25.87			0.00			0.00			0.00	0.00	0.00	44.01	12.587	38.46	113.5	250	0.27	30.90	0.63	0.72	124.4%
	80	79				44.01	2498	3.51	25.87			0.00			0.00			0.00	0.00	0.00	44.01	12.587	38.46	13.1	250	1.38	69.86	1.42	1.62	55.0%
	79					44.01	2498					0.00			0.00			0.00	0.00											

APPENDIX F
Stormwater Management Report

SMITHVILLE PHASE 3A BLOCK PLAN
AREA 9 SMITHVILLE
PRELIMINARY STORMWATER MANAGEMENT REPORT

August 19, 2024

Prepared for:

Lockbridge Development Inc.
25 Sable Street
North York ON M6M 3K8

Prepared by:

Stantec Consulting Ltd
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

Sign-off Sheet

This document entitled Smithville Phase 3A/Block Plan 9, Smithville, Ontario Stormwater Management Strategy was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Lockbridge Development Inc. ("Client") to support the Block Plan Submission and Draft Plan Application Submission (the "Application") for a portion of Smithville Phase 3A/Block Plan Area 9 (the "Project"). In connection thereto, this document may be reviewed and used by the provincial and municipal government agencies participating in the permitting process in the normal course of their duties. Except as set forth in the previous sentence, any reliance on this document by any third party for any other purpose is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by Max Ornat Digitally signed by Max Ornat DN: C=CA, E=max.ornat@stantec.com, CN=Max Ornat Date: 2024.08.19 17:59:36-04'00' _____
(signature)

Maximilian Ornat, B.Eng

Reviewed by Bryan Weersink Digitally signed by Bryan Weersink DN: C=CA, E=bryan.weersink@stantec.com, CN=Bryan Weersink Date: 2024.08.19 17:58:18-04'00' _____
(signature)

Bryan Weersink, P. Eng.

Approved by Brousseau, Kevin Digitally signed by Brousseau, Kevin DN: CN="Brousseau, Kevin", OU=Internal, OU=users, OU=stantec, DC=corp, DC=ads Date: 2024.08.20 09:20:31-04'00' _____
(signature)

Kevin Brousseau, L.E.T., C.E.T.

Table of Contents

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) has been retained by Lockbridge Development (the "Client") to complete a Stormwater Management (SWM) strategy and design in conjunction with the Functional Servicing Report (FSR) in support of the Stage 1 Draft Plan and Block Plan Area 9 Approvals located in Smithville (Town), Township of West Lincoln (Township), Region of Niagara (Region). This Report provides the SWM Plan for the proposed development.

The purposes of this Report are to:

- Examine the existing drainage conditions and determine the applicable SWM criteria for the proposed site conditions to mitigate impacts of the proposed development.
- Provide a functional level SWM Plan to manage the runoff from the developed site.

1.1 BACKGROUND INFORMATION

The following data sources, background reports and technical guidelines were referenced while preparing this Report, the following should be read in conjunction with this report.

- Geotechnical Investigation, Smithville 3A/Block Plan Area 9 – Smithville, ON, prepared by Stantec Consulting Ltd., July 2, 2024
- Smithville Subwatershed Study Phase 3: Management, Implementation, and Monitoring Plan, Wood Environment and Infrastructure Solutions, April 2023.
- Erosion and Sedimentation Control Guide for Urban Construction, Toronto and Region Conservation Authority, 2019
- Stormwater Management Planning and Design (SWMPD) Manual, Ministry of the Environment, Conservation and Parks (MECP), March 2003.
- MTO Drainage Management Manual, Ministry of Transportation Ontario, 1997

1.2 SITE DESCRIPTION

The entire total area of Block Plan 9, which is part of Phase 3A area, is 63.5 hectares (ha) and consists of multiple Owners/Developers. The land is primarily undeveloped in existing conditions and the primary land use is agricultural. The site is approximately split two portions, with the north portion generally sloping and draining northeast to an existing culvert beneath Townline Road, while the southern portion drains southeast towards a trail bordering the east portion of the site. The site is bounded by Townline Road to the north, Port Davidson Road to the West, Shurie Road to the east, and a woodlot with several residential properties to the south. A Site Location Plan can be found on Figure 1 in Appendix A.

1.3 GEOTECHNICAL CONDITIONS

The Site is located in the approximately 3,500 km^2 physiographic region of the Haldimand Clay Plain, which occupies the Niagara Peninsula between the Niagara Escarpment and Lake Erie. It is bounded by the Niagara River in the east and extends past Highway 6 connecting Hamilton on the Niagara Escarpment to Port Dover on Lake Erie. The Quaternary geology map shows that the general Site area is covered with glaciolacustrine silt and clay deposits, which have been described as poorly draining with low infiltration rates, resulting in surface ponding in poor drainage areas.

A Geotechnical Investigation was carried out onsite between February 27, 2024, to March 5, 2024. During this investigation, it was found that the subsurface stratigraphy could be summarized as an approximately 460 mm thick layer of topsoil which contained rootlets and comprised of silty sand, underlain by layer of silty clay, underlain by Dolostone bedrock. Within the bedrock, there were weathered rock cores, which are indicative of the karstic process. Karst formations were not confirmed but are known to be present in the general Site area and are potentially located onsite.

Monitoring wells were also installed onsite to aid in the measurement of groundwater level. Groundwater levels were varied and ranged from 181.7 mASL (metres above sea level) to 186.9 mASL. Existing grade elevations on site range from approximately 186.0 mASL to 191.0 mASL.

2.0 STORMWATER MANAGEMENT CRITERIA

The proposed SWM facilities shall be designed to provide the following levels of control as per the requirements of the Ministry of the Environment, Conservation, and Parks (MECP), the Niagara Peninsula Conservation Authority (NPCA), and the Township of West Lincoln. Additionally, criteria as outlined in the *Smithville Subwatershed Study Phase 3: Management, Implementation, and Monitoring Plan*, Wood Environment and Infrastructure Solutions, April 2023 were incorporated.

- **Quantity Control:** Quantity control shall be provided to maintain peak outflows at or below pre-development levels for the 2-year through 100-year design storm events. The *Smithville Subwatershed Study Phase 3: Management, Implementation, and Monitoring Plan*, Wood Environment and Infrastructure Solutions, April 2023 also provides unitary flow rates and storage volumes to be met at each specified outlet.

- **Quality Control:** The SWM facilities shall provide a sufficient permanent pool and extended detention volume to meet the MECP Enhanced (80% TSS removal) criteria to treat stormwater runoff and promote the at-source removal of contaminants. The 2023 Subwatershed Study (SWS) also provides guidance on the level of treatment to be provided by stormwater facilities (Wood, 2023), which also states 80% TSS removal for this site.

- **Erosion Control:** Stormwater runoff from the 25 mm storm event shall be stored and released over a minimum 24-hour period (48 hours preferred). Unitary discharge rates outlined in Table 2.2.3 of the SWS (Wood, 2023) shall be followed to mitigate erosion impacts at key locations throughout the watershed.

- **Infiltration and Water Balance**: Promote infiltration measures where possible and provide best efforts to match pre-development infiltration rates.

3.0 STORMWATER MANAGEMENT STRATEGY

Stormwater runoff from the site will be provided with onsite water quality and water quantity controls. The Stormwater management modelling software Visual OTTHYMO (VO) was used to simulate drainage conditions of the site under existing and proposed conditions.

Design storms were developed for the 2- ,5- ,10- ,25- ,50- , and 100-year events with IDF parameters from the Vineland Station, shown in Table 1 below. The 3-, 6-, and 12-hour Chicago storm distributions were developed and run to be consistent with the SWS (Wood, 2023). The 12-hour storm produced the highest peak flows and was used to determine the most conservative design. The Regional Storm (Hurricane Hazel) was also used to access the long-duration, high volume impacts on the end-of-pipe facilities. Each design storm up to the 100-year event will be controlled to equal or less than existing levels.

Table 1: IDF Parameters (Vineland Station)

Return Period	IDF Parameter		
	A	B	C
2-year	603.25	6.00	0.79
5-year	785.59	6.00	0.79
10-year	953.64	7.00	0.79
25-year	1119.02	7.00	0.79
50-year	1301.80	8.00	0.80
100-year	1426.00	8.00	0.80

IDF values were obtained from the vineland station historical data and interpolated using the GEV Method to obtain A, B, and C values for each design storm. All Chicago design storms use a time to peak ratio of 0.38 as per guidance from MTO Drainage Management Manual (MTO, 1997).

4.0 DRAINAGE CONDITIONS

4.1 EXISTING DRAINAGE CONDITIONS

Under existing conditions, the majority of runoff is split between flowing north and south via uncontrolled overland flow. Some flow from the east portion of the site drains east but is ultimately conveyed northwards via a ditch located on the border of the site to an existing headwall that leads to a 600 mm storm sewer on Townline Road. Some flow from the west end of the site is conveyed off-site through an existing 600 mm culvert located at Port Davidson Road. Flow from the north portion of the site is conveyed through an existing 900 mm culvert under Townline Road, and ultimately to Twenty Mile Creek, located north of the site. Flow from the south portion of the site is directed offsite, and flows into north Creek, which eventually contributes flow to Twenty Mile Creek. The dominant land use is agricultural with the site containing some landscaped and forested portions. Several external areas that are predominantly landscaped areas east of the site contribute drainage towards the drainage ditch that conveys flow northwards in existing conditions. Figure 2, provided in Appendix A, illustrates the existing conditions drainage areas. The following catchments were delineated for the existing site:

- **Catchment 100** – 10.57 ha of mostly agricultural land with some trees, draining north to the existing 900 mm culvert on Townline Road.
- **Catchment 101** – 0.04 ha of mostly landscaped area, located directly adjacent to Townline Road, draining north to the existing 900 mm culvert on Townline Road.
- **Catchment 102** – 7.24 ha of mostly agricultural land with some forested areas, draining eastward toward a ditch and conveyed north to the northeast outlet (existing 600 mm storm sewer).
- **Catchment 103** – 1.41 ha of mostly agricultural land with some driveway and rooftop area, draining westward towards the existing 600 mm culvert on Port Davidson Road.
- **Catchment 104** – 3.63 ha of mostly agricultural land with some rooftop, drive, and landscaped area, draining southwest off-site.
- **Catchment 105** – 9.75 ha of agricultural land, draining south off-site.
- **Catchment 106** – 1.27 ha of agricultural land and forested area, draining south off-site.
- **Catchment 120** – 4.33 ha of agricultural, rooftops, driveways, and landscaped area, draining southeast towards catchment 100.
- **Catchment 121** – 2.12 ha of mostly agricultural land, draining south towards catchment 105.
- **Catchment 122** – 3.16 ha of mostly agricultural land, with some landscaped, rooftop, and driveway areas, draining southwest towards the existing 600 mm culvert on Port Davidson Road.
- **Catchment 123** – 1.39 ha of landscaped, agricultural, rooftop, and driveway area, draining northwest off-site.
- **Catchment 124** – 0.71 ha of external rooftop and landscaped area, draining west towards the drainage ditch and conveyed northwards to the northeast outlet (existing 600 mm storm sewer).
- **Catchment 125** – 0.18 ha of external landscaped and paved area, draining to the northeast outlet (existing 600 mm storm sewer).
- **Catchment 126** – 1.06 ha of external landscaped area, draining west towards the drainage ditch and conveyed northwards to the northeast outlet (existing 600 mm storm sewer).

Peak flows for both existing and proposed conditions were generated using the hydrological modelling software, VO. Hydrologic modelling files and results can be found in Appendix C.

4.2 PROPOSED DRAINAGE CONDITIONS

Under proposed conditions, the Site is to be developed as a mix of single-family, semi-detached, and townhomes. Catchments in the proposed model have been graded to generally flow in the same directions as in existing, to aid in matching or reducing peak flows and runoff volumes. The existing outlets that were described in Section 4.1 will remain as-is with quality, quality, and erosion control provided through the use of the two proposed SWM ponds. Figure 3, provided in Appendix A, shows the proposed conditions drainage areas. The following catchments were delineated for the proposed site:

- **Catchment 200** – 9.08 ha of residential area consisting of mostly single-family homes, landscaped area, and roadway, draining northwards towards the proposed north SWM pond.
- **Catchment 201** – 0.68 ha of residential area, draining to the proposed north SWM pond.
- **Catchment 202** – 0.36 of residential development fronting Townline Road, draining north off-site.
- **Catchment 203** – 0.22 ha of future roadway draining north to the 900 mm culvert on Townline Road.
- **Catchment 204** – 0.16 ha of future multiblock, draining north to the 900 mm culvert on Townline Road.
- **Catchment 205** – 0.56 ha of mostly landscaped rear-lots, draining east to the existing ditch and subsequently the northeastern outlet.
- **Catchment 206** – 2.57 ha of mostly forested area, draining north to the northeast outlet.
- **Catchment 207** – 12.64 ha of residential development, landscaped area, and roadway, draining southwards towards the proposed south SWM pond.
- **Catchment 208** – 1.03 ha of paved and landscaped area, draining south towards catchment 207 and ultimately the proposed south SWM pond.
- **Catchment 209** – 1.84 ha area containing the future south SWM pond.
- **Catchment 210** – 0.62 ha of mostly landscaped rear-lots, draining south off-site.
- **Catchment 211** –1.01 ha area containing the proposed north SWM pond, maintenance path, and landscaped area.
- **Catchment 212** – 4.77 ha of residential development, landscaped area, and roadway, draining west towards the existing 600 mm culvert located on Port Davidson Road.
- **Catchment 213** – 0.12 ha of future roadway, draining north off-site.
- **Catchment 220 –** 1.58 ha of residential development, landscaped area, and roadway, draining east towards catchment 200 and ultimately the proposed north SWM pond.
- **Catchment 221** – 4.96 ha of residential development, landscaped area, and roadway, draining south towards catchment 207, and ultimately the proposed south SWM pond.
- **Catchment 222** – 1.38 ha of external landscaped, agricultural, rooftop, and driveway area, draining northwest off-site.
- **Catchment 223** – 0.70 ha of landscaped, agricultural, rooftop, and driveway area, draining south towards catchment 200 and ultimately the proposed north SWM pond.
- **Catchment 224** – 0.64 ha of rooftop and mostly landscaped rear-lots, draining south towards catchment 200 and ultimately the proposed north SWM pond.
- **Catchment 226** – 0.05 ha of paved sidewalk and landscaped area, draining northeast to the existing 600 mm storm sewer.

- **Catchment 227** – 0.13 ha of landscaped and paved area, draining northeast to the existing 600 mm storm sewer.
- **Catchment 228** – 0.71 ha of rooftop and landscaped area, draining west to the existing ditch and ultimately conveyed to the northeast existing 600 mm storm sewer.
- **Catchment 229** – 1.06 ha of landscaped area, draining northwest to the existing ditch and ultimately conveyed to the northeast existing 600 mm storm sewer.

5.0 STORMWATER MANAGEMENT CONTROLS

Stormwater Management controls are to be primarily provided by two proposed 'wet' SWM Facilities, with one located at the north end of the site and one at the south. Facilities were designed based on the MECP design manual (2003, MECP), with additional criteria guidance from the Smithville SWS (Wood, 2023). Details regarding their specifications can be found in the following sections.

5.1 NORTH SWM FACILITY

As mentioned, a wet pond is proposed to be installed in the north portion of the development to provide water quantity, quality, and erosion control prior to discharge to the 900 mm culvert under Townline Road. The proposed pond design has a bottom elevation of 184.00 mASL and a top of bank elevation at 187.00 mASL. The maximum 100-year ponding elevation is 186.60 mASL. One orifice plate and a 600 mm outlet pipe are included in the outlet design to attenuate peak flow rates to the required quantity and erosion control targets. A dual orifice configuration was selected for the outlet of the SWM pond such that the SWS unitary discharge requirements could be met for erosion control purposes, while keeping flows lower than existing conditions and without overtopping the berm. The pond is designed to retain and discharge the runoff volume resulting from up to and including 100-year rainfall event; however, in the event of an overflow due to clogging or a rainfall event in excess of the 100-year event, an emergency spillway is proposed to convey flow downstream, which will be directed towards Townline Road. To prevent untreated runoff from infiltrating out of the SWM pond, it is recommended at this stage to provide a liner within the facility; however, further details related to the design of the liner are recommended to be re-visited and explored at the detailed design stage by a Geotechnical Engineer. In Tables 2 and 3, the design and operating characteristics of the proposed wet pond can be found alongside a preliminary SWM Facility Drawing (C-800) located in Appendix A.

Table 2: North SWM Facility Design Characteristics

Parameter	Characteristics
Total Contributing Area	13.9 ha
Total Percent Impervious	65%
Bottom Elevation of Forebay	184.00 m
Permanent Pool Elevation (Forebay)	185.50 m
Pond Top Elevation	187.00 m
100-year Water Level (based on the 100-year Chicago Storm)	186.60 m
Quality Control (Enhanced)	
Required Permanent Pool Volume (per hectare)	173 m^3/ha
Required Permanent Pool Volume (+10%)	2,610 m^3
Provided Permanent Pool Volume	5,076 m^3
Erosion Control	
SWS Erosion Control Unitary Volume[1]	400 m^3/imp.ha
Required Erosion Control Volume	3,559 m^3
Provided Erosion Control Volume	3,787 m^3
SWS Unitary Discharge [1]	0.001 m^3/s/ha
Required Maximum Erosion Control Discharge Rate	0.014 m^3/s
Provided Maximum Erosion Control Discharge Rate	0.014 m^3/s
Outlet Structure Details	
Orifice #1 Invert	185.50 m
Orifice #1 Diameter	90 mm
DICB invert	186.20 m
DICB Pipe Outlet Invert	185.40 m
DICB Pipe Outlet Diameter	600 mm
Emergency Overflow Spillway invert	186.60 m
Emergency Overflow Spillway width	2.5 m
Emergency Overflow Spillway side slopes (H:V)	5:1

1. Based on the Twenty Mile Creek SWS Table 2.2.3 Stormwater Facility Sizing Criteria

Table 3: North SWM Facility Operating Characteristics

Design Storm	Max. Storage Volume (m^3)	Max. Level (m)	Freeboard (m)	Drawdown time (Hours)	Peak Outflow (m^3/s)
25 mm Event	1,890	185.87	1.13	91.1	0.01
2-year	3,500	186.15	0.85	130.5	0.01
5-year	4,080	186.25	0.75	137.4	0.09
10-year	4,480	186.31	0.69	138.4	0.22
25-year	5,030	186.40	0.60	138.9	0.49
50-year	5,580	186.49	0.51	139.1	0.66
100-year	6,300	186.60	0.40	139.4	0.73
Hurricane Hazel	8,140	186.86	0.14	139.9	1.65

In Table 4 below, the peak flow to the northern outlet is compared to the 25- and 100-year targets from the SWS (Wood, 2023), showing that the proposed flow rates from the SWM Facility are below target levels. Additionally, existing flow rate targets are maintained, which is discussed in subsequent sections.

Table 4: Comparison of Peak Flow Targets in SWS study

Design Storm	Drainage Area (ha)	Unitary Flow Rate ($m^3/s/ha$)	SWS Study Target Flow (m^3/s)	Proposed Peak Flow Rate at the Townline Culvert (m^3/s)
25-year	14.07	0.053	0.75	0.49
100-year		0.095	1.34	0.75

5.2 SOUTH SWM FACILITY

As mentioned, an additional wet pond is proposed at the south end of the block to provide the necessary water quantity, quality, and erosion controls for flows discharged to the south. No design for the south pond was completed as part of this study, with further design and details to be conducted at a future stage when the south portion of the block moves forward. The pond was conceptually modelled and included in this analysis to aid in the estimation of proposed condition peak flows as well as outline current requirements but is subject to change depending on future design and site conditions. The south pond design requirements can be found below in Table 5.

Table 5: South Pond Design Requirements

Parameter	Characteristics
Total Contributing Area	20.5 ha
Total Percent Impervious	65%
Quality Control (Enhanced)	
Required Permanent Pool Volume (per hectare)	173 m^3/ha
Required Permanent Pool Volume (+10%)	3,903 m^3
Erosion Control	
SWS Extended Detention[1]	400 m^3/imp.ha
Required Extended Detention Volume	5,322 m^3
SWS Unitary Discharge [1]	0.001 m^3/s/ha
Required Maximum Extended Detention Discharge Rate	0.020 m^3/ha

5.3 PEAK FLOWS

The total peak flow rates to the site outlets have been used to compare to target rates for each rainfall event and are presented below in Table 6.

Table 6: Existing and Proposed Peak Flow Rates

Storm event	Peak Flow Rates (m^3/s)							
	North Outlet (Existing 900 mm Culvert)		Northeast Outlet (600 mm Storm Sewer)		West Outlet (Existing 600 mm culvert)		South Outlet	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
25 mm Event	0.08	0.05	0.08	0.06	0.03	0.39	0.10	0.02
2-year	0.19	0.09	0.22	0.14	0.08	0.68	0.24	0.03
5-year	0.34	0.11	0.41	0.24	0.14	0.92	0.43	0.05
10-year	0.46	0.22	0.56	0.32	0.19	1.22	0.58	0.09
25-year	0.64	0.49	0.78	0.44	0.26	1.50	0.81	0.18
50-year	0.78	0.67	0.96	0.54	0.32	1.72	1.00	0.28
100-year	0.95	0.75	1.16	0.65	0.39	1.96	1.20	0.40
Hurricane Hazel	1.57	1.67	1.23	0.73	0.53	0.69	1.85	2.52

As shown in Table 6 above, the existing flow rates are met through the proposed SWM controls for all storm events up to and including the 100-year event for the north, northeast, and south outlets.

The west outlet currently shows increases in flow but as per the SWS (Wood, 2023), a future SWM pond is proposed to be constructed west of Port Davidson Road to aid in attenuating this flow, which has not been included in the model at this time. Details on the sizing and design of this future pond will be conducted at a future design stage. Furthermore, infrastructure crossing Port Davidson Road will need to be increased to accommodate this development.

Stormwater management design calculations are provided in Appendix B. Output for both the existing and proposed hydrological models are provided in Appendix C.

5.4 WATER QUALITY

Due to the size of the site and type of development proposed, an enhanced level of water quality control (minimum of 80% Total Suspended Solids removal) is required. Wet ponds are able to provide an enhanced level water quality control if sized appropriately and are the Township's preferred end-of-pipe facility, as per the SWS (Wood, 2023). Areas draining from rooftops and landscaped areas are considered 'clean' and do not require treatment before being conveyed off site. Paved areas such as parking lots are exposed to salt and other potential contaminants from the road and require treatment before being conveyed off site.

The North SWM pond provides sufficient permanent pool to achieve 80% TSS removal, as outlined in Table 2. Additionally, a forebay has been designed to provide isolated removal of sediment, with calculations presented in Appendix B.

Although the south SWM pond has not been designed, the required permanent pool volume to achieve 80% TSS removal has been outlined in Table 5. These values will need to be confirmed at the design stage for this facility.

6.0 EROSION AND SEDIMENT CONROL

The erosion and sediment control strategy has been developed and is discussed in the FSR (2024, Stantec). Note that this plan will be refined at the detailed design stage.

7.0 MONITORING AND MAINTENANCE PROGRAM

Monitoring and maintenance activities are an important part of a SWM Strategy to ensure the designed features continue to operate as intended. As such, inspections should take place at a regular frequency to observe any deficiencies within the system. This program will be refined during the detailed design phase of the project and will be done so in accordance with the criteria and recommendations outlined in the SWS (Wood, 2023).

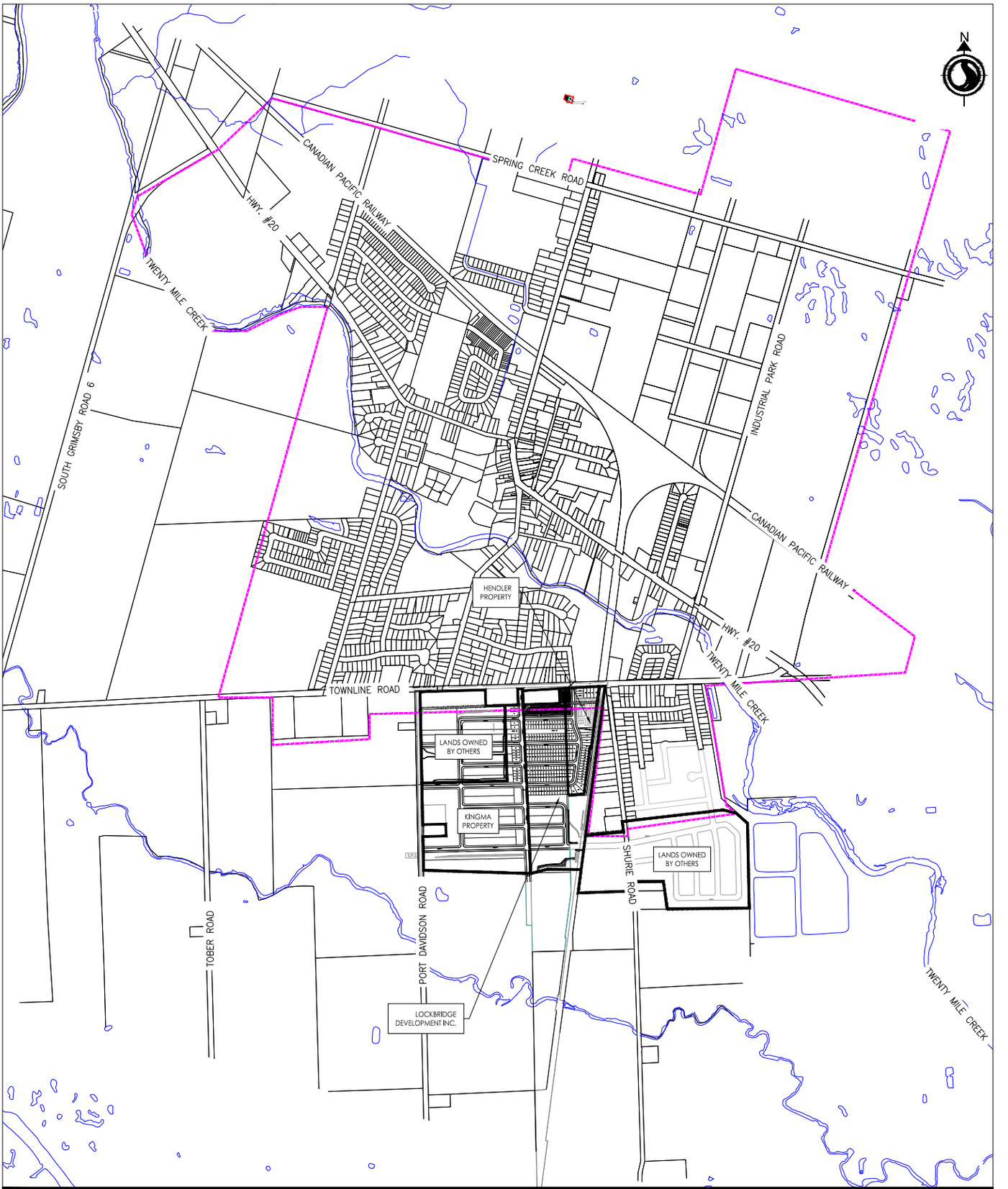
8.0 CONCLUSIONS

Based on the preceding documentation, the following conclusions are drawn:

- **Water Quantity –** A ‘wet’ SWM pond for the north portion of the site has been proposed to be used to maintain the existing peak flow rates to the site’s outlets and is shown to adequately meet the water quantity criteria of matching or improving peak flows when compared to existing conditions. Additionally, it meets the flow criteria outlined in the SWS (Wood, 2023). The south pond has been conceptually sized, but details of the pond will need to be determined and refined at a later stage.
- **Water Quality –** The north SWM pond has been proposed to provide an enhanced level of quality control for the northern portion of the site to meet the water quality criteria of 80% TSS removal. Details for the south pond will need to be determined and refined at a later stage.
- **Erosion Control –** The north SWM pond has been sized in accordance with the SWS (Wood, 2023) to adequately meet the outlined erosion control criteria for the northing portion of the site. Details for the south pond will need to be determined and refined at a later stage.

APPENDIX A
FIGURES AND SWM FACILITY DRAWING

Site Location Plan, Figure 1.0
Existing Conditions Drainage Areas, Figure 2.0
Proposed Conditions Drainage Areas, Figure 3.0
Preliminary SWM Facility Plan - North, Drawing No. C-800



V:\01614\active\161414394\design\drawing\civil\sheet_files\Conceptual\161414394_C-1.0-LP.dwg
8/16/2024 1:43:37 PM By: Elders, Jeff

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Project No.
161414473

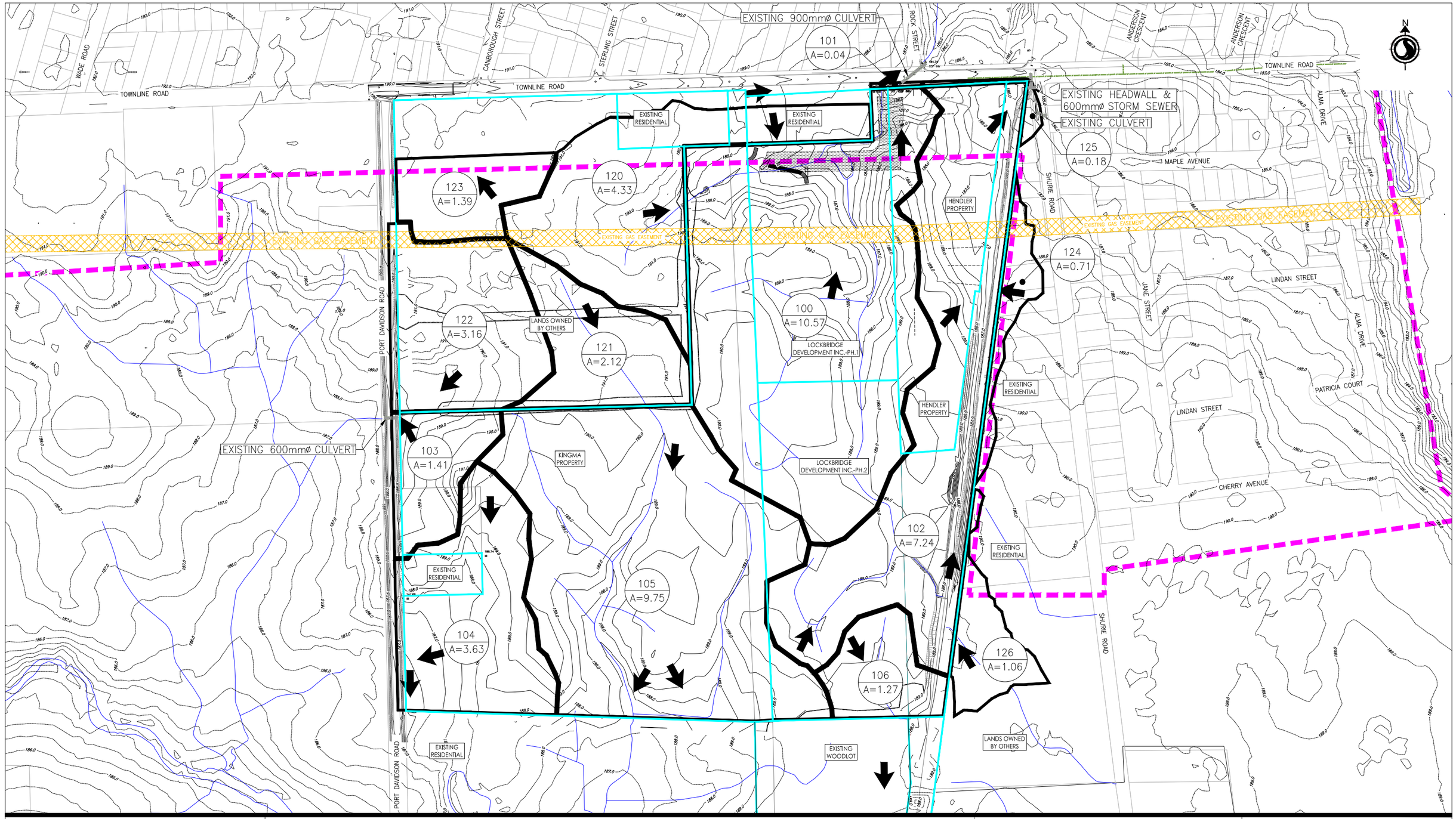
Title
SITE LOCATION

Revision

Date
2024-08-16

Reference Sheet

Figure No.
1.0



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Legend

100 / A=10.57 — CATCHMENT I.D. / CONTRIBUTING AREA (ha)

MAJOR OVERLAND FLOW ROUTE

DRAINAGE AREA

PROPERTY LINE

EXISTING URBAN BOUNDARY

EXISTING GAS EASEMENT

EXISTING CONTOUR

EXISTING CONTOUR (FROM M.N.R 2010)

Notes

Scale

1:5000

0 50 150 250m

Client/Project

LOCKBRIDGE DEVELOPMENT INC.

BLOCK AREA 9
SMITHVILLE 3A

Project No.
161414473

Title

EXISTING CONDITIONS DRAINAGE AREAS

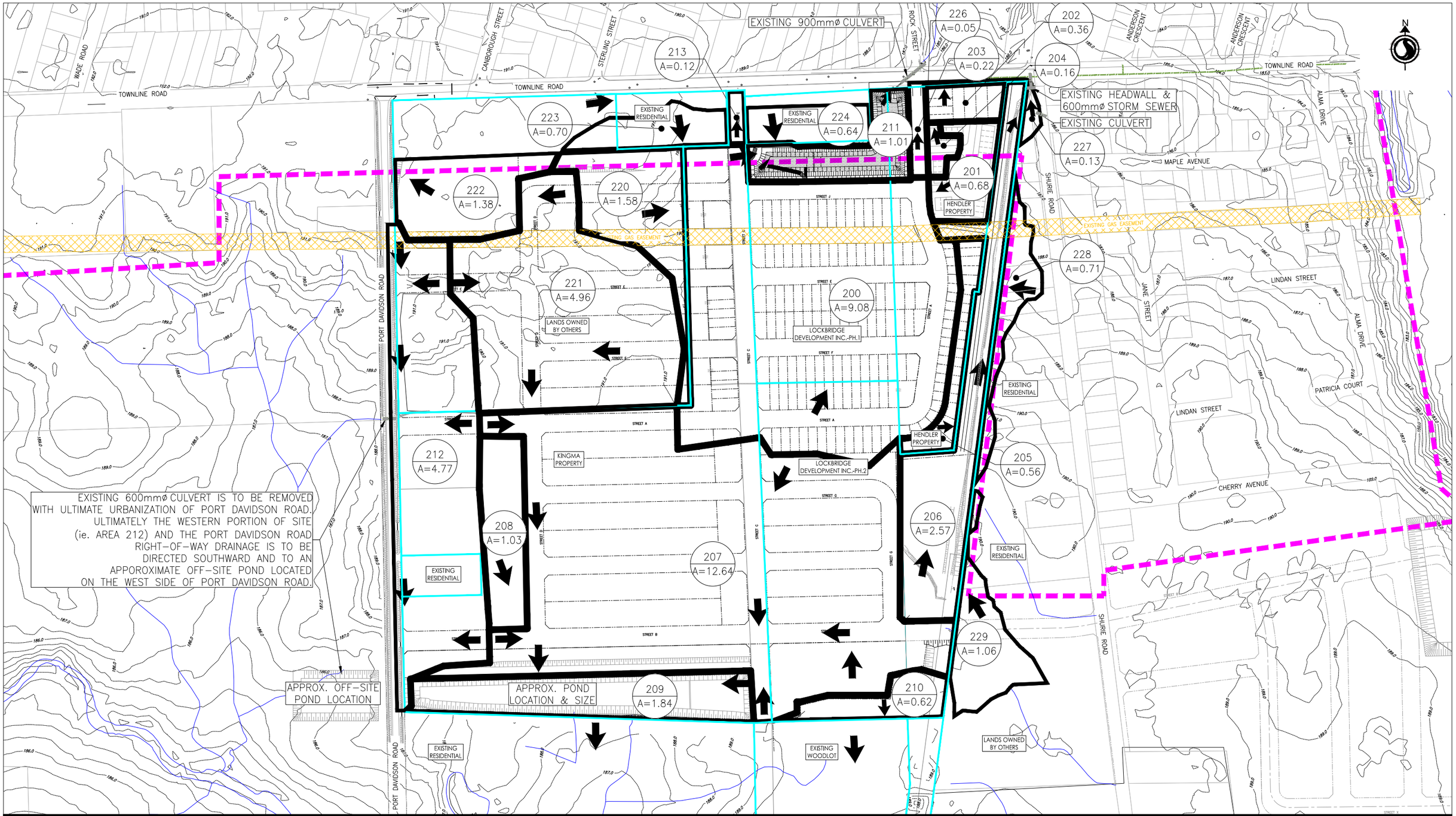
Revision

Date
2024/07/10

Reference Sheet

Figure No.
2.0

V:\01614\active\161414394\design\drawing civil\sheet_files\SWM\161414394_C-2.0-ExConds.dwg
7/10/2024 2:51:54 PM By: Elders, Jeff



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Legend

- 200 / A=12.74 — CATCHMENT I.D. / CONTRIBUTING AREA (ha)
- MAJOR OVERLAND FLOW ROUTE
- DRAINAGE AREA
- PROPERTY LINE
- EXISTING URBAN BOUNDARY
- EXISTING GAS EASEMENT
- EXISTING CONTOUR (FROM M.N.R 2010) — 185.0

Notes

Scale 1:5000 — 0 50 150 250m

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK AREA 9
SMITHVILLE 3A

Project No.
161414473

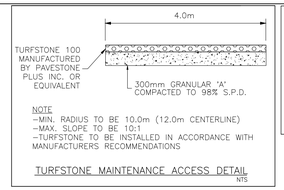
Title
PROPOSED CONDITIONS DRAINAGE AREAS

Revision

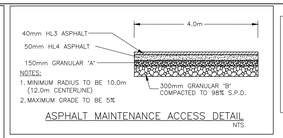
Date
2024/07/12

Reference Sheet

Figure No.
3.0

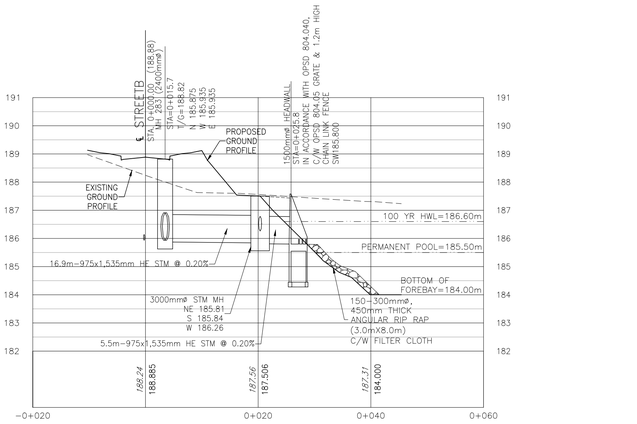


TURFSTONE MAINTENANCE ACCESS DETAIL
NTS



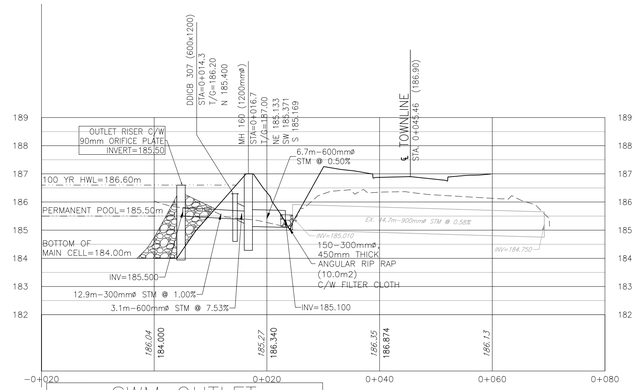
ASPHALT MAINTENANCE ACCESS DETAIL
NTS

NOTE: POND TO BE LINED UP TO PERMANENT POOL ELEVATION. A GEOTECHNICAL CONSULTANT IS TO DETERMINE THE THICKNESS OF THE POND LINER (T.B.D AT TIME OF POND GRADING)



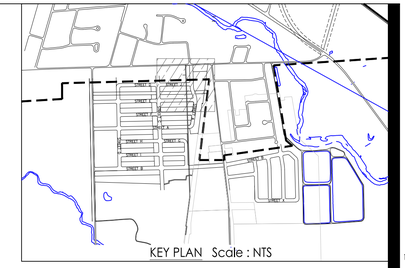
SWM INLET
[CROSS-SECTION A-A]

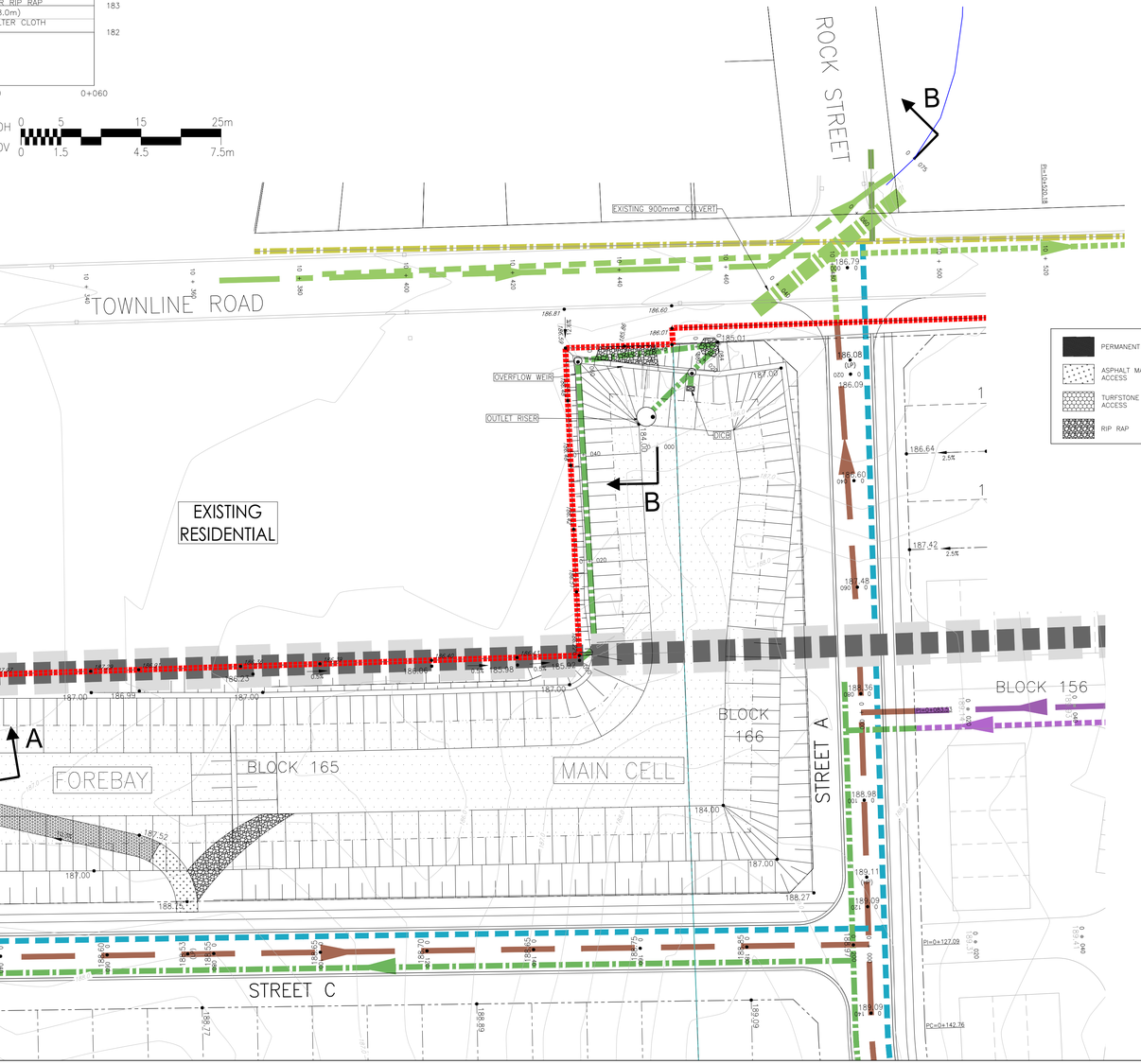
1:500H 0 5 15 25m
1:150V 0 1.5 4.5 7.5m

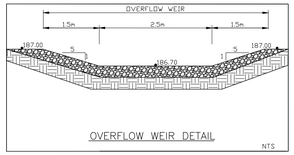


SWM OUTLET
[CROSS-SECTION B-B]

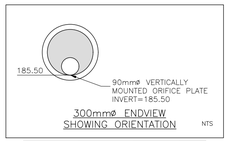
1:500H 0 5 15 25m
1:150V 0 1.5 4.5 7.5m







PERMANENT POOL
ASPHALT MAINTENANCE ACCESS
TURFSTONE MAINTENANCE ACCESS
RIP RAP



ORIFICE 1

Stantec
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes
1. ELEV'S ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)
BM1: CONCRETE CULVERT ALONG REGIONAL ROAD 65, 3.1 km WEST OF BISMARK, 80m EAST OF DWELLING AT 6250 REG. ROAD 65, TABLET ON TOP OF CULVERT 7.3m SW OF ROAD CENTRELINE, ELEV: 182.679
BM2: TOP OF HEADWALL AT NE OF INTERSECTION OF TOWNLINE ROAD AND ROCK STREET ELEV: 185.740
2. BLOCK PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
3. DRAFT PLAN PREPARED BY ARCADIS, DATED AUGUST 2024.
4. TOPOGRAPHICAL SURVEY PREPARED BY METROPOLITAN CONSULTING INC., DATED MAY 2022. CONTOURS OUTSIDE OF THE PROPERTY LINE, HAVE BEEN OBTAINED FROM S.W.O.O.P. TOPOGRAPHIC INFORMATION (2010).

Legend
- PROPERTY LINE
- BLOCK 3A LIMIT
- BLOCK PLAN AREA 9 LIMIT
- STAGE 1 DRAFT PLAN LIMITS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- FUTURE STORM SEWER
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- FUTURE WATERMAIN

Revision	By	Appd	YYYY.MM.DD
0. STAGE 1 DRAFT PLAN SUBMISSION	JH	KBL	2024.08.15

File Name: 161414394_C-800_801HX-Con	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
	WJE	WJE	SAK	2024.08.19

Permit-Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
LOCKBRIDGE DEVELOPMENT INC.

BLOCK PLAN AREA 9
SMITHVILLE 3A

Smithville, ON

Title
PRELIMINARY SWM FACILITY PLAN - NORTH

Project No. 161414473
Scale 1:500 (0 5 15 25m)
Revision 0
Drawing No. **C-800**

V:\161414\active\161414394\design\drawing\worksheet_files\Concept\sh161414394_C-800_801HX-Con.dwg
ORIGINAL SHEET - ARCH D

APPENDIX B
STORMWATER MANAGEMENT DESIGN CALCULATIONS

161414473 - Smithville

Rainfall Data

Design Storm	IDF Storm Parameters			Time of Peak Ratio	Storm Duration	Total Depth
	A	B	C	r	D (h)	(mm)
GEV Distribution						
2-year	655.4	5.52	0.792	0.4	3	31.4
5-year	991.5	6.84	0.816	0.4	3	41.7
10-year	1288.5	8.04	0.835	0.4	3	48.8
25-year	1785.8	9.90	0.860	0.4	3	58.8
50-year	2279.6	11.58	0.880	0.4	3	67.1
100-year	2928.4	13.62	0.901	0.4	3	76.4
25-mm	425	5	0.792	0.4	4	21.8

*Information from the Unguaged Historical IDF from the project location (gridded dataset)
*Obtained from: https://idf-cc-uwo.ca/idfgrid
*Converted time period form hours to minutes

$$i = \frac{A}{(t + B)^C}$$

SCS Curve Number, Initial Abstraction, and Time of Concentration Reference Sheet

NRCS (SCS) Curve Number Data

CN (I)= 4.2CN(II)/(10-0.058CN(II)) CN (III)= 23CN(II)/(10+0.13CN(II))

TABLE OF CURVE NUMBERS (CN's)									Source
Land Use		Hydrologic Soil Type (AMC II Assumed)							
		A	AB	B	BC	C	CD	D	
Meadow	"Good"	30	44	58	65	71	75	78	MTO
Woodlot	"Fair"	36	48	60	67	73	76	79	MTO
Lawns	"Good"	39	50	61	68	74	77	80	USDA
Pasture/Range		58	62	65	71	76	79	81	MTO
Crop		66	70	74	78	82	84	86	MTO
Bare Soil (Fallow)		77	82	86	89	91	93	94	MTO
Impervious		98	98	98	98	8	8	98	MTO
Water		100	100	100	100	100	100	100	MTO

NOTE: Standhyd commands - CN value is based solely on the pervious surfaces only.
Nashyd commands - CN value is based on a composite of both the pervious and impervious surfaces
MTO - Ministry of Transportation Ontario Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
USDA - United States Department of Agriculture (2004), National Engineering Handbook, Part 630 Hydrology, Chapter 9 Hydrologic Soil Cover Complexes

Initial Rainfall Abstraction Data

Initial Rainfall Abstraction, Ia (mm)						
Land Use	Forest/Woodlot	Meadow/Field	Crop	Lawn/Grass	Pavement	Water
Ia	10	8	7	5	2	0

Runoff Coefficient Data

Hydrologic Soil Group	Land Use, Crop, and Management									
	Forest/ Woodlot	Meadow/ Field	CULTIVATED (RC, PM)	CULTIVATED (RC, CM)	CULTIVATED (SG, PM)	CULTIVATED (SG, CM)	CULTIVATED (M)	URBAN RES. (30% Imp)	URBAN RES. (55% Imp)	URBAN RES. (70% Imp)
A	0.060	0.100	0.550	0.500	0.350	0.200	0.300	0.300	0.425	0.500
AB	0.095	0.150	0.600	0.525	0.375	0.210	0.325	0.350	0.475	0.550
B	0.130	0.200	0.650	0.550	0.400	0.220	0.350	0.400	0.525	0.600
BC	0.145	0.225	0.675	0.600	0.425	0.235	0.375	0.425	0.566	0.650
C	0.160	0.250	0.700	0.650	0.450	0.250	0.400	0.450	0.606	0.700
CD	0.180	0.275	0.725	0.675	0.475	0.275	0.425	0.475	0.647	0.750
D	0.200	0.300	0.750	0.700	0.500	0.300	0.450	0.500	0.688	0.800

Legend	RC	SG	PM	M	CM
	Row Crop	Small Grains	Poor Management	Meadow	Conservative Management

Estimating Travel Velocity Using Bransby Williams and Aiport Method

Bransby Williams Formula - For 'C' greater than or equal to 0.40

$$t_c = \frac{0.057 * L}{S^{0.2} * A^{0.1}}$$

t_c = Time of Concentration
L = Length of Longest Flow Path
S = Slope
A = Catchment Area

Airport Formula - For 'C' less than 0.40

$$t_c = \frac{3.26 * (1.1 - C) * L^{0.5}}{S^{0.33}}$$

t_c = Time of Concentration
L = Length of Longest Flow Path
S = Slope
C = Runoff Coefficient

Estimating Travel Velocity Using Uplands Method

$V = (x)(S)^{0.5}$ (Refer to Fig 3.12 Velocities for Upland method for estimating travel time for overland flow)

V= Velocity
S= Slope
x = Land Cover Coefficient **(see below)**

x =	
0.6	Forest with Heavy Ground Litter, hay meadow (overland flow)
1.5	Trash Fallow or Minimum Tillage cultivation, strip cropped woodland(overland flow)
2.3	Short grass pasture (overland flow)
2.7	Cultivated Straight row (overland flow)
3.0	Nearly bare untilled (overland flow) or alluvial fans located in the Western mountain Regions
4.6	Grassed Waterway
6.1	Paved Areas (sheet flow); small upland gullies

Time of Concentration for One Land Use on Flow Path

$Tc_1 = L_1 / V_1$ $Tp_1 = 0.67 \times Tc_1$

Total Time of Concentration for Multiple Land Uses on Flow Path

$Tc_{total} = Tc_1 + Tc_2 + Tc_3 + Tc_4 + Tc_5$ $Tp_{total} = Tp_1 + Tp_2 + Tp_3 + Tp_4 + Tp_5$

161414473 - Smithville
NRCS (SCS) Curve Number Determination

Soil Type	Hydrologic Soil Group
Gravel	A
Sand and Gravel	AB
Silty Sand, Loamy Sand, Sand Loam	B
Silt, Silt Loam	BC
Clay, Clay Loam, Silty Clay Loam	C
Bedrock, shallow soil over bedrock, organic	CD
Muck	D

TABLE OF CURVE NUMBERS (CN's)

Land Use		Hydrologic Soil Type							Source
		A	AB	B	BC	C	CD	D	
Meadow	"Good"	30	44	58	65	71	75	78	MTO
Woodlot	"Fair"	36	48	60	67	73	76	79	MTO
Lawns	"Good"	39	50	61	68	74	77	80	USDA
Pasture/Range		58	62	65	71	76	79	81	MTO
Crop		66	70	74	78	82	84	86	MTO
Bare Soil (Fallow)		77	82	86	89	91	93	94	MTO
Impervious		98	98	98	98	98	98	98	MTO

MTO - Ministry of Transportation Ontario Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
USDA - United States Department of Agriculture (2004), National Engineering Handbook, Part 630 Hydrology, Chapter 9 Hydrologic Soil Cover Complexes

HYDROLOGIC SOIL TYPE (%) - Existing Conditions

Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
100						100		100
101						100		100
102						100		100
103						100		100
104						100		100
105						100		100
106						100		100
120						100		100
121						100		100
122						100		100
123						100		100
124						100		100
125						100		100
126						100		100

LAND USE (%) - Existing Conditions

Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Bare Soil	Impervious	Total
100	0	0	10	0	90	0	0	100
101	0	0	50	0	0	0	50	100
102	0	25	10	0	60	0	5	100
103	0	0	25	0	65	0	10	100
104	0	0	30	0	65	0	5	100
105	0	2	0	0	98	0	0	100
106	0	40	0	0	60	0	0	100
120	0	0	35	0	50	0	15	100
121	0	0	10	0	90	0	0	100
122	0	5	35	0	50	0	10	100
123	0	0	40	0	20	0	40	100
124	0	0	60	0	0	0	40	100
125	0	5	10	0	75	0	10	100
126	0	0	90	0	0	0	10	100

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Existing Conditions

Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Bare Soil	Impervious	Weighted CN w/ imp area	Weighted CN w/o imp area
100			8		76			83.3	83.3
101			39				49	87.5	77.0
102		19	8		50		5	82.0	81.2
103			19		55		10	83.7	82.1
104			23		55		5	82.6	81.8
105		2			82			83.8	83.8
106		30			50			80.8	80.8
120			27		42		15	83.7	81.1
121			8		76			83.3	83.3
122		4	27		42		10	82.6	80.8
123			31		17		39	86.8	79.3
124			46				39	85.4	77.0
125		4	8		63		10	84.3	82.8
126			69.3				9.8	79	77.0

Notes:
AMC II assumed
Hydrological Soil Groups taken from MTO Drainage Manual

161414473 - Smithville
NRCS (SCS) Curve Number Determination

Soil Type	Hydrologic Soil Group
Gravel	A
Sand and Gravel	AB
Silty Sand, Loamy Sand, Sand Loam	B
Silt, Silt Loam	BC
Clay, Clay Loam, Silty Clay Loam	C
Bedrock, shallow soil over bedrock, organic	CD
Muck	D

TABLE OF CURVE NUMBERS (CN's)

Land Use		Hydrologic Soil Type							Source
		A	AB	B	BC	C	CD	D	
Meadow	"Good"	30	44	58	65	71	75	78	MTO
Woodlot	"Fair"	36	48	60	67	73	76	79	MTO
Lawns	"Good"	39	50	61	68	74	77	80	USDA
Pasture/Range		58	62	65	71	76	79	81	MTO
Crop		66	70	74	78	82	84	86	MTO
Bare Soil (Fallow)		77	82	86	89	91	93	94	MTO
Impervious		98	98	98	98	98	98	98	MTO

MTO - Ministry of Transportation Ontario Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
USDA - United States Department of Agriculture (2004), National Engineering Handbook, Part 630 Hydrology, Chapter 9 Hydrologic Soil Cover Complexes

HYDROLOGIC SOIL TYPE (%) - Existing Conditions

Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
200						100		100
201						100		100
202						100		100
203						100		100
204						100		100
205						100		100
206						100		100
207						100		100
208						100		100
209						100		100
210						100		100
211						100		100
212						100		100
213						100		100
220						100		100
221						100		100
222						100		100
223						100		100
224						100		100
226						100		100
227						100		100
228						100		100
229						100		100

LAND USE (%) - Existing Conditions

Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Bare Soil	Impervious	Total
200			35				65	100
201			35				65	100
202			35				65	100
203			20				80	100
204			25				75	100
205			35				65	100
206		90			5		5	100
207			35				65	100
208			35				65	100
209			35				65	100
210		60			40			100
211			35				65	100
212			35				65	100
213			90				10	100
220			35				65	100
221			35				65	100
222			35				65	100
223			60		10		30	100
224			75				25	100
226			35				65	100
227			75				25	100
228			65				35	100
229					90		10	100

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Existing Conditions

Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Bare Soil	Impervious	Weighted CN w/ imp area	Weighted CN w/o imp area
200			27				64	90.7	77.0
201			27				64	90.7	77.0
202			27				64	90.7	77.0
203			15				78	93.8	77.0
204			19				74	92.8	77.0
205			27				64	90.7	77.0
206		68			4		5	77.5	76.4
207			27				64	90.7	77.0
208			27				64	90.7	77.0
209			27				64	90.7	77.0
210		46			34			79.2	79.2
211			27				64	90.7	77.0
212			27				64	90.7	77.0
213			69				10	79.1	77.0
220			27				64	90.7	77.0
221			27				64	90.7	77.0
222			27				64	90.7	77.0
223			46		8		29	84.0	78.0
224			58				25	82.3	77.0
226			27				64	90.7	77.0
227			58				25	82.3	77.0
228			50				34	84.4	77.0
229					75.6		9.8	85	84.0

Notes:
AMC II assumed
Hydrological Soil Groups taken from MTO Drainage Manual

Visual OTTHYMO Parameters

Pre-Development Conditions

NasHyd

Catchment ID	Area (ha)	CN	Slope (%)	Length (m)	Tc (hrs)	TP (hrs)	IA (mm)
100	10.57	83.3	0.54%	651.0	1.531	1.021	7.00
101	0.04	87.5	1.25%	8.0	0.128	0.086	7.00
102	7.24	82.0	2.33%	150.0	0.453	0.302	7.00
103	1.41	83.7	2.82%	124.0	0.387	0.258	7.00
104	3.63	82.6	1.20%	374.6	0.891	0.594	7.00
105	9.75	83.8	0.57%	437.0	1.229	0.819	7.00
106	1.27	80.8	0.28%	181.1	1.006	0.671	7.00
120	4.33	83.7	0.81%	246.0	0.821	0.547	7.00
121	2.12	83.3	0.19%	268.1	1.393	0.929	7.00
122	3.16	82.6	0.42%	235.8	0.997	0.664	7.00
123	1.39	86.8	0.63%	160.0	0.722	0.482	7.00
124	0.71	85.4	0.91%	55.0	0.374	0.249	7.00
125	0.18	84.3	0.91%	30.0	0.276	0.184	7.00
126	1.06	79.1	0.30%	164.0	0.927	0.618	7.00
Total	**46.86**	ha					

Notes:

TIMP ..... *Total percent impervious*

XIMP ..... *Percent impervious directly connected*

Time of Concentration calculated using the Airport Method ..... $Tc = [\ 3.26\ (1.1-C)\ L^{0.5}\ ] / S^{0.33}$

(For areas less than 100 ha, and RC less than 0.4)

Where: *C = Runoff Coefficient according to MTO Design chart 1.07 for 'cultivated' on silt loam/loam soil*

L = Length of Overland Flow (m)

S = Slope (%)

Time of Concentration calculated using the Bransby Williams Method ..... *Tc = 0.057*L/[(Sw^0.2)*(A^0.1)]*

(For areas less than 100 ha, and RC greater than 0.4)

Where: *tc = time of concentration, minutes*

L = catchment or watershed length, m

Sw = catchment or watershed slope, %

A = catchment or watershed area, ha

Time to Peak (hr) ..... *Tp = 0.6Tc (StandHyd), Tp = Flow Length/0.3 (NasHyd)*

161414473 - Smithville

Visual OTTHYMO Parameters

Post-Development Conditions

NasHyd

Catchment ID	Area (ha)	CN	Slope (%)	Length (m)	Tc (hrs)	TP (hrs)	IA (mm)
206	2.57	77.5	2.30%	103.0	0.38	0.251	7.00
210	0.62	79.2	2.14%	70.0	0.32	0.212	7.00
213	0.12	79.1	0.50%	70.0	0.51	0.343	7.00
223	0.70	84.0	0.94%	53.0	0.36	0.242	7.00
224	0.64	82.3	0.50%	56.0	0.46	0.307	7.00
227	0.13	82.3	0.50%	30.0	0.34	0.224	7.00
228	0.71	84.4	0.50%	57.0	0.46	0.309	7.00
229	1.06	85.4	0.50%	153.0	0.76	0.507	7.00

StandHyd

Catchment ID	Area (ha)	CN	TIMP	XIMP	Perv. Ia (mm)	Perv. Slope (%)	Perv. Length (m)	Imp. Slope (%)	Imp. Length (m)
200	9.08	77.0	0.65	0.55	5.00	2.0	10.0	2.0	246.0
201	0.68	77.0	0.85	0.75	5.00	2.0	10.0	2.0	67.3
202	0.36	77.0	0.65	0.55	5.00	2.0	10.0	2.0	49.0
203	0.22	77.0	0.80	0.80	5.00	2.0	10.0	2.0	38.3
204	0.16	77.0	0.75	0.55	5.00	2.0	10.0	2.0	32.7
205	0.56	77.0	0.50	0.01	5.00	2.0	10.0	2.0	61.1
207	12.64	77.0	0.65	0.55	5.00	2.0	10.0	2.0	290.3
208	1.03	77.0	0.65	0.55	5.00	2.0	10.0	2.0	82.9
209	1.84	77.0	0.65	0.55	5.00	2.0	10.0	2.0	110.8
211	1.01	77.0	0.65	0.55	5.00	2.0	10.0	2.0	82.1
212	4.77	77.0	0.65	0.55	5.00	2.0	10.0	2.0	178.3
220	1.58	77.0	0.65	0.55	5.00	2.0	10.0	2.0	102.6
221	4.96	77.0	0.65	0.55	5.00	2.0	10.0	2.0	181.8
222	1.38	77.0	0.65	0.55	5.00	2.0	10.0	2.0	95.92
226	0.05	77.0	0.65	0.55	5.00	2.0	10.0	2.0	18.26

Total **46.87** **ha**

Total to North SWM **13.69** **ha**

Notes:

TIMP → *Total percent impervious*

XIMP → *Percent impervious directly connected*

Time of Concentration calculated using the Airport Method → $Tc = [\ 3.26\ (1.1-C)\ L^{0.5}\ ] / S^{0.33}$

(For areas less than 100 ha, and RC less than 0.4)

Where: *C = Runoff Coefficient according to MTO Design chart 1.07 for 'cultivated' on silt loam/loam soil*

L = Length of Overland Flow (m)

S = Slope (%)

Time of Concentration calculated using the Bransby Williams Method → *Tc = 0.057*L/[(Sw^0.2)*(A^0.1)]*

(For areas less than 100 ha, and RC greater than 0.4)

Where: *tc = time of concentration, minutes*

L = catchment or watershed length, m

Sw = catchment or watershed slope, %

A = catchment or watershed area, ha

Time to Peak (hr) → *Tp = 0.6Tc (StandHyd), Tp = Flow Length/0.3 (NasHyd)*

161414473 - Smithville
Water Quality Parameters

North SWMF		
Required protection level:	Enhanced	
Contributing drainage area[1]:	13.7	ha
Impervious level:	65	%
Total required water quality storage volume per hectare:	213	m^3/ha
Required permanent pool volume per hectare:	173	m^3/ha
Required extended detention storage volume per hectare:	40	m^3/ha
SWS Extended Detention[1]	400	m^3/ imp. ha
SWS Unitary Discharge[1]	0.001	m^3/s/ha
Required permanent pool volume (+10%):	2,610	m^3
Provided permanent pool volume:	5,076	m^3
Required extended detention storage volume:	3,559	m^3
Required maximum extended detention discharge rate:	0.014	m^3/s
Provided extended detention volume during water quality event:	3,787	m^3
Provided maximum extended detention discharge rate:	0.014	m^3/s
Total pond storage volume:	8,863	m^3

South SWMF		
Required protection level:	Enhanced	
Contributing drainage area[1]:	20.5	ha
Impervious level:	65	%
Total required water quality storage volume per hectare:	213	m^3/ha
Required permanent pool volume per hectare:	173	m^3/ha
Required extended detention storage volume per hectare:	40	m^3/ha
SWS Extended Detention[1]	400	m^3/ imp. ha
SWS Unitary Discharge[1]	0.001	m^3/s/ha
Required permanent pool volume (+10%):	3,903	m^3
Provided permanent pool volume:	7,152	m^3
Required extended detention storage volume:	5,322	m^3
Required maximum extended detention discharge rate:	0.020	m^3/s
Provided extended detention volume during water quality event:	6,406	m^3
Provided maximum extended detention discharge rate:	0.018	m^3/s
Total pond storage volume:	13,558	m^3

MOE SWM Design Manual Table 3.2

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

Notes
1. Based on the Twenty Mile Creek SWS Table 2.2.3 Stormwater Facility Sizing Criteria
2. Based on the Twenty Mile Creek SWS Table 2.2.4 Unitary Storage and Discharge Criteria for Flood Control

North SWMF - Smithville

Stormwater Management Facility Design Calculations

	Rating Curve				Estimated	Volume Estimation									Outlet Structure Controls								
	Depth/Disch.		Storage		Detention		Forebay	Forebay	Total Pond		Active Storage	Total	Active Storage		Ext. Detention		DICB			Emergency		Outlet	Parameters
	Elevation	Discharge	Active	Total	Time	Elevation	Area	Volume	Area	Volume	Volume	Volume (excl. sediment)	Depth	Elevation	Orifice #1	Orifice #2	Inlet	Orifice #3	Control	Spillway	Total Flow	Parameter	
	(m)	(m^3/s)	(m^3)	(m^3)	(hrs)	(m)	(m^2)	(m^3)	(m^2)	(m^3)	(m^3)	(m^3)	(m)	(m)	(m^3/s)		(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	
	184.00					184.0			1,981					184.00									Water Quality Extended Detention Orifice #1
	184.10			207		184.1		37	2,509	244		207		184.10									Orifice #1 Elev (m) / Orifice Coeff.
	184.20			423		184.2		78	2,658	502		423		184.20									185.50 / 0.600
	184.30			650		184.3		126	2,809	775		650		184.30									Orifice #1-Midpoint (m) / Perimeter (m)
	184.40			885		184.4		178	2,962	1,064		885		184.40									185.55 / 0.283
Max. Sed. Storage	184.50			1,131		184.5		237	3,118	1,368		1,131		184.50									Orifice Diameter (mm) / Area (m^2)
	184.60			1,450		184.6		302	3,277	1,687		1,450		184.60									90.00 / 0.006
	184.70			1,786		184.7		374	3,437	2,023		1,786		184.70									Weir Coeff. (Sharp) / Orientation
	184.80			2,138		184.8		452	3,601	2,375		2,138		184.80									1.80 / Vertical
	184.90			2,506		184.9		537	3,767	2,743		2,506		184.90									DICB Outlet Pipe
	185.00			2,891		185.0		630	3,935	3,128		2,891		185.00									Pipe Elev (m) / Orifice Coeff.
	185.10			3,293		185.1		731	4,106	3,530		3,293		185.10									185.40 / 0.600
	185.20			3,713		185.2		839	4,279	3,950		3,713		185.20									Pipe (m) / Perimeter (m)
	185.30			4,149		185.3		955	4,455	4,386		4,149		185.30									185.70 / 1.885
	185.40			4,604		185.4		1081	4,633	4,841		4,604		185.40									Pipe Diameter (mm) / Area (m^2)
Permanent Pool	185.50			5,076		185.5		1214	4,815	5,313		5,076		185.50									600.00 / 0.283
	185.60	0.004	492	5,568	34.4	185.6			4,998	5,805	492	5,568	0.1	185.60	0.004						0.004		Weir Coeff. (Sharp) / Orientation
	185.70	0.007	1,000	6,076	61.0	185.7			5,161	6,313	1000	6,076	0.2	185.70	0.007						0.007		1.80 / Vertical
	185.80	0.009	1,524	6,600	80.2	185.8			5,326	6,837	1524	6,600	0.3	185.80	0.009						0.009		Emergency Overflow Weir
	185.90	0.010	2,065	7,141	96.3	185.9			5,492	7,378	2065	7,141	0.4	185.90	0.010						0.010		Spillway Invert (m) / Top of Berm (m)
	186.00	0.011	2,622	7,698	110.8	186.0			5,659	7,935	2622	7,698	0.5	186.00	0.011						0.011		186.60 / 186.90
	186.10	0.013	3,197	8,273	124.0	186.1			5,827	8,510	3197	8,273	0.6	186.10	0.013						0.013		Spillway Length @ Invert (m) / Max. Flow Depth (m)
	186.20	0.014	3,788	8,864	136.5	186.2			5,998	9,101	3788	8,864	0.7	186.20	0.014			0.531			0.014	0.014	2.5 / 0.30
	186.30	0.174	4,396	9,472	138.3	186.3			6,169	9,709	4396	9,472	0.8	186.30	0.015		0.160	0.582	0.160		0.174		Side Slopes (ratio of H:V) / Topwidth
	186.40	0.484	5,022	10,098	138.9	186.4			6,343	10,335	5022	10,098	0.9	186.40	0.016		0.468	0.629	0.468		0.484		5.00 / 5.50
	186.50	0.689	5,665	10,741	139.2	186.5			6,518	10,978	5665	10,741	1.0	186.50	0.017		0.983	0.672	0.672		0.689		Weir Coefficient (Rectangle) / Weir Coeff. (Triangle)
	186.60	0.730	6,325	11,401	139.4	186.6			6,695	11,639	**6325**	11,401	1.1	186.60	0.017		1.710	0.713	0.713		0.730		1.70 / 1.30
	186.70	0.925	7,004	12,080	139.7	186.7			6,874	12,317	**7004**	12,080	1.2	186.70	0.018		2.402	0.751	0.751	0.155	0.925		
	186.80	1.303	7,700	12,776	139.8	186.8			7,057	13,014	**7700**	12,776	1.3	186.80	0.019		2.962	0.788	0.788	0.496	1.303		DICB invert (m) / 186.20
	186.90	1.862	8,415	13,491	140.0	186.9			7,243	13,729	**8415**	13,491	1.4	186.90	0.020		3.583	0.823	0.823	1.019	1.862		
Top of Active Storage	187.00	2.610	9,149	14,225	140.1	187.0			7,430	14,462	**9149**	14,225	1.5	187.00	0.020		4.229	0.857	0.857	1.733	2.610		

Ext. Det storage 8976.00

Drawdown Time Calculations Greater than 0.1 m above the permanent pool

$T=[v_2-v_1]/[(Q_2+Q_1)/2]/3600$

where

T=drawdown time in hours

v_2=starting pond volume

v_2=ending pond volume

Q_2=starting flow

Q_1=ending flow

From 0.0 to 0.1 m above the permanent pool

$T=[v_2-v_1]/[(Q_2)]/3600$

where

T=drawdown time in hours

v_2=starting pond volume

v_2=ending pond volume

Q_2=starting flow

Weir Equation Used: $Q = C_{wb}*L*H^{1.5} + C_{wt}*S*H^{2.5}$

where

L = bottom width of spillway

H = head above weir invert

S = side slopes (ratio of H:V)

C_{wt} = weir coefficient (triangular)

C_{wb} = weir coefficient (broad-crested)

Sharp crested semi-circular weir equation

Sharp crested semi-circular weir equation

$Q=C*D^{2.5}*(H/D)^{1.88}$

where

C = sharp crested semi-circular weir coefficient

D = diameter of orifice

H = head above orifice invert

Note: used when water elevation is below 3/4 of the orifice diameter

Orifice Flow Calculations: Orifice flow equation

$Q = C*A*(2*g*H)^{0.5}$

where

C = orifice coefficient

A = area of orifice

g = acceleration due to gravity

H = head above centre line of orifice

Note: used when water elevation is above 3/4 of the orifice diameter

Drawdown Time Calculations Greater than 0.1 m above the permanent pool

$T=[v_2-v_1]/[(Q_2+Q_1)/2]/3600$

where

T=drawdown time in hours

v_2=starting pond volume

v_2=ending pond volume

Q_2=starting flow

Q_1=ending flow

From 0.0 to 0.1 m above the permanent pool

$T=[v_2-v_1]/[(Q_2)]/3600$

where

T=drawdown time in hours

v_2=starting pond volume

v_2=ending pond volume

Q_2=starting flow

Weir Equation Used: $Q = C_{wb}*L*H^{1.5} + C_{wt}*S*H^{2.5}$

where

L = bottom width of spillway

H = head above weir invert

S = side slopes (ratio of H:V)

C_{wt} = weir coefficient (triangular)

C_{wb} = weir coefficient (broad-crested)

Sharp crested semi-circular weir equation

Sharp crested semi-circular weir equation

$Q=C*D^{2.5}*(H/D)^{1.88}$

where

C = sharp crested semi-circular weir coefficient

D = diameter of orifice

H = head above orifice invert

Note: used when water elevation is below 3/4 of the orifice diameter

Orifice Flow Calculations: Orifice flow equation

$Q = C*A*(2*g*H)^{0.5}$

where

C = orifice coefficient

A = area of orifice

g = acceleration due to gravity

H = head above centre line of orifice

Note: used when water elevation is above 3/4 of the orifice diameter

Ditch Inlet Capacity Calculation (OPSD Type 705.030, Grate Type 403.010)
MTO Design Chart 4.20

Ditch Inlet Width: 1.2 m 5 :1 grate slope

	Capacity (m^3/s) per meter width						Actual Inlet Flow m^3/s				
Flow Depth	**2:1**	**3:1**	**4:1**	**5:1**	**6:1**	**Head**	**2:1**	**3:1**	**4:1**	**5:1**	**6:1**
0	0.000	0.000	0.000	0.000	0.000	0	0.000	0.000	0.000	0.000	0.000
0.05	0.024	0.023	0.022	0.021	0.021	0.05	0.029	0.028	0.027	0.026	0.025
0.1	0.065	0.084	0.112	0.133	0.140	0.1	0.078	0.101	0.134	0.160	0.168
0.15	0.110	0.148	0.204	0.246	0.260	0.15	0.132	0.177	0.245	0.295	0.312
0.2	0.200	0.253	0.331	0.390	0.410	0.2	0.240	0.303	0.398	0.468	0.492
0.25	0.300	0.375	0.488	0.572	0.600	0.25	0.360	0.450	0.585	0.686	0.720
0.3	0.420	0.530	0.695	0.819	0.860	0.3	0.504	0.636	0.834	0.983	1.032
0.35	0.550	0.675	0.863	1.003	1.050	0.35	0.660	0.810	1.035	1.204	1.260
0.4	0.700	0.900	1.200	1.425	1.500	0.4	0.840	1.080	1.440	1.710	1.800
0.45	0.900	1.150	1.525	1.806	1.900	0.45	1.080	1.380	1.830	2.168	2.280
0.5	1.050	1.313	1.706	2.002	2.100	0.5	1.260	1.575	2.048	2.402	2.520
0.55	1.100	1.450	1.975	2.369	2.500	0.55	1.320	1.740	2.370	2.843	3.000
0.6	1.296	1.620	2.105	2.469	2.590	0.6	1.556	1.944	2.526	2.962	3.108
0.65	1.419	1.780	2.321	2.727	2.863	0.65	1.703	2.136	2.786	3.273	3.435
0.7	1.543	1.941	2.538	2.986	3.135	0.7	1.851	2.329	3.045	3.583	3.762
0.75	1.666	2.104	2.762	3.255	3.419	0.75	1.999	2.525	3.314	3.906	4.103
0.8	1.789	2.268	2.986	3.524	3.704	0.8	2.147	2.721	3.583	4.229	4.445
0.85	1.912	2.429	3.204	3.785	3.979	0.85	2.294	2.914	3.845	4.542	4.775
0.9	2.035	2.590	3.422	4.047	4.255	0.9	2.442	3.108	4.107	4.856	5.106
0.95	2.158	2.750	3.637	4.302	4.524	0.95	2.590	3.300	4.364	5.163	5.429
1	2.281	2.909	3.851	4.558	4.793	1	2.738	3.491	4.622	5.469	5.752
1.05	2.404	3.061	4.045	4.784	5.030	1.05	2.885	3.673	4.854	5.741	6.036
1.1	2.512	3.192	4.212	4.977	5.231	1.1	3.015	3.831	5.054	5.972	6.278
1.15	2.636	3.350	4.420	5.223	5.490	1.15	3.164	4.020	5.304	6.267	6.588
1.2	2.760	3.507	4.628	5.469	5.749	1.2	3.312	4.209	5.554	6.562	6.899
1.25	2.884	3.665	4.836	5.715	6.008	1.25	3.461	4.398	5.804	6.858	7.209
1.3	3.008	3.823	5.045	5.961	6.266	1.3	3.610	4.587	6.053	7.153	7.520
1.35	3.132	3.980	5.253	6.207	6.525	1.35	3.758	4.776	6.303	7.448	7.830
1.4	3.256	4.138	5.461	6.453	6.784	1.4	3.907	4.966	6.553	7.744	8.141

SMITHVILLE

Sediment Forebay Sizing Calculations (North Pond)

Using MOE - Stormwater Management Planning and Design Manual (2003)

STORMWATER MANAGEMENT FACILITY

Settling

Dist = sqrt(r*Q_p/v_s)

= **9.7** **m**

r : 1 = l to w ratio — r = 2.85

Q_p = peak SWM outflow during quality storm — Q_p = 0.010 — Note 1.

v_s = settling velocity for 0.15 mm particles (m/s) — v_s = 0.0003

Dispersion Length

Dist = 8Q/dv

= **47.4** **m**

y_d = total depth of sediment in forebay (m) — y_d = 0.5

Q = 10 yr inlet flow (m^3/s) — Q = 2.960 — Note 2.

d = depth of perm pool in forebay (m) — d = 1

v_f = desired vel in forebay (m/s) — v_f = 0.5

Velocity

v = Q/A

= **0.090** **m/s**

y = total depth of forebay from perm. pool (m) — y = 1.5

b = bottom width (avg) of forebay (m) — b = 19.00

Q = 10 yr inlet flow (m^3/s) — Q = 2.960 — Note 2.

A = cross-sectional area (m^2) — A = 33.00

Target velocity = 0.15 — V_{targ} = 0.15

Therefore, **Velocity Target Satisfied**

Cleanout Frequency

Table 6.3 MOE SWMPD Manual

cleanout = Vol/(load*A_{sew}*effic)

= **8.6** **years**

Water Quality Level — Enhanced

A_{sew} = Contributing Sewer Area (ha) — A_{sew} = 13.69

Imp = Percent Impervious (%) — Imp = 75%

load = Sediment Loading (m^3/ha) — load = 3.1 — Note 3.

effic = Removal Efficiency (%) - Enhanced Level — effic = 80%

Targ = Cleanout Frequency Target (years) — Targ = 7

Vol = Sediment volume (m^3) — Vol = 293 — Note 4.

Therefore, **Cleanout Frequency Satisfied**

Surface Area Check

SA_f/SA_{pp} = **33.0%**

SA_f = Forebay Surface Area (m^2) — SA_f = 1,225

SA_{pp} = Total Permanent Pool Surface Area (m^2) — SA_{pp} = 3,717

Targ = Forebay size (as % of Permanent Pool Area) — Targ = 33%

Therefore, **The forebay size is OK!**

Notes:

1. Based on max outflow from pond for extended detention volume
2. 10 year peak inlet flow to SWM facility based on Visual OTTHYMO Modelling
3. Interpolated from sediment loading table
4. Volume of bottom 0.5 m depth, the maximum sediment accumulation depth

South SWMF - Smithville

Bottom of Pond Elevation 184.00 m
Permanent Pool Depth 1.50 m

	Elevation (m)	Depth (m)	Footprint Area (m^2)	Storage: Forebay Volume (m^3)	Storage: Total Storage Volume (m^3)	Storage: Live Storage (m^3)	Storage: Live Storage (ha-m)	Discharge: Orifice 1 (m^3/s)	Discharge: Orifice 2 (m^3/s)	Discharge: Weir 1 (m^3/s)	Discharge: Total Flow (m^3/s)	Discharge: Outlet Parameter (m^3/s)	Drawdown Time (h)
	184.00	0.00	4,800	0	0								
	184.10	0.10	5,035	123	492								
	184.20	0.20	5,270	252	1,007								
	184.30	0.30	5,506	386	1,546								
	184.40	0.40	5,741	527	2,108								
Max Sed. Storage	184.50	0.50	5,976	674	2,694								
	184.60	0.60	6,211	826	3,303								
	184.70	0.70	6,446	984	3,936								
	184.80	0.80	6,682	1,148	4,593								
	184.90	0.90	6,917	1,318	5,273								
	185.00	1.00	7,152	1,494	5,976								
	185.10	1.10	7,387	1,676	6,703								
	185.20	1.20	7,622	1,863	7,453								
	185.30	1.30	7,858	2,057	8,227								
	185.40	1.40	8,093	2,256	9,025								
Permanent Pool	185.50	1.50	8,328	2,462	9,846	0	0.0000	0.0000			0.000		0.0
	185.60	1.60	8,563		10,691	845	0.0845	0.0049			0.005		95.7
	185.70	1.70	8,798		11,559	1,713	0.1713	0.0085			0.008		131.8
	185.80	1.80	9,034		12,450	2,604	0.2604	0.0110			0.011		157.2
	185.90	1.90	9,269		13,365	3,519	0.3519	0.0130			0.013		178.5
	186.00	2.00	9,504		14,304	4,458	0.4458	0.0147			0.015		197.3
	186.10	2.10	9,739		15,266	5,420	0.5420	0.0163			0.016		214.6
Ext. Det.	186.20	2.20	9,974		16,252	6,406	0.6406	0.0177	0.0000		0.018	0.020	230.7
	186.30	2.30	10,210		17,261	7,415	0.7415	0.0190	0.0319		0.051		238.9
	186.40	2.40	10,445		18,294	8,448	0.8448	0.0202	0.0901		0.110		242.5
	186.50	2.50	10,680		19,350	9,504	0.9504	0.0214	0.1655		0.187		244.5
	186.60	2.60	10,915		20,430	10,584	1.0584	0.0225	0.2548		0.277		245.7
	186.70	2.70	11,150		21,533	11,687	1.1687	0.0235	0.3562	0.000	0.380		246.7
	186.80	2.80	11,386		22,660	12,814	1.2814	0.0245	0.4682	0.067	0.559		247.3
	186.90	2.90	11,621		23,810	13,964	1.3964	0.0255	0.5671	0.302	0.894		247.8
	187.00	3.00	11,856		24,984	15,138	1.5138	0.0264	0.6382	0.762	1.427		248.1

Orifice 1 Flow $Q_{orif} = C \times A \times (2gH)^{1/2}$

Invert elevation	185.50	m
Crown Elevation	185.60	m
Diameter	0.100	m
Area	0.008	m^2
Cd	0.63	
Cw	0.005	

Emergency Spillway 1 $Q_{weir} = C \times L \times H^{3/2} + C_s \times S \times H^{5/2}$

Elevation	186.70	m
Length	0.50	m
Discharge Coeff.	1.670	
Discharge Coeff.	1.268	
Height	0.3	m
Side Slopes	10	m/m

Orifice 2 Flow $Q_{orif} = C \times A \times (2gH)^{1/2}$

Invert Elevation	186.20	m
Crown Elevation	186.85	m
Diameter	0.650	m
Area	0.332	m^2
Cd	0.63	
Cw	0.528	

Orifice Flow Calculations: $Q_{orif} = C \times A \times (2gH)^{1/2}$
where
C = orifice coefficient
A = area of orifice
g = acceleration due to gravity
H = head above centreline of orifice
Note: used when water elevation is above 3/4 of the orifice diameter

Sharp crested semi-circular weir equation: $Q = C_w \times (H/D)^{1.5}$
where
C_w = sharp-crested weir coefficient
D = diameter of orifice
H = head above orifice invert
Note: used when water elevation is below 3/4 of the orifice diameter

Broad Crested Weir Equation: $Q_{weir} = C \times L \times H^{3/2} + C_s \times S \times H^{5/2}$
where
C = rectangular weir coefficient
C_s = triangular weir coefficient
L = bottom width of spillway
H = head above weir invert
S = side slopes (ratio H:W)

161414473 - Smithville
Outlet Flow Comparison

Outlet Culvert (from pond)

Return Period	Pre-development Flows (m^3/s)	Post-devlopment Flows (m^3/s)	Percent of change
25 mm event	0.08	0.05	-37%
2 -Year, 12hr	0.19	0.09	-54%
5-Year, 12hr	0.34	0.11	-67%
10-Year, 12hr	0.46	0.22	-53%
25-Year, 12hr	0.64	0.49	-23%
50-Year, 12hr	0.78	0.67	-15%
100-Year, 12hr	0.95	0.75	-21%
Hurricane Hazel	1.57	1.67	6%

NE Outlet

Return Period	Pre-development Flows (m^3/s)	Post-devlopment Flows (m^3/s)	Percent of change
25 mm event	0.08	0.06	-22%
2 -Year, 12hr	0.22	0.14	-38%
5-Year, 12hr	0.41	0.24	-42%
10-Year, 12hr	0.56	0.32	-43%
25-Year, 12hr	0.78	0.44	-44%
50-Year, 12hr	0.96	0.54	-44%
100-Year, 12hr	1.16	0.65	-44%
Hurricane Hazel	1.23	0.73	-40%

South Outlet

Return Period	Pre-development Flows (m^3/s)	Post-devlopment Flows (m^3/s)	Percent of change
25 mm event	0.10	0.02	-84%
2 -Year, 12hr	0.24	0.03	-88%
5-Year, 12hr	0.43	0.05	-89%
10-Year, 12hr	0.58	0.09	-84%
25-Year, 12hr	0.81	0.18	-77%
50-Year, 12hr	1.00	0.28	-72%
100-Year, 12hr	1.20	0.40	-67%
Hurricane Hazel	1.85	2.52	36%

West Outlet

Return Period	Pre-development Flows (m^3/s)	Post-devlopment Flows (m^3/s)	Percent of change
25 mm event	0.03	0.39	1231%
2 -Year, 12hr	0.08	0.68	791%
5-Year, 12hr	0.14	0.92	572%
10-Year, 12hr	0.19	1.22	547%
25-Year, 12hr	0.26	1.50	474%
50-Year, 12hr	0.32	1.72	434%
100-Year, 12hr	0.39	1.96	404%
Hurricane Hazel	0.53	0.69	30%

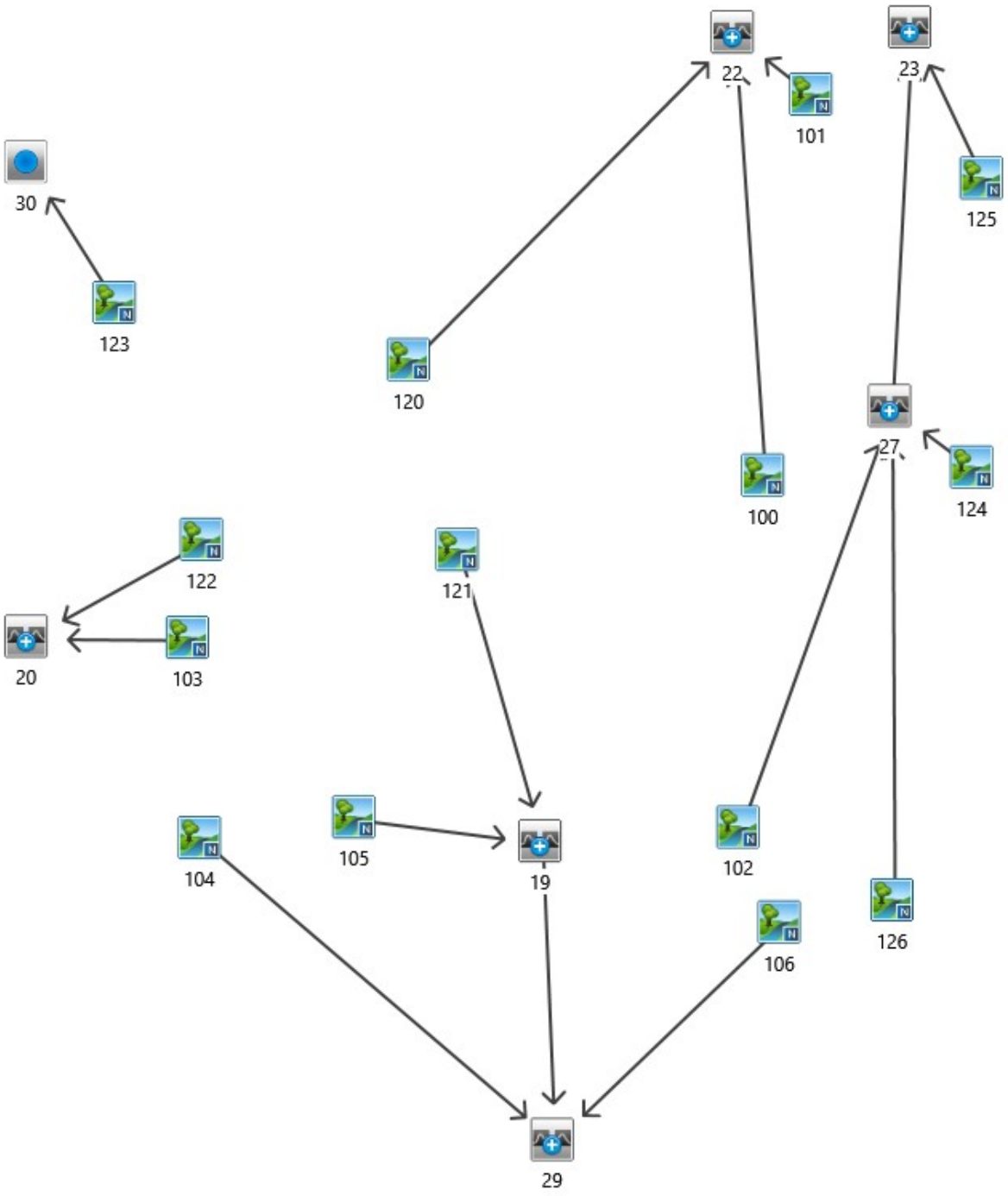
APPENDIX C
VISUAL OTTHYMO MODELING OUTPUTS

- APPENDIX C1 Pre-Schematic
- APPENDIX C2 Existing Output
- APPENDIX C3 Post Schematic
- APPENDIX C4 Proposed Output

APPENDIX C-1

EXISTING CONDITIONS SCHEMATIC

VO Schematic - Existing Conditions



APPENDIX C-2

EXISTING OUTPUT

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

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

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M M M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\8a40acb8-7777-4f80-bed7-083b9e542c74\sc
  Summary filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\8a40acb8-7777-4f80-bed7-083b9e542c74\sc


DATE: 08/19/2024                          TIME: 11:11:31

USER:


COMMENTS: _____


-------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 100yr 12hr 5min Chicago       **
  ************************************************


---------------------
| CHICAGO STORM    |   IDF curve parameters: A=2987.057
| Ptotal= 96.22 mm |                         B=  15.200
---------------------                         C=   0.897
                    used in:   INTENSITY =  A / (t + B)^C

                    Duration of storm  = 12.00 hrs
                    Storm time step    =  5.00 min
                    Time to peak ratio =  0.38

               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
```



```
                 hrs   mm/hr |   hrs   mm/hr |'  hrs   mm/hr |   hrs   mm/hr
                0.00    0.99 |  3.00    3.32 |  6.00    5.86 |  9.00    1.65
                0.08    1.01 |  3.08    3.55 |  6.08    5.49 |  9.08    1.62
                0.17    1.03 |  3.17    3.81 |  6.17    5.16 |  9.17    1.59
                0.25    1.05 |  3.25    4.12 |  6.25    4.87 |  9.25    1.56
                0.33    1.07 |  3.33    4.48 |  6.33    4.60 |  9.33    1.53
                0.42    1.10 |  3.42    4.90 |  6.42    4.37 |  9.42    1.50
                0.50    1.12 |  3.50    5.40 |  6.50    4.15 |  9.50    1.48
                0.58    1.14 |  3.58    6.02 |  6.58    3.96 |  9.58    1.45
                0.67    1.17 |  3.67    6.77 |  6.67    3.78 |  9.67    1.43
                0.75    1.20 |  3.75    7.73 |  6.75    3.61 |  9.75    1.40
                0.83    1.23 |  3.83    8.96 |  6.83    3.46 |  9.83    1.38
                0.92    1.26 |  3.92   10.62 |  6.92    3.32 |  9.92    1.36
                1.00    1.29 |  4.00   12.92 |  7.00    3.20 | 10.00    1.33
                1.08    1.32 |  4.08   16.29 |  7.08    3.08 | 10.08    1.31
                1.17    1.36 |  4.17   21.59 |  7.17    2.97 | 10.17    1.29
                1.25    1.39 |  4.25   30.82 |  7.25    2.86 | 10.25    1.27
                1.33    1.43 |  4.33   49.63 |  7.33    2.77 | 10.33    1.25
                1.42    1.47 |  4.42  100.76 |  7.42    2.68 | 10.42    1.23
                1.50    1.52 |  4.50  201.53 |  7.50    2.59 | 10.50    1.22
                1.58    1.57 |  4.58  116.59 |  7.58    2.51 | 10.58    1.20
                1.67    1.62 |  4.67   70.34 |  7.67    2.44 | 10.67    1.18
                1.75    1.67 |  4.75   48.12 |  7.75    2.37 | 10.75    1.17
                1.83    1.73 |  4.83   35.56 |  7.83    2.30 | 10.83    1.15
                1.92    1.79 |  4.92   27.69 |  7.92    2.24 | 10.92    1.13
                2.00    1.85 |  5.00   22.40 |  8.00    2.18 | 11.00    1.12
                2.08    1.92 |  5.08   18.63 |  8.08    2.12 | 11.08    1.10
                2.17    2.00 |  5.17   15.85 |  8.17    2.07 | 11.17    1.09
                2.25    2.08 |  5.25   13.73 |  8.25    2.02 | 11.25    1.08
                2.33    2.17 |  5.33   12.06 |  8.33    1.97 | 11.33    1.06
                2.42    2.27 |  5.42   10.73 |  8.42    1.92 | 11.42    1.05
                2.50    2.38 |  5.50    9.64 |  8.50    1.88 | 11.50    1.04
                2.58    2.50 |  5.58    8.73 |  8.58    1.84 | 11.58    1.02
                2.67    2.63 |  5.67    7.97 |  8.67    1.80 | 11.67    1.01
                2.75    2.77 |  5.75    7.32 |  8.75    1.76 | 11.75    1.00
                2.83    2.93 |  5.83    6.77 |  8.83    1.72 | 11.83    0.99
                2.92    3.11 |  5.92    6.28 |  8.92    1.69 | 11.92    0.98


---------------------------------------------------------------------------
---------------------
| CALIB            |
| NASHYD  (  0122)|  Area    (ha)=   3.16   Curve Number   (CN)= 82.6
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=   0.66

    Unit Hyd Qpeak  (cms)=   0.182

    PEAK FLOW      (cms)=   0.251 (i)
    TIME TO PEAK   (hrs)=   5.333
    RUNOFF VOLUME  (mm)=  55.770
    TOTAL RAINFALL (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.580
```



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

---------------------------------------------------------------------------
---------------------
| CALIB            |
| NASHYD  (  0103)|  Area    (ha)=   1.41   Curve Number   (CN)= 83.7
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=   0.26

    Unit Hyd Qpeak  (cms)=   0.209

    PEAK FLOW      (cms)=   0.216 (i)
    TIME TO PEAK   (hrs)=   4.833
    RUNOFF VOLUME  (mm)=  57.356
    TOTAL RAINFALL (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.596

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

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

---------------------
| ADD HYD  (  0020)|
|  1 +  2 =  3     |      AREA    QPEAK    TPEAK    R.V.
---------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0103):    1.41   0.216    4.83    57.36
    + ID2= 2 (  0122):    3.16   0.251    5.33    55.77
      ==========================================
      ID = 3 (  0020):    4.57   0.389    5.00    56.26

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
---------------------
| CALIB            |
| NASHYD  (  0120)|  Area    (ha)=   4.33   Curve Number   (CN)= 83.7
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=   0.55

    Unit Hyd Qpeak  (cms)=   0.302

    PEAK FLOW      (cms)=   0.409 (i)
    TIME TO PEAK   (hrs)=   5.250
    RUNOFF VOLUME  (mm)=  57.394
    TOTAL RAINFALL (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.596

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

---------------------------------------------------------------------------
---------------------
| CALIB            |
| NASHYD  (  0100)|  Area    (ha)=  10.57   Curve Number   (CN)= 83.3
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=   1.02
```



```
    Unit Hyd Qpeak  (cms)=   0.395

    PEAK FLOW      (cms)=   0.618 (i)
    TIME TO PEAK   (hrs)=   5.750
    RUNOFF VOLUME  (mm)=  56.799
    TOTAL RAINFALL (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.590

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

---------------------------------------------------------------------------
---------------------
| CALIB            |
| NASHYD  (  0101)|  Area    (ha)=   0.04   Curve Number   (CN)= 87.5
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
---------------------  U.H. Tp(hrs)=   0.09

    Unit Hyd Qpeak  (cms)=   0.018

    PEAK FLOW      (cms)=   0.011 (i)
    TIME TO PEAK   (hrs)=   4.667
    RUNOFF VOLUME  (mm)=  60.615
    TOTAL RAINFALL (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.630

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

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

---------------------
| ADD HYD  (  0022)|
|  1 +  2 =  3     |      AREA    QPEAK    TPEAK    R.V.
---------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0100):   10.57   0.618    5.75    56.80
    + ID2= 2 (  0101):    0.04   0.011    4.67    60.62
      ==========================================
      ID = 3 (  0022):   10.61   0.619    5.75    56.81

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

---------------------
| ADD HYD  (  0022)|
|  3 +  2 =  1     |      AREA    QPEAK    TPEAK    R.V.
---------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0022):   10.61   0.619    5.75    56.81
    + ID2= 2 (  0120):    4.33   0.409    5.25    57.39
      ==========================================
      ID = 1 (  0022):   14.94   0.945    5.50    56.98

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

```
| CALIB          |
| NASHYD  (  0102)|  Area   (ha)=   7.24  Curve Number  (CN)= 82.0
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.30

    Unit Hyd Qpeak  (cms)=   0.916

    PEAK FLOW      (cms)=   0.962 (i)
    TIME TO PEAK   (hrs)=   4.917
    RUNOFF VOLUME   (mm)=  54.885
    TOTAL RAINFALL  (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.570

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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0126)|  Area   (ha)=   1.06  Curve Number  (CN)= 79.1
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.62

    Unit Hyd Qpeak  (cms)=   0.066

    PEAK FLOW      (cms)=   0.080 (i)
    TIME TO PEAK   (hrs)=   5.333
    RUNOFF VOLUME   (mm)=  50.915
    TOTAL RAINFALL  (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.529

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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0124)|  Area   (ha)=   0.71  Curve Number  (CN)= 85.4
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.25

    Unit Hyd Qpeak  (cms)=   0.109

    PEAK FLOW      (cms)=   0.118 (i)
    TIME TO PEAK   (hrs)=   4.833
    RUNOFF VOLUME   (mm)=  59.961
    TOTAL RAINFALL  (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.623

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

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

--------------------
| ADD HYD  (  0027)|
|  1 +  2 =  3   |      AREA    QPEAK    TPEAK    R.V.
```



```
-------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0102):    7.24   0.962    4.92   54.88
    + ID2= 2 (  0124):    0.71   0.118    4.83   59.96
      ==========================================================
      ID = 3 (  0027):    7.95   1.076    4.92   55.34

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

--------------------
| ADD HYD  (  0027)|
|  3 +  2 =  1   |      AREA    QPEAK    TPEAK    R.V.
-------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0027):    7.95   1.076    4.92   55.34
    + ID2= 2 (  0126):    1.06   0.080    5.33   50.91
      ==========================================================
      ID = 1 (  0027):    9.01   1.131    4.92   54.82

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0125)|  Area   (ha)=   0.18  Curve Number  (CN)= 84.3
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.18

    Unit Hyd Qpeak  (cms)=   0.037

    PEAK FLOW      (cms)=   0.034 (i)
    TIME TO PEAK   (hrs)=   4.750
    RUNOFF VOLUME   (mm)=  58.149
    TOTAL RAINFALL  (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.604

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

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

--------------------
| ADD HYD  (  0023)|
|  1 +  2 =  3   |      AREA    QPEAK    TPEAK    R.V.
-------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0125):    0.18   0.034    4.75   58.15
    + ID2= 2 (  0027):    9.01   1.131    4.92   54.82
      ==========================================================
      ID = 3 (  0023):    9.19   1.159    4.92   54.88

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0121)|  Area   (ha)=   2.12  Curve Number  (CN)= 83.3
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.93
```



```
    Unit Hyd Qpeak  (cms)=   0.087

    PEAK FLOW      (cms)=   0.134 (i)
    TIME TO PEAK   (hrs)=   5.667
    RUNOFF VOLUME   (mm)=  56.798
    TOTAL RAINFALL  (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.590

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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0105)|  Area   (ha)=   9.75  Curve Number  (CN)= 83.8
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.82

    Unit Hyd Qpeak  (cms)=   0.455

    PEAK FLOW      (cms)=   0.686 (i)
    TIME TO PEAK   (hrs)=   5.583
    RUNOFF VOLUME   (mm)=  57.546
    TOTAL RAINFALL  (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.598

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

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

--------------------
| ADD HYD  (  0019)|
|  1 +  2 =  3   |      AREA    QPEAK    TPEAK    R.V.
-------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0105):    9.75   0.686    5.58   57.55
    + ID2= 2 (  0121):    2.12   0.134    5.67   56.80
      ==========================================================
      ID = 3 (  0019):   11.87   0.818    5.58   57.41

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0104)|  Area   (ha)=   3.63  Curve Number  (CN)= 82.6
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.59

    Unit Hyd Qpeak  (cms)=   0.233

    PEAK FLOW      (cms)=   0.312 (i)
    TIME TO PEAK   (hrs)=   5.250
    RUNOFF VOLUME   (mm)=  55.769
    TOTAL RAINFALL  (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.580
```



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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0106)|  Area   (ha)=   1.27  Curve Number  (CN)= 80.8
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.67

    Unit Hyd Qpeak  (cms)=   0.072

    PEAK FLOW      (cms)=   0.095 (i)
    TIME TO PEAK   (hrs)=   5.417
    RUNOFF VOLUME   (mm)=  53.215
    TOTAL RAINFALL  (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.553

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

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

--------------------
| ADD HYD  (  0029)|
|  1 +  2 =  3   |      AREA    QPEAK    TPEAK    R.V.
-------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0104):    3.63   0.312    5.25   55.77
    + ID2= 2 (  0106):    1.27   0.095    5.42   53.21
      ==========================================================
      ID = 3 (  0029):    4.90   0.406    5.33   55.11

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

--------------------
| ADD HYD  (  0029)|
|  3 +  2 =  1   |      AREA    QPEAK    TPEAK    R.V.
-------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0029):    4.90   0.406    5.33   55.11
    + ID2= 2 (  0019):   11.87   0.818    5.58   57.41
      ==========================================================
      ID = 1 (  0029):   16.77   1.201    5.50   56.74

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0123)|  Area   (ha)=   1.39  Curve Number  (CN)= 86.8
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.48

    Unit Hyd Qpeak  (cms)=   0.110

    PEAK FLOW      (cms)=   0.157 (i)
```

```
    TIME TO PEAK    (hrs)=   5.167
    RUNOFF VOLUME   (mm)=  62.258
    TOTAL RAINFALL  (mm)=  96.218
    RUNOFF COEFFICIENT  =   0.647

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

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

  ---------------------
 | Junction Command(0030) |
  ---------------------

                  AREA    QPEAK   TPEAK    R.V.
                  (ha)    (cms)   (hrs)   (mm)
 INFLOW : ID= 2(  0123)   1.39    0.16    5.17    62.26
 OUTFLOW: ID= 2(  0030)   1.39    0.16    5.17    62.26

  ---------------------------------------------------------------------------
===========================================================================
====================

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

     OOO  TTTTT  TTTTT H   H Y   Y M   M  OOO   TM
    O   O   T      T   H   H  Y Y  MM MM O   O
    O   O   T      T   H   H   Y   M M O   O
     OOO    T      T   H   H   Y   M   M  OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\6dccda19-53da-426f-b92a-44333e42c11c\sc
  Summary filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\6dccda19-53da-426f-b92a-44333e42c11c\sc


DATE: 08/19/2024                    TIME: 11:11:30

USER:


COMMENTS: _____
```



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

 **********************************************
 ** SIMULATION : 10yr 12hr 5min Chicago      **
 **********************************************


--------------------
| CHICAGO STORM    |   IDF curve parameters: A=1303.567
| Ptotal= 65.32 mm |                   B=   9.700
--------------------                   C=   0.831
                 used in:   INTENSITY =  A / (t + B)^C

                 Duration of storm  = 12.00 hrs
                 Storm time step    =  5.00 min
                 Time to peak ratio =  0.38

          TIME   RAIN |  TIME   RAIN |'  TIME   RAIN |  TIME   RAIN
           hrs  mm/hr |   hrs  mm/hr |'  hrs  mm/hr |   hrs  mm/hr
          0.00   0.99 |  3.00   2.72 |  6.00   4.34 |  9.00   1.53
          0.08   1.01 |  3.08   2.88 |  6.08   4.11 |  9.08   1.51
          0.17   1.03 |  3.17   3.05 |  6.17   3.91 |  9.17   1.48
          0.25   1.05 |  3.25   3.25 |  6.25   3.72 |  9.25   1.46
          0.33   1.06 |  3.33   3.48 |  6.33   3.56 |  9.33   1.44
          0.42   1.08 |  3.42   3.74 |  6.42   3.41 |  9.42   1.41
          0.50   1.10 |  3.50   4.06 |  6.50   3.27 |  9.50   1.39
          0.58   1.12 |  3.58   4.43 |  6.58   3.14 |  9.58   1.37
          0.67   1.15 |  3.67   4.88 |  6.67   3.03 |  9.67   1.35
          0.75   1.17 |  3.75   5.44 |  6.75   2.92 |  9.75   1.33
          0.83   1.19 |  3.83   6.15 |  6.83   2.82 |  9.83   1.32
          0.92   1.22 |  3.92   7.08 |  6.92   2.73 |  9.92   1.30
          1.00   1.24 |  4.00   8.35 |  7.00   2.64 | 10.00   1.28
          1.08   1.27 |  4.08  10.19 |  7.08   2.56 | 10.08   1.26
          1.17   1.30 |  4.17  13.04 |  7.17   2.48 | 10.17   1.25
          1.25   1.33 |  4.25  18.00 |  7.25   2.41 | 10.25   1.23
          1.33   1.36 |  4.33  28.38 |  7.33   2.35 | 10.33   1.21
          1.42   1.39 |  4.42  60.23 |  7.42   2.28 | 10.42   1.20
          1.50   1.43 |  4.50 139.67 |  7.50   2.22 | 10.50   1.18
          1.58   1.46 |  4.58  70.72 |  7.58   2.17 | 10.58   1.17
          1.67   1.50 |  4.67  40.43 |  7.67   2.12 | 10.67   1.16
          1.75   1.54 |  4.75  27.50 |  7.75   2.06 | 10.75   1.14
          1.83   1.59 |  4.83  20.56 |  7.83   2.02 | 10.83   1.13
          1.92   1.64 |  4.92  16.31 |  7.92   1.97 | 10.92   1.12
          2.00   1.69 |  5.00  13.47 |  8.00   1.93 | 11.00   1.10
          2.08   1.74 |  5.08  11.45 |  8.08   1.89 | 11.08   1.09
          2.17   1.80 |  5.17   9.95 |  8.17   1.85 | 11.17   1.08
          2.25   1.86 |  5.25   8.80 |  8.25   1.81 | 11.25   1.07
          2.33   1.92 |  5.33   7.88 |  8.33   1.77 | 11.33   1.06
          2.42   2.00 |  5.42   7.14 |  8.42   1.74 | 11.42   1.04
          2.50   2.07 |  5.50   6.53 |  8.50   1.71 | 11.50   1.03
          2.58   2.16 |  5.58   6.02 |  8.58   1.67 | 11.58   1.02
          2.67   2.25 |  5.67   5.58 |  8.67   1.64 | 11.67   1.01
          2.75   2.35 |  5.75   5.20 |  8.75   1.61 | 11.75   1.00
          2.83   2.46 |  5.83   4.88 |  8.83   1.59 | 11.83   0.99
```



```
          2.92   2.59 |  5.92   4.59 |  8.92   1.56 | 11.92   0.98


---------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0122)|  Area   (ha)=   3.16  Curve Number  (CN)= 82.6
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.66

    Unit Hyd Qpeak  (cms)=   0.182

    PEAK FLOW       (cms)=   0.121 (i)
    TIME TO PEAK    (hrs)=   5.417
    RUNOFF VOLUME   (mm)=  30.414
    TOTAL RAINFALL  (mm)=  65.319
    RUNOFF COEFFICIENT  =   0.466

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

---------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0103)|  Area   (ha)=   1.41  Curve Number  (CN)= 83.7
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.26

    Unit Hyd Qpeak  (cms)=   0.209

    PEAK FLOW       (cms)=   0.105 (i)
    TIME TO PEAK    (hrs)=   4.833
    RUNOFF VOLUME   (mm)=  31.532
    TOTAL RAINFALL  (mm)=  65.319
    RUNOFF COEFFICIENT  =   0.483

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

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

--------------------
| ADD HYD  (  0020)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------        (ha)   (cms)   (hrs)   (mm)
      ID1= 1 (  0103):    1.41   0.105    4.83    31.53
    + ID2= 2 (  0122):    3.16   0.121    5.42    30.41
      ==========================================
      ID = 3 (  0020):    4.57   0.188    5.08    30.76

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0120)|  Area   (ha)=   4.33  Curve Number  (CN)= 83.7
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
```



```
--------------------  U.H. Tp(hrs)=   0.55

    Unit Hyd Qpeak  (cms)=   0.302

    PEAK FLOW       (cms)=   0.199 (i)
    TIME TO PEAK    (hrs)=   5.250
    RUNOFF VOLUME   (mm)=  31.554
    TOTAL RAINFALL  (mm)=  65.319
    RUNOFF COEFFICIENT  =   0.483

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

---------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0100)|  Area   (ha)=  10.57  Curve Number  (CN)= 83.3
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   1.02

    Unit Hyd Qpeak  (cms)=   0.395

    PEAK FLOW       (cms)=   0.302 (i)
    TIME TO PEAK    (hrs)=   5.833
    RUNOFF VOLUME   (mm)=  31.134
    TOTAL RAINFALL  (mm)=  65.319
    RUNOFF COEFFICIENT  =   0.477

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

---------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0101)|  Area   (ha)=   0.04  Curve Number  (CN)= 87.5
|ID= 1 DT= 5.0 min |  Ia     (mm)=   7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.09

    Unit Hyd Qpeak  (cms)=   0.018

    PEAK FLOW       (cms)=   0.006 (i)
    TIME TO PEAK    (hrs)=   4.667
    RUNOFF VOLUME   (mm)=  34.358
    TOTAL RAINFALL  (mm)=  65.319
    RUNOFF COEFFICIENT  =   0.526

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

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

--------------------
| ADD HYD  (  0022)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------        (ha)   (cms)   (hrs)   (mm)
      ID1= 1 (  0100):   10.57   0.302    5.83    31.13
    + ID2= 2 (  0101):    0.04   0.006    4.67    34.36
```

```
     ==============================================
     ID = 3 (  0022):   10.61   0.303    5.83    31.15

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


--------------------
| ADD HYD  (  0022)|
|  3 +  2 =  1   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0022):   10.61   0.303    5.83    31.15
    + ID2= 2 (  0120):    4.33   0.199    5.25    31.55
     ==============================================
      ID = 1 (  0022):   14.94   0.460    5.50    31.26

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0102)|  Area    (ha)=   7.24   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.30

   Unit Hyd Qpeak  (cms)=   0.916

   PEAK FLOW      (cms)=   0.462 (i)
   TIME TO PEAK   (hrs)=   4.917
   RUNOFF VOLUME   (mm)=  29.803
   TOTAL RAINFALL  (mm)=  65.319
   RUNOFF COEFFICIENT  =   0.456

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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0126)|  Area    (ha)=   1.06   Curve Number   (CN)= 79.1
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.62

   Unit Hyd Qpeak  (cms)=   0.066

   PEAK FLOW      (cms)=   0.037 (i)
   TIME TO PEAK   (hrs)=   5.333
   RUNOFF VOLUME   (mm)=  27.114
   TOTAL RAINFALL  (mm)=  65.319
   RUNOFF COEFFICIENT  =   0.415

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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0124)|  Area    (ha)=   0.71   Curve Number   (CN)= 85.4
```



```
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.25

   Unit Hyd Qpeak  (cms)=   0.109

   PEAK FLOW      (cms)=   0.058 (i)
   TIME TO PEAK   (hrs)=   4.833
   RUNOFF VOLUME   (mm)=  33.401
   TOTAL RAINFALL  (mm)=  65.319
   RUNOFF COEFFICIENT  =   0.511

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

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


--------------------
| ADD HYD  (  0027)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0102):    7.24   0.462    4.92    29.80
    + ID2= 2 (  0124):    0.71   0.058    4.83    33.40
     ==============================================
      ID = 3 (  0027):    7.95   0.518    4.92    30.12

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


--------------------
| ADD HYD  (  0027)|
|  3 +  2 =  1   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 3 (  0027):    7.95   0.518    4.92    30.12
    + ID2= 2 (  0126):    1.06   0.037    5.33    27.11
     ==============================================
      ID = 1 (  0027):    9.01   0.544    4.92    29.77

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0125)|  Area    (ha)=   0.18   Curve Number   (CN)= 84.3
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.18

   Unit Hyd Qpeak  (cms)=   0.037

   PEAK FLOW      (cms)=   0.017 (i)
   TIME TO PEAK   (hrs)=   4.750
   RUNOFF VOLUME   (mm)=  32.113
   TOTAL RAINFALL  (mm)=  65.319
   RUNOFF COEFFICIENT  =   0.492

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



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


--------------------
| ADD HYD  (  0023)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0125):    0.18   0.017    4.75    32.11
    + ID2= 2 (  0027):    9.01   0.544    4.92    29.77
     ==============================================
      ID = 3 (  0023):    9.19   0.557    4.92    29.82

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0121)|  Area    (ha)=   2.12   Curve Number   (CN)= 83.3
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.93

   Unit Hyd Qpeak  (cms)=   0.087

   PEAK FLOW      (cms)=   0.065 (i)
   TIME TO PEAK   (hrs)=   5.750
   RUNOFF VOLUME   (mm)=  31.133
   TOTAL RAINFALL  (mm)=  65.319
   RUNOFF COEFFICIENT  =   0.477

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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0105)|  Area    (ha)=   9.75   Curve Number   (CN)= 83.8
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.82

   Unit Hyd Qpeak  (cms)=   0.455

   PEAK FLOW      (cms)=   0.335 (i)
   TIME TO PEAK   (hrs)=   5.583
   RUNOFF VOLUME   (mm)=  31.661
   TOTAL RAINFALL  (mm)=  65.319
   RUNOFF COEFFICIENT  =   0.485

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

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


--------------------
| ADD HYD  (  0019)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0105):    9.75   0.335    5.58    31.66
    + ID2= 2 (  0121):    2.12   0.065    5.75    31.13
```



```
     ==============================================
     ID = 3 (  0019):   11.87   0.400    5.58    31.57

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0104)|  Area    (ha)=   3.63   Curve Number   (CN)= 82.6
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.59

   Unit Hyd Qpeak  (cms)=   0.233

   PEAK FLOW      (cms)=   0.150 (i)
   TIME TO PEAK   (hrs)=   5.333
   RUNOFF VOLUME   (mm)=  30.414
   TOTAL RAINFALL  (mm)=  65.319
   RUNOFF COEFFICIENT  =   0.466

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

--------------------------------------------------------------------------------
--------------------
| CALIB          |
| NASHYD  (  0106)|  Area    (ha)=   1.27   Curve Number   (CN)= 80.8
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.67

   Unit Hyd Qpeak  (cms)=   0.072

   PEAK FLOW      (cms)=   0.045 (i)
   TIME TO PEAK   (hrs)=   5.417
   RUNOFF VOLUME   (mm)=  28.657
   TOTAL RAINFALL  (mm)=  65.319
   RUNOFF COEFFICIENT  =   0.439

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

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


--------------------
| ADD HYD  (  0029)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
      ID1= 1 (  0104):    3.63   0.150    5.33    30.41
    + ID2= 2 (  0106):    1.27   0.045    5.42    28.66
     ==============================================
      ID = 3 (  0029):    4.90   0.195    5.33    29.96

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


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

```
|  3 +  2 =  1   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):     4.90   0.195     5.33    29.96
     + ID2= 2 (  0019):    11.87   0.400     5.58    31.57
       ================================================
       ID = 1 (  0029):    16.77   0.583     5.50    31.10

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0123)|   Area    (ha)=   1.39   Curve Number   (CN)= 86.8
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.48

    Unit Hyd Qpeak  (cms)=   0.110

    PEAK FLOW      (cms)=   0.079 (i)
    TIME TO PEAK   (hrs)=   5.167
    RUNOFF VOLUME   (mm)=  35.080
    TOTAL RAINFALL  (mm)=  65.319
    RUNOFF COEFFICIENT  =   0.537

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

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

  --------------------------
  | Junction Command(0030) |
  --------------------------

                    AREA     QPEAK    TPEAK     R.V.
                    (ha)     (cms)    (hrs)     (mm)
 INFLOW : ID= 2(  0123)    1.39     0.08     5.17     35.08
 OUTFLOW: ID= 2(  0030)    1.39     0.08     5.17     35.08

  --------------------------------------------------------------------------------
================================================================================
====================

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

      OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
     O   O    T      T    H   H   Y Y   MM MM  O   O
     O   O    T      T    H   H    Y    M M M  O   O
      OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.
```



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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\157bc479-9c80-4749-8af1-6f650518548a\sc
  Summary filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\157bc479-9c80-4749-8af1-6f650518548a\sc


DATE: 08/19/2024                      TIME: 11:11:31

USER:


COMMENTS: _____


--------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 25-mm Quality Storm          **
  ************************************************

------------------
| CHICAGO STORM    |   IDF curve parameters: A= 425.000
| Ptotal= 25.00 mm |                         B=   5.000
------------------                          C=   0.767
                    used in:   INTENSITY =  A / (t + B)^C

                    Duration of storm  =  4.00 hrs
                    Storm time step    = 10.00 min
                    Time to peak ratio =  0.40

              TIME   RAIN |  TIME   RAIN |'  TIME   RAIN |  TIME   RAIN
               hrs  mm/hr |   hrs  mm/hr |'   hrs  mm/hr |   hrs  mm/hr
              0.00   1.65 |  1.00   4.31 |  2.00   5.82 |  3.00   2.27
              0.17   1.82 |  1.17   6.37 |  2.17   4.52 |  3.17   2.08
              0.33   2.04 |  1.33  13.83 |  2.33   3.72 |  3.33   1.92
              0.50   2.33 |  1.50  53.25 |  2.50   3.19 |  3.50   1.79
              0.67   2.72 |  1.67  16.08 |  2.67   2.80 |  3.67   1.68
              0.83   3.31 |  1.83   8.40 |  2.83   2.50 |  3.83   1.58


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0122)|   Area    (ha)=   3.16   Curve Number   (CN)= 82.6
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.66

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



```
                    ---- TRANSFORMED HYETOGRAPH ----
              TIME   RAIN |  TIME   RAIN |'  TIME   RAIN |  TIME   RAIN
               hrs  mm/hr |   hrs  mm/hr |'   hrs  mm/hr |   hrs  mm/hr
              0.083   1.65 | 1.083   4.31 | 2.083   5.82 |  3.08   2.27
              0.167   1.65 | 1.167   4.31 | 2.167   5.82 |  3.17   2.27
              0.250   1.82 | 1.250   6.37 | 2.250   4.52 |  3.25   2.08
              0.333   1.82 | 1.333   6.37 | 2.333   4.52 |  3.33   2.08
              0.417   2.04 | 1.417  13.83 | 2.417   3.72 |  3.42   1.92
              0.500   2.04 | 1.500  13.83 | 2.500   3.72 |  3.50   1.92
              0.583   2.33 | 1.583  53.25 | 2.583   3.19 |  3.58   1.79
              0.667   2.33 | 1.667  53.25 | 2.667   3.19 |  3.67   1.79
              0.750   2.72 | 1.750  16.08 | 2.750   2.80 |  3.75   1.68
              0.833   2.72 | 1.833  16.08 | 2.833   2.80 |  3.83   1.68
              0.917   3.31 | 1.917   8.40 | 2.917   2.50 |  3.92   1.58
              1.000   3.31 | 2.000   8.40 | 3.000   2.50 |  4.00   1.58

    Unit Hyd Qpeak  (cms)=   0.182

    PEAK FLOW      (cms)=   0.019 (i)
    TIME TO PEAK   (hrs)=   2.583
    RUNOFF VOLUME   (mm)=   4.531
    TOTAL RAINFALL  (mm)=  25.000
    RUNOFF COEFFICIENT  =   0.181

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0103)|   Area    (ha)=   1.41   Curve Number   (CN)= 83.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.26

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


                    ---- TRANSFORMED HYETOGRAPH ----
              TIME   RAIN |  TIME   RAIN |'  TIME   RAIN |  TIME   RAIN
               hrs  mm/hr |   hrs  mm/hr |'   hrs  mm/hr |   hrs  mm/hr
              0.083   1.65 | 1.083   4.31 | 2.083   5.82 |  3.08   2.27
              0.167   1.65 | 1.167   4.31 | 2.167   5.82 |  3.17   2.27
              0.250   1.82 | 1.250   6.37 | 2.250   4.52 |  3.25   2.08
              0.333   1.82 | 1.333   6.37 | 2.333   4.52 |  3.33   2.08
              0.417   2.04 | 1.417  13.83 | 2.417   3.72 |  3.42   1.92
              0.500   2.04 | 1.500  13.83 | 2.500   3.72 |  3.50   1.92
              0.583   2.33 | 1.583  53.25 | 2.583   3.19 |  3.58   1.79
              0.667   2.33 | 1.667  53.25 | 2.667   3.19 |  3.67   1.79
              0.750   2.72 | 1.750  16.08 | 2.750   2.80 |  3.75   1.68
              0.833   2.72 | 1.833  16.08 | 2.833   2.80 |  3.83   1.68
              0.917   3.31 | 1.917   8.40 | 2.917   2.50 |  3.92   1.58
              1.000   3.31 | 2.000   8.40 | 3.000   2.50 |  4.00   1.58

    Unit Hyd Qpeak  (cms)=   0.209
```



```
    PEAK FLOW      (cms)=   0.016 (i)
    TIME TO PEAK   (hrs)=   2.000
    RUNOFF VOLUME   (mm)=   4.799
    TOTAL RAINFALL  (mm)=  25.000
    RUNOFF COEFFICIENT  =   0.192

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

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

--------------------
| ADD HYD  (  0020)|
|  1 +  2 =  3   |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0103):     1.41   0.016     2.00     4.80
     + ID2= 2 (  0122):     3.16   0.019     2.58     4.53
       ================================================
       ID = 3 (  0020):     4.57   0.029     2.25     4.61

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0120)|   Area    (ha)=   4.33   Curve Number   (CN)= 83.7
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.55

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


                    ---- TRANSFORMED HYETOGRAPH ----
              TIME   RAIN |  TIME   RAIN |'  TIME   RAIN |  TIME   RAIN
               hrs  mm/hr |   hrs  mm/hr |'   hrs  mm/hr |   hrs  mm/hr
              0.083   1.65 | 1.083   4.31 | 2.083   5.82 |  3.08   2.27
              0.167   1.65 | 1.167   4.31 | 2.167   5.82 |  3.17   2.27
              0.250   1.82 | 1.250   6.37 | 2.250   4.52 |  3.25   2.08
              0.333   1.82 | 1.333   6.37 | 2.333   4.52 |  3.33   2.08
              0.417   2.04 | 1.417  13.83 | 2.417   3.72 |  3.42   1.92
              0.500   2.04 | 1.500  13.83 | 2.500   3.72 |  3.50   1.92
              0.583   2.33 | 1.583  53.25 | 2.583   3.19 |  3.58   1.79
              0.667   2.33 | 1.667  53.25 | 2.667   3.19 |  3.67   1.79
              0.750   2.72 | 1.750  16.08 | 2.750   2.80 |  3.75   1.68
              0.833   2.72 | 1.833  16.08 | 2.833   2.80 |  3.83   1.68
              0.917   3.31 | 1.917   8.40 | 2.917   2.50 |  3.92   1.58
              1.000   3.31 | 2.000   8.40 | 3.000   2.50 |  4.00   1.58

    Unit Hyd Qpeak  (cms)=   0.302

    PEAK FLOW      (cms)=   0.031 (i)
    TIME TO PEAK   (hrs)=   2.417
    RUNOFF VOLUME   (mm)=   4.802
    TOTAL RAINFALL  (mm)=  25.000
    RUNOFF COEFFICIENT  =   0.192
```

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

| CALIB |
| NASHYD (0100)| Area (ha)= 10.57 Curve Number (CN)= 83.3
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 1.02

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.395

PEAK FLOW (cms)= 0.051 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 4.701
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.188

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

| CALIB |
| NASHYD (0101)| Area (ha)= 0.04 Curve Number (CN)= 87.5
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.09

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.018

PEAK FLOW (cms)= 0.001 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 5.700
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.228

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

| ADD HYD (0022)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
--- (ha) (cms) (hrs) (mm)
ID1= 1 (0100): 10.57 0.051 3.08 4.70
+ ID2= 2 (0101): 0.04 0.001 1.67 5.70
==========
ID = 3 (0022): 10.61 0.051 3.08 4.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0022)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
--- (ha) (cms) (hrs) (mm)
ID1= 3 (0022): 10.61 0.051 3.08 4.70
+ ID2= 2 (0120): 4.33 0.031 2.42 4.80
==========
ID = 1 (0022): 14.94 0.076 2.83 4.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0102)| Area (ha)= 7.24 Curve Number (CN)= 82.0
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.30

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.916

PEAK FLOW (cms)= 0.067 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 4.391
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.176

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

| CALIB |
| NASHYD (0126)| Area (ha)= 1.06 Curve Number (CN)= 79.1
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.62

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.066

PEAK FLOW (cms)= 0.006 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 3.805
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.152

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

| CALIB |
| NASHYD (0124)| Area (ha)= 0.71 Curve Number (CN)= 85.4
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.25

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.109

PEAK FLOW (cms)= 0.009 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 5.270
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.211

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

| ADD HYD (0027)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
--- (ha) (cms) (hrs) (mm)
ID1= 1 (0102): 7.24 0.067 2.08 4.39
+ ID2= 2 (0124): 0.71 0.009 2.00 5.27
==========

ID = 3 (0027): 7.95 0.076 2.00 4.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0027)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 3 (0027): 7.95 0.076 2.00 4.47
+ ID2= 2 (0126): 1.06 0.006 2.50 3.81
==========
ID = 1 (0027): 9.01 0.080 2.08 4.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0125)| Area (ha)= 0.18 Curve Number (CN)= 84.3
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.18

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.037

PEAK FLOW (cms)= 0.002 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 4.946
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.198

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

| ADD HYD (0023)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0125): 0.18 0.002 1.83 4.95
+ ID2= 2 (0027): 9.01 0.080 2.08 4.39
==========
ID = 3 (0023): 9.19 0.082 2.08 4.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0121)| Area (ha)= 2.12 Curve Number (CN)= 83.3
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.93

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.087

PEAK FLOW (cms)= 0.011 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 4.700
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.188

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

| CALIB |
| NASHYD (0105)| Area (ha)= 9.75 Curve Number (CN)= 83.8
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.82

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

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.455

PEAK FLOW (cms)= 0.055 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 4.828
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.193

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

| ADD HYD (0019)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0105): 9.75 0.055 2.83 4.83
+ ID2= 2 (0121): 2.12 0.011 3.00 4.70
==========
ID = 3 (0019): 11.87 0.066 2.83 4.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0104)| Area (ha)= 3.63 Curve Number (CN)= 82.6
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.59

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.233

PEAK FLOW (cms)= 0.024 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 4.531
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.181

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

| CALIB |
| NASHYD (0106)| Area (ha)= 1.27 Curve Number (CN)= 80.8
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.67

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.072

PEAK FLOW (cms)= 0.007 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 4.134
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.165

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

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

ADD HYD (0029)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0104):	3.63	0.024	2.50	4.53	
+ ID2= 2 (0106):	1.27	0.007	2.58	4.13	
ID = 3 (0029):	4.90	0.030	2.50	4.43	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)					
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 3 (0029):	4.90	0.030	2.50	4.43	
+ ID2= 2 (0019):	11.87	0.066	2.83	4.81	
ID = 1 (0029):	16.77	0.095	2.75	4.70	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0123)| Area (ha)= 1.39 Curve Number (CN)= 86.8					
ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # 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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.110

PEAK FLOW (cms)= 0.013 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 5.721
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.229

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

Junction Command(0030)				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2(0123)	1.39	0.01	2.33	5.72
OUTFLOW: ID= 2(0030)	1.39	0.01	2.33	5.72

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

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

Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\2475ce4b-1336-47fe-9e5f-e12c8bc7f29f\sc
Summary filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\2475ce4b-1336-47fe-9e5f-e12c8bc7f29f\sc

DATE: 08/19/2024 TIME: 11:11:31

USER:

COMMENTS: _____

****
** SIMULATION : 25yr 12hr 5min Chicago **
****

CHICAGO STORM	IDF curve parameters: A=1837.546
Ptotal= 77.38 mm	B= 11.800
	C= 0.857

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

Duration of storm = 12.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	1.03	3.00	3.01	6.00	4.97	9.00	1.62
0.08	1.04	3.08	3.19	6.08	4.69	9.08	1.60
0.17	1.06	3.17	3.40	6.17	4.44	9.17	1.57
0.25	1.08	3.25	3.64	6.25	4.22	9.25	1.54
0.33	1.10	3.33	3.92	6.33	4.02	9.33	1.52
0.42	1.12	3.42	4.24	6.42	3.83	9.42	1.49
0.50	1.15	3.50	4.62	6.50	3.67	9.50	1.47
0.58	1.17	3.58	5.08	6.58	3.51	9.58	1.45
0.67	1.19	3.67	5.65	6.67	3.37	9.67	1.42
0.75	1.22	3.75	6.35	6.75	3.24	9.75	1.40
0.83	1.24	3.83	7.25	6.83	3.12	9.83	1.38
0.92	1.27	3.92	8.44	6.92	3.01	9.92	1.36
1.00	1.30	4.00	10.07	7.00	2.91	10.00	1.34
1.08	1.33	4.08	12.45	7.08	2.82	10.08	1.32
1.17	1.36	4.17	16.17	7.17	2.73	10.17	1.30
1.25	1.40	4.25	22.65	7.25	2.64	10.25	1.29
1.33	1.43	4.33	36.11	7.33	2.56	10.33	1.27
1.42	1.47	4.42	75.42	7.42	2.49	10.42	1.25
1.50	1.51	4.50	163.74	7.50	2.42	10.50	1.24
1.58	1.55	4.58	88.04	7.58	2.36	10.58	1.22
1.67	1.59	4.67	51.42	7.67	2.29	10.67	1.20
1.75	1.64	4.75	34.99	7.75	2.23	10.75	1.19
1.83	1.69	4.83	25.99	7.83	2.18	10.83	1.17
1.92	1.74	4.92	20.44	7.92	2.13	10.92	1.16
2.00	1.80	5.00	16.73	8.00	2.08	11.00	1.15
2.08	1.86	5.08	14.09	8.08	2.03	11.08	1.13
2.17	1.93	5.17	12.14	8.17	1.98	11.17	1.12
2.25	2.00	5.25	10.65	8.25	1.94	11.25	1.11
2.33	2.07	5.33	9.47	8.33	1.90	11.33	1.09
2.42	2.15	5.42	8.51	8.42	1.86	11.42	1.08
2.50	2.24	5.50	7.73	8.50	1.82	11.50	1.07
2.58	2.34	5.58	7.08	8.58	1.79	11.58	1.06
2.67	2.45	5.67	6.53	8.67	1.75	11.67	1.05

2.75	2.57	5.75	6.05	8.75	1.72	11.75	1.03
2.83	2.70	5.83	5.64	8.83	1.69	11.83	1.02
2.92	2.85	5.92	5.28	8.92	1.65	11.92	1.01

CALIB					
NASHYD (0122)| Area (ha)= 3.16 Curve Number (CN)= 82.6					
ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00					
U.H. Tp(hrs)= 0.66					

Unit Hyd Qpeak (cms)= 0.182

PEAK FLOW (cms)= 0.168 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 39.983
TOTAL RAINFALL (mm)= 77.381
RUNOFF COEFFICIENT = 0.517

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

CALIB					
NASHYD (0103)| Area (ha)= 1.41 Curve Number (CN)= 83.7					
ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00					
U.H. Tp(hrs)= 0.26					

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.146 (i)
TIME TO PEAK (hrs)= 4.833
RUNOFF VOLUME (mm)= 41.303
TOTAL RAINFALL (mm)= 77.381
RUNOFF COEFFICIENT = 0.534

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

ADD HYD (0020)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0103):	1.41	0.146	4.83	41.30	
+ ID2= 2 (0122):	3.16	0.168	5.33	39.98	
ID = 3 (0020):	4.57	0.261	5.08	40.39	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	

```
| NASHYD  (  0120)|  Area    (ha)=   4.33   Curve Number   (CN)= 83.7
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.55

    Unit Hyd Qpeak  (cms)=   0.302

    PEAK FLOW      (cms)=   0.275 (i)
    TIME TO PEAK   (hrs)=   5.250
    RUNOFF VOLUME   (mm)=  41.330
    TOTAL RAINFALL  (mm)=  77.381
    RUNOFF COEFFICIENT  =   0.534

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

---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0100)|  Area    (ha)=  10.57   Curve Number   (CN)= 83.3
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   1.02

    Unit Hyd Qpeak  (cms)=   0.395

    PEAK FLOW      (cms)=   0.417 (i)
    TIME TO PEAK   (hrs)=   5.833
    RUNOFF VOLUME   (mm)=  40.835
    TOTAL RAINFALL  (mm)=  77.381
    RUNOFF COEFFICIENT  =   0.528

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

---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0101)|  Area    (ha)=   0.04   Curve Number   (CN)= 87.5
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.09

    Unit Hyd Qpeak  (cms)=   0.018

    PEAK FLOW      (cms)=   0.008 (i)
    TIME TO PEAK   (hrs)=   4.667
    RUNOFF VOLUME   (mm)=  44.382
    TOTAL RAINFALL  (mm)=  77.381
    RUNOFF COEFFICIENT  =   0.574

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

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

-------------------
| ADD HYD  (  0022)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
-------------------       (ha)   (cms)   (hrs)    (mm)
```



```
      ID1= 1 (  0100):   10.57   0.417    5.83    40.84
    + ID2= 2 (  0101):    0.04   0.008    4.67    44.38
      ==========================================================
      ID = 3 (  0022):   10.61   0.417    5.83    40.85

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


-------------------
| ADD HYD  (  0022)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK    R.V.
-------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0022):   10.61   0.417    5.83    40.85
    + ID2= 2 (  0120):    4.33   0.275    5.25    41.33
      ==========================================================
      ID = 1 (  0022):   14.94   0.636    5.50    40.99

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0102)|  Area    (ha)=   7.24   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.30

    Unit Hyd Qpeak  (cms)=   0.916

    PEAK FLOW      (cms)=   0.643 (i)
    TIME TO PEAK   (hrs)=   4.917
    RUNOFF VOLUME   (mm)=  39.256
    TOTAL RAINFALL  (mm)=  77.381
    RUNOFF COEFFICIENT  =   0.507

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

---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0126)|  Area    (ha)=   1.06   Curve Number   (CN)= 79.1
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.62

    Unit Hyd Qpeak  (cms)=   0.066

    PEAK FLOW      (cms)=   0.053 (i)
    TIME TO PEAK   (hrs)=   5.333
    RUNOFF VOLUME   (mm)=  36.025
    TOTAL RAINFALL  (mm)=  77.381
    RUNOFF COEFFICIENT  =   0.466

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

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



```
| CALIB          |
| NASHYD  (  0124)|  Area    (ha)=   0.71   Curve Number   (CN)= 85.4
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.25

    Unit Hyd Qpeak  (cms)=   0.109

    PEAK FLOW      (cms)=   0.080 (i)
    TIME TO PEAK   (hrs)=   4.833
    RUNOFF VOLUME   (mm)=  43.490
    TOTAL RAINFALL  (mm)=  77.381
    RUNOFF COEFFICIENT  =   0.562

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

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


-------------------
| ADD HYD  (  0027)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
-------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0102):    7.24   0.643    4.92    39.26
    + ID2= 2 (  0124):    0.71   0.080    4.83    43.49
      ==========================================================
      ID = 3 (  0027):    7.95   0.721    4.92    39.63

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


-------------------
| ADD HYD  (  0027)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK    R.V.
-------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0027):    7.95   0.721    4.92    39.63
    + ID2= 2 (  0126):    1.06   0.053    5.33    36.02
      ==========================================================
      ID = 1 (  0027):    9.01   0.756    4.92    39.21

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0125)|  Area    (ha)=   0.18   Curve Number   (CN)= 84.3
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.18

    Unit Hyd Qpeak  (cms)=   0.037

    PEAK FLOW      (cms)=   0.023 (i)
    TIME TO PEAK   (hrs)=   4.750
    RUNOFF VOLUME   (mm)=  41.978
    TOTAL RAINFALL  (mm)=  77.381
    RUNOFF COEFFICIENT  =   0.542
```



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

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


-------------------
| ADD HYD  (  0023)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
-------------------       (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0125):    0.18   0.023    4.75    41.98
    + ID2= 2 (  0027):    9.01   0.756    4.92    39.21
      ==========================================================
      ID = 3 (  0023):    9.19   0.775    4.92    39.26

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0121)|  Area    (ha)=   2.12   Curve Number   (CN)= 83.3
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.93

    Unit Hyd Qpeak  (cms)=   0.087

    PEAK FLOW      (cms)=   0.090 (i)
    TIME TO PEAK   (hrs)=   5.667
    RUNOFF VOLUME   (mm)=  40.835
    TOTAL RAINFALL  (mm)=  77.381
    RUNOFF COEFFICIENT  =   0.528

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

---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0105)|  Area    (ha)=   9.75   Curve Number   (CN)= 83.8
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.82

    Unit Hyd Qpeak  (cms)=   0.455

    PEAK FLOW      (cms)=   0.463 (i)
    TIME TO PEAK   (hrs)=   5.583
    RUNOFF VOLUME   (mm)=  41.457
    TOTAL RAINFALL  (mm)=  77.381
    RUNOFF COEFFICIENT  =   0.536

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

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


-------------------
| ADD HYD  (  0019)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
-------------------       (ha)   (cms)   (hrs)    (mm)
```

```
     ID1= 1 (  0105):    9.75  0.463    5.58   41.46
   + ID2= 2 (  0121):    2.12  0.090    5.67   40.83
     ==============================================
     ID = 3 (  0019):   11.87  0.552    5.58   41.35

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0104)|  Area    (ha)=   3.63   Curve Number   (CN)= 82.6
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.59

   Unit Hyd Qpeak  (cms)=   0.233

   PEAK FLOW      (cms)=   0.209 (i)
   TIME TO PEAK   (hrs)=   5.250
   RUNOFF VOLUME  (mm)=  39.982
   TOTAL RAINFALL (mm)=  77.381
   RUNOFF COEFFICIENT  =   0.517

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0106)|  Area    (ha)=   1.27   Curve Number   (CN)= 80.8
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.67

   Unit Hyd Qpeak  (cms)=   0.072

   PEAK FLOW      (cms)=   0.063 (i)
   TIME TO PEAK   (hrs)=   5.417
   RUNOFF VOLUME  (mm)=  37.887
   TOTAL RAINFALL (mm)=  77.381
   RUNOFF COEFFICIENT  =   0.490

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

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

--------------------
| ADD HYD  (  0029)|
|  1 +  2 =  3   |      AREA    QPEAK    TPEAK    R.V.
--------------------      (ha)   (cms)   (hrs)    (mm)
     ID1= 1 (  0104):    3.63  0.209    5.25   39.98
   + ID2= 2 (  0106):    1.27  0.063    5.42   37.89
     ==============================================
     ID = 3 (  0029):    4.90  0.271    5.33   39.44

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



```
--------------------
| ADD HYD  (  0029)|
|  3 +  2 =  1   |      AREA    QPEAK    TPEAK    R.V.
--------------------      (ha)   (cms)   (hrs)    (mm)
     ID1= 3 (  0029):    4.90  0.271    5.33   39.44
   + ID2= 2 (  0019):   11.87  0.552    5.58   41.35
     ==============================================
     ID = 1 (  0029):   16.77  0.807    5.50   40.79

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0123)|  Area    (ha)=   1.39   Curve Number   (CN)= 86.8
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.48

   Unit Hyd Qpeak  (cms)=   0.110

   PEAK FLOW      (cms)=   0.108 (i)
   TIME TO PEAK   (hrs)=   5.167
   RUNOFF VOLUME  (mm)=  45.438
   TOTAL RAINFALL (mm)=  77.381
   RUNOFF COEFFICIENT  =   0.587

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

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

 --------------------------
 | Junction Command(0030) |
 --------------------------

                  AREA     QPEAK   TPEAK    R.V.
                  (ha)     (cms)   (hrs)    (mm)
 INFLOW : ID= 2(  0123)    1.39     0.11    5.17    45.44
 OUTFLOW: ID= 2(  0030)    1.39     0.11    5.17    45.44

 ------------------------------------------------------------------------------
================================================================================
====================

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

     OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
    O   O    T      T    H   H   Y Y   MM MM  O   O
    O   O    T      T    H   H    Y    M M M  O   O
     OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
```



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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\102a9324-992d-48ea-80e2-e5381487ff71\sc
  Summary filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\102a9324-992d-48ea-80e2-e5381487ff71\sc


DATE: 08/19/2024                    TIME: 11:11:30

USER:


COMMENTS: _____


--------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 2yr 12hr 5min Chicago         **
  ************************************************

--------------------
| CHICAGO STORM    |   IDF curve parameters: A= 632.129
| Ptotal= 42.50 mm |                    B=   6.000
--------------------                    C=   0.787
                  used in:   INTENSITY =  A / (t + B)^C

                  Duration of storm  = 12.00 hrs
                  Storm time step    =  5.00 min
                  Time to peak ratio =  0.38

            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
             hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
            0.00    0.79 |  3.00    1.96 |  6.00    2.96 |  9.00    1.17
            0.08    0.80 |  3.08    2.06 |  6.08    2.82 |  9.08    1.15
            0.17    0.81 |  3.17    2.17 |  6.17    2.70 |  9.17    1.14
            0.25    0.82 |  3.25    2.29 |  6.25    2.59 |  9.25    1.12
            0.33    0.84 |  3.33    2.44 |  6.33    2.49 |  9.33    1.10
            0.42    0.85 |  3.42    2.60 |  6.42    2.39 |  9.42    1.09
            0.50    0.87 |  3.50    2.79 |  6.50    2.31 |  9.50    1.07
            0.58    0.88 |  3.58    3.01 |  6.58    2.23 |  9.58    1.06
            0.67    0.90 |  3.67    3.28 |  6.67    2.15 |  9.67    1.04
            0.75    0.91 |  3.75    3.61 |  6.75    2.09 |  9.75    1.03
            0.83    0.93 |  3.83    4.02 |  6.83    2.02 |  9.83    1.02
            0.92    0.95 |  3.92    4.55 |  6.92    1.96 |  9.92    1.01
            1.00    0.97 |  4.00    5.26 |  7.00    1.91 | 10.00    0.99
            1.08    0.99 |  4.08    6.26 |  7.08    1.86 | 10.08    0.98
            1.17    1.01 |  4.17    7.80 |  7.17    1.81 | 10.17    0.97
```



```
            1.25    1.03 |  4.25   10.43 |  7.25    1.76 | 10.25    0.96
            1.33    1.05 |  4.33   16.00 |  7.33    1.72 | 10.33    0.95
            1.42    1.07 |  4.42   34.76 |  7.42    1.68 | 10.42    0.94
            1.50    1.10 |  4.50   95.77 |  7.50    1.64 | 10.50    0.92
            1.58    1.12 |  4.58   41.27 |  7.58    1.60 | 10.58    0.91
            1.67    1.15 |  4.67   22.67 |  7.67    1.56 | 10.67    0.90
            1.75    1.18 |  4.75   15.51 |  7.75    1.53 | 10.75    0.89
            1.83    1.21 |  4.83   11.79 |  7.83    1.50 | 10.83    0.88
            1.92    1.24 |  4.92    9.54 |  7.92    1.47 | 10.92    0.88
            2.00    1.28 |  5.00    8.03 |  8.00    1.44 | 11.00    0.87
            2.08    1.31 |  5.08    6.95 |  8.08    1.41 | 11.08    0.86
            2.17    1.35 |  5.17    6.13 |  8.17    1.39 | 11.17    0.85
            2.25    1.39 |  5.25    5.50 |  8.25    1.36 | 11.25    0.84
            2.33    1.44 |  5.33    5.00 |  8.33    1.34 | 11.33    0.83
            2.42    1.48 |  5.42    4.58 |  8.42    1.31 | 11.42    0.82
            2.50    1.54 |  5.50    4.24 |  8.50    1.29 | 11.50    0.82
            2.58    1.59 |  5.58    3.94 |  8.58    1.27 | 11.58    0.81
            2.67    1.65 |  5.67    3.69 |  8.67    1.25 | 11.67    0.80
            2.75    1.72 |  5.75    3.47 |  8.75    1.23 | 11.75    0.79
            2.83    1.79 |  5.83    3.28 |  8.83    1.21 | 11.83    0.79
            2.92    1.87 |  5.92    3.11 |  8.92    1.19 | 11.92    0.78


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0122)|  Area    (ha)=   3.16   Curve Number   (CN)= 82.6
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.66

   Unit Hyd Qpeak  (cms)=   0.182

   PEAK FLOW      (cms)=   0.049 (i)
   TIME TO PEAK   (hrs)=   5.417
   RUNOFF VOLUME  (mm)=  14.161
   TOTAL RAINFALL (mm)=  42.504
   RUNOFF COEFFICIENT  =   0.333

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0103)|  Area    (ha)=   1.41   Curve Number   (CN)= 83.7
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.26

   Unit Hyd Qpeak  (cms)=   0.209

   PEAK FLOW      (cms)=   0.043 (i)
   TIME TO PEAK   (hrs)=   4.833
   RUNOFF VOLUME  (mm)=  14.824
   TOTAL RAINFALL (mm)=  42.504
   RUNOFF COEFFICIENT  =   0.349
```

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

| ADD HYD (0020)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0103): 1.41 0.043 4.83 14.82
+ ID2= 2 (0122): 3.16 0.049 5.42 14.16
==========
ID = 3 (0020): 4.57 0.076 5.08 14.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0120)| Area (ha)= 4.33 Curve Number (CN)= 83.7
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.302

PEAK FLOW (cms)= 0.081 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 14.834
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.349

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

| CALIB |
| NASHYD (0100)| Area (ha)= 10.57 Curve Number (CN)= 83.3
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 1.02

Unit Hyd Qpeak (cms)= 0.395

PEAK FLOW (cms)= 0.125 (i)
TIME TO PEAK (hrs)= 5.917
RUNOFF VOLUME (mm)= 14.585
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.343

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

| CALIB |
| NASHYD (0101)| Area (ha)= 0.04 Curve Number (CN)= 87.5
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00

---------- U.H. Tp(hrs)= 0.09

Unit Hyd Qpeak (cms)= 0.018

PEAK FLOW (cms)= 0.003 (i)
TIME TO PEAK (hrs)= 4.667
RUNOFF VOLUME (mm)= 16.774
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.395

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

| ADD HYD (0022)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0100): 10.57 0.125 5.92 14.58
+ ID2= 2 (0101): 0.04 0.003 4.67 16.77
==========
ID = 3 (0022): 10.61 0.125 5.92 14.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0022)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 3 (0022): 10.61 0.125 5.92 14.59
+ ID2= 2 (0120): 4.33 0.081 5.25 14.83
==========
ID = 1 (0022): 14.94 0.189 5.58 14.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0102)| Area (ha)= 7.24 Curve Number (CN)= 82.0
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.30

Unit Hyd Qpeak (cms)= 0.916

PEAK FLOW (cms)= 0.185 (i)
TIME TO PEAK (hrs)= 4.917
RUNOFF VOLUME (mm)= 13.807
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.325

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

| CALIB |
| NASHYD (0126)| Area (ha)= 1.06 Curve Number (CN)= 79.1
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.62

Unit Hyd Qpeak (cms)= 0.066

PEAK FLOW (cms)= 0.015 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 12.282
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.289

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

| CALIB |
| NASHYD (0124)| Area (ha)= 0.71 Curve Number (CN)= 85.4
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.25

Unit Hyd Qpeak (cms)= 0.109

PEAK FLOW (cms)= 0.024 (i)
TIME TO PEAK (hrs)= 4.833
RUNOFF VOLUME (mm)= 15.957
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.375

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

| ADD HYD (0027)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0102): 7.24 0.185 4.92 13.81
+ ID2= 2 (0124): 0.71 0.024 4.83 15.96
==========
ID = 3 (0027): 7.95 0.208 4.92 14.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0027)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 3 (0027): 7.95 0.208 4.92 14.00
+ ID2= 2 (0126): 1.06 0.015 5.33 12.28
==========

ID = 1 (0027): 9.01 0.218 4.92 13.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0125)| Area (ha)= 0.18 Curve Number (CN)= 84.3
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.18

Unit Hyd Qpeak (cms)= 0.037

PEAK FLOW (cms)= 0.007 (i)
TIME TO PEAK (hrs)= 4.750
RUNOFF VOLUME (mm)= 15.179
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.357

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

| ADD HYD (0023)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0125): 0.18 0.007 4.75 15.18
+ ID2= 2 (0027): 9.01 0.218 4.92 13.80
==========
ID = 3 (0023): 9.19 0.224 4.92 13.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0121)| Area (ha)= 2.12 Curve Number (CN)= 83.3
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.93

Unit Hyd Qpeak (cms)= 0.087

PEAK FLOW (cms)= 0.027 (i)
TIME TO PEAK (hrs)= 5.750
RUNOFF VOLUME (mm)= 14.584
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.343

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

| CALIB |
| NASHYD (0105)| Area (ha)= 9.75 Curve Number (CN)= 83.8
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00

```
---------- U.H. Tp(hrs)= 0.82

    Unit Hyd Qpeak (cms)= 0.455

    PEAK FLOW      (cms)= 0.138 (i)
    TIME TO PEAK   (hrs)= 5.667
    RUNOFF VOLUME  (mm)= 14.898
    TOTAL RAINFALL (mm)= 42.504
    RUNOFF COEFFICIENT = 0.351

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

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

------------------
| ADD HYD ( 0019)|
|  1 + 2 = 3   |      AREA   QPEAK   TPEAK   R.V.
------------------      (ha)   (cms)   (hrs)   (mm)
      ID1= 1 ( 0105):    9.75  0.138    5.67   14.90
    + ID2= 2 ( 0121):    2.12  0.027    5.75   14.58
      ==========================================
      ID = 3 ( 0019):   11.87  0.165    5.67   14.84

    NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
------------------
| CALIB          |
| NASHYD ( 0104)|  Area   (ha)=  3.63  Curve Number  (CN)= 82.6
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
------------------ U.H. Tp(hrs)= 0.59

    Unit Hyd Qpeak (cms)= 0.233

    PEAK FLOW      (cms)= 0.061 (i)
    TIME TO PEAK   (hrs)= 5.333
    RUNOFF VOLUME  (mm)= 14.161
    TOTAL RAINFALL (mm)= 42.504
    RUNOFF COEFFICIENT = 0.333

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

-------------------------------------------------------------------------------
------------------
| CALIB          |
| NASHYD ( 0106)|  Area   (ha)=  1.27  Curve Number  (CN)= 80.8
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
------------------ U.H. Tp(hrs)= 0.67

    Unit Hyd Qpeak (cms)= 0.072

    PEAK FLOW      (cms)= 0.018 (i)
    TIME TO PEAK   (hrs)= 5.417
    RUNOFF VOLUME  (mm)= 13.148
    TOTAL RAINFALL (mm)= 42.504
```



```
    RUNOFF COEFFICIENT = 0.309

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

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

------------------
| ADD HYD ( 0029)|
|  1 + 2 = 3   |      AREA   QPEAK   TPEAK   R.V.
------------------      (ha)   (cms)   (hrs)   (mm)
      ID1= 1 ( 0104):    3.63  0.061    5.33   14.16
    + ID2= 2 ( 0106):    1.27  0.018    5.42   13.15
      ==========================================
      ID = 3 ( 0029):    4.90  0.079    5.33   13.90

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

------------------
| ADD HYD ( 0029)|
|  3 + 2 = 1   |      AREA   QPEAK   TPEAK   R.V.
------------------      (ha)   (cms)   (hrs)   (mm)
      ID1= 3 ( 0029):    4.90  0.079    5.33   13.90
    + ID2= 2 ( 0019):   11.87  0.165    5.67   14.84
      ==========================================
      ID = 1 ( 0029):   16.77  0.238    5.50   14.57

    NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
------------------
| CALIB          |
| NASHYD ( 0123)|  Area   (ha)=  1.39  Curve Number  (CN)= 86.8
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
------------------ U.H. Tp(hrs)= 0.48

    Unit Hyd Qpeak (cms)= 0.110

    PEAK FLOW      (cms)= 0.033 (i)
    TIME TO PEAK   (hrs)= 5.167
    RUNOFF VOLUME  (mm)= 17.002
    TOTAL RAINFALL (mm)= 42.504
    RUNOFF COEFFICIENT = 0.400

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

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

 -------------------------
 | Junction Command(0030) |
 -------------------------

                    AREA    QPEAK   TPEAK    R.V.
                    (ha)    (cms)   (hrs)    (mm)
 INFLOW : ID= 2(  0123)   1.39    0.03    5.17    17.00
```



```
 OUTFLOW: ID= 2(  0030)   1.39    0.03    5.17    17.00

 -------------------------------------------------------------------------------
================================================================================
====================

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

       OOO  TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O   T      T    H   H   Y Y   MM MM  O   O
      O   O   T      T    H   H    Y    M M M  O   O
       OOO    T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\c9e5f5ab-2126-4329-9a34-062992913feb\sc
  Summary filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\c9e5f5ab-2126-4329-9a34-062992913feb\sc


DATE: 08/19/2024                      TIME: 11:11:33

USER:



COMMENTS: _____


---------------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : 50yr 12hr 5min Chicago       **
  ************************************************

---------------------
| CHICAGO STORM    |   IDF curve parameters: A=2353.333
| Ptotal= 86.68 mm |                    B=  13.500
---------------------                    C=   0.877
                  used in:   INTENSITY =  A / (t + B)^C

                  Duration of storm  = 12.00 hrs
                  Storm time step    =  5.00 min
                  Time to peak ratio =  0.38
```


TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	1.02	3.00	3.18	6.00	5.43	9.00	1.66
0.08	1.04	3.08	3.39	6.08	5.10	9.08	1.62
0.17	1.06	3.17	3.63	6.17	4.81	9.17	1.60
0.25	1.08	3.25	3.90	6.25	4.56	9.25	1.57
0.33	1.10	3.33	4.21	6.33	4.33	9.33	1.54
0.42	1.12	3.42	4.58	6.42	4.12	9.42	1.51
0.50	1.15	3.50	5.03	6.50	3.93	9.50	1.49
0.58	1.17	3.58	5.56	6.58	3.75	9.58	1.46
0.67	1.19	3.67	6.21	6.67	3.59	9.67	1.44
0.75	1.22	3.75	7.04	6.75	3.45	9.75	1.42
0.83	1.25	3.83	8.10	6.83	3.31	9.83	1.39
0.92	1.28	3.92	9.51	6.92	3.19	9.92	1.37
1.00	1.31	4.00	11.46	7.00	3.07	10.00	1.35
1.08	1.34	4.08	14.31	7.08	2.96	10.08	1.33
1.17	1.37	4.17	18.78	7.17	2.87	10.17	1.31
1.25	1.41	4.25	26.57	7.25	2.77	10.25	1.29
1.33	1.45	4.33	42.60	7.33	2.68	10.33	1.28
1.42	1.49	4.42	87.70	7.42	2.60	10.42	1.26
1.50	1.53	4.50	182.13	7.50	2.53	10.50	1.24
1.58	1.57	4.58	101.91	7.58	2.45	10.58	1.22
1.67	1.62	4.67	60.53	7.67	2.38	10.67	1.21
1.75	1.67	4.75	41.28	7.75	2.32	10.75	1.19
1.83	1.72	4.83	30.58	7.83	2.26	10.83	1.18
1.92	1.78	4.92	23.92	7.92	2.20	10.92	1.16
2.00	1.84	5.00	19.45	8.00	2.15	11.00	1.15
2.08	1.91	5.08	16.28	8.08	2.09	11.08	1.13
2.17	1.98	5.17	13.94	8.17	2.04	11.17	1.12
2.25	2.06	5.25	12.14	8.25	2.00	11.25	1.10
2.33	2.14	5.33	10.73	8.33	1.95	11.33	1.09
2.42	2.23	5.42	9.60	8.42	1.91	11.42	1.08
2.50	2.33	5.50	8.67	8.50	1.87	11.50	1.07
2.58	2.44	5.58	7.90	8.58	1.83	11.58	1.05
2.67	2.56	5.67	7.25	8.67	1.79	11.67	1.04
2.75	2.69	5.75	6.69	8.75	1.76	11.75	1.03
2.83	2.84	5.83	6.21	8.83	1.72	11.83	1.02
2.92	3.00	5.92	5.79	8.92	1.69	11.92	1.01

```
-------------------------------------------------------------------------------
------------------
| CALIB          |
| NASHYD ( 0122)|  Area   (ha)=  3.16  Curve Number  (CN)= 82.6
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
------------------ U.H. Tp(hrs)= 0.66

    Unit Hyd Qpeak (cms)= 0.182

    PEAK FLOW      (cms)= 0.207 (i)
    TIME TO PEAK   (hrs)= 5.333
    RUNOFF VOLUME  (mm)= 47.666
    TOTAL RAINFALL (mm)= 86.678
```

```
    RUNOFF COEFFICIENT  =  0.550

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

---------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0103)|  Area   (ha)=  1.41  Curve Number  (CN)= 83.7
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=  0.26

    Unit Hyd Qpeak  (cms)=  0.209

    PEAK FLOW      (cms)=  0.179 (i)
    TIME TO PEAK   (hrs)=  4.833
    RUNOFF VOLUME  (mm)=  49.124
    TOTAL RAINFALL  (mm)=  86.678
    RUNOFF COEFFICIENT  =  0.567

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

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


--------------------
| ADD HYD  (  0020)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0103):    1.41   0.179    4.83    49.12
    + ID2= 2 (  0122):    3.16   0.207    5.33    47.67
     ==========================================
      ID = 3 (  0020):    4.57   0.322    5.00    48.12

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0120)|  Area   (ha)=  4.33  Curve Number  (CN)= 83.7
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=  0.55

    Unit Hyd Qpeak  (cms)=  0.302

    PEAK FLOW      (cms)=  0.339 (i)
    TIME TO PEAK   (hrs)=  5.250
    RUNOFF VOLUME  (mm)=  49.157
    TOTAL RAINFALL  (mm)=  86.678
    RUNOFF COEFFICIENT  =  0.567

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

---------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0100)|  Area   (ha)=  10.57  Curve Number  (CN)= 83.3
```



```
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=  1.02

    Unit Hyd Qpeak  (cms)=  0.395

    PEAK FLOW      (cms)=  0.513 (i)
    TIME TO PEAK   (hrs)=  5.833
    RUNOFF VOLUME  (mm)=  48.610
    TOTAL RAINFALL  (mm)=  86.678
    RUNOFF COEFFICIENT  =  0.561

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

---------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0101)|  Area   (ha)=  0.04  Curve Number  (CN)= 87.5
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=  0.09

    Unit Hyd Qpeak  (cms)=  0.018

    PEAK FLOW      (cms)=  0.009 (i)
    TIME TO PEAK   (hrs)=  4.667
    RUNOFF VOLUME  (mm)=  52.322
    TOTAL RAINFALL  (mm)=  86.678
    RUNOFF COEFFICIENT  =  0.604

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

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


--------------------
| ADD HYD  (  0022)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0100):   10.57   0.513    5.83    48.61
    + ID2= 2 (  0101):    0.04   0.009    4.67    52.32
     ==========================================
      ID = 3 (  0022):   10.61   0.514    5.83    48.62

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


--------------------
| ADD HYD  (  0022)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK    R.V.
--------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0022):   10.61   0.514    5.83    48.62
    + ID2= 2 (  0120):    4.33   0.339    5.25    49.16
     ==========================================
      ID = 1 (  0022):   14.94   0.784    5.50    48.78

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



```
---------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0102)|  Area   (ha)=  7.24  Curve Number  (CN)= 82.0
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=  0.30

    Unit Hyd Qpeak  (cms)=  0.916

    PEAK FLOW      (cms)=  0.795 (i)
    TIME TO PEAK   (hrs)=  4.917
    RUNOFF VOLUME  (mm)=  46.858
    TOTAL RAINFALL  (mm)=  86.678
    RUNOFF COEFFICIENT  =  0.541

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

---------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0126)|  Area   (ha)=  1.06  Curve Number  (CN)= 79.1
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=  0.62

    Unit Hyd Qpeak  (cms)=  0.066

    PEAK FLOW      (cms)=  0.066 (i)
    TIME TO PEAK   (hrs)=  5.333
    RUNOFF VOLUME  (mm)=  43.247
    TOTAL RAINFALL  (mm)=  86.678
    RUNOFF COEFFICIENT  =  0.499

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

---------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0124)|  Area   (ha)=  0.71  Curve Number  (CN)= 85.4
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=  0.25

    Unit Hyd Qpeak  (cms)=  0.109

    PEAK FLOW      (cms)=  0.098 (i)
    TIME TO PEAK   (hrs)=  4.833
    RUNOFF VOLUME  (mm)=  51.529
    TOTAL RAINFALL  (mm)=  86.678
    RUNOFF COEFFICIENT  =  0.594

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

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


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



```
| ADD HYD  (  0027)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0102):    7.24   0.795    4.92    46.86
    + ID2= 2 (  0124):    0.71   0.098    4.83    51.53
     ==========================================
      ID = 3 (  0027):    7.95   0.890    4.92    47.28

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


--------------------
| ADD HYD  (  0027)|
|  3 +  2 =  1   |       AREA    QPEAK    TPEAK    R.V.
--------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0027):    7.95   0.890    4.92    47.28
    + ID2= 2 (  0126):    1.06   0.066    5.33    43.25
     ==========================================
      ID = 1 (  0027):    9.01   0.935    4.92    46.80

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0125)|  Area   (ha)=  0.18  Curve Number  (CN)= 84.3
|ID= 1 DT= 5.0 min |  Ia     (mm)=  7.00  # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=  0.18

    Unit Hyd Qpeak  (cms)=  0.037

    PEAK FLOW      (cms)=  0.028 (i)
    TIME TO PEAK   (hrs)=  4.750
    RUNOFF VOLUME  (mm)=  49.861
    TOTAL RAINFALL  (mm)=  86.678
    RUNOFF COEFFICIENT  =  0.575

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

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


--------------------
| ADD HYD  (  0023)|
|  1 +  2 =  3   |       AREA    QPEAK    TPEAK    R.V.
--------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0125):    0.18   0.028    4.75    49.86
    + ID2= 2 (  0027):    9.01   0.935    4.92    46.80
     ==========================================
      ID = 3 (  0023):    9.19   0.958    4.92    46.86

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
--------------------
| CALIB           |
| NASHYD  (  0121)|  Area   (ha)=  2.12  Curve Number  (CN)= 83.3
```

|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.93

Unit Hyd Qpeak (cms)= 0.087

PEAK FLOW (cms)= 0.111 (i)
TIME TO PEAK (hrs)= 5.667
RUNOFF VOLUME (mm)= 48.610
TOTAL RAINFALL (mm)= 86.678
RUNOFF COEFFICIENT = 0.561

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

| CALIB |
| NASHYD (0105)| Area (ha)= 9.75 Curve Number (CN)= 83.8
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.82

Unit Hyd Qpeak (cms)= 0.455

PEAK FLOW (cms)= 0.569 (i)
TIME TO PEAK (hrs)= 5.583
RUNOFF VOLUME (mm)= 49.297
TOTAL RAINFALL (mm)= 86.678
RUNOFF COEFFICIENT = 0.569

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

| ADD HYD (0019)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0105): 9.75 0.569 5.58 49.30
+ ID2= 2 (0121): 2.12 0.111 5.67 48.61
==========
ID = 3 (0019): 11.87 0.679 5.58 49.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0104)| Area (ha)= 3.63 Curve Number (CN)= 82.6
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.59

Unit Hyd Qpeak (cms)= 0.233

PEAK FLOW (cms)= 0.258 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 47.666

TOTAL RAINFALL (mm)= 86.678
RUNOFF COEFFICIENT = 0.550

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

| CALIB |
| NASHYD (0106)| Area (ha)= 1.27 Curve Number (CN)= 80.8
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.67

Unit Hyd Qpeak (cms)= 0.072

PEAK FLOW (cms)= 0.078 (i)
TIME TO PEAK (hrs)= 5.417
RUNOFF VOLUME (mm)= 45.334
TOTAL RAINFALL (mm)= 86.678
RUNOFF COEFFICIENT = 0.523

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

| ADD HYD (0029)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0104): 3.63 0.258 5.25 47.67
+ ID2= 2 (0106): 1.27 0.078 5.42 45.33
==========
ID = 3 (0029): 4.90 0.336 5.33 47.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0029)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 3 (0029): 4.90 0.336 5.33 47.06
+ ID2= 2 (0019): 11.87 0.679 5.58 49.17
==========
ID = 1 (0029): 16.77 0.995 5.50 48.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0123)| Area (ha)= 1.39 Curve Number (CN)= 86.8
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
---------- U.H. Tp(hrs)= 0.48

Unit Hyd Qpeak (cms)= 0.110

PEAK FLOW (cms)= 0.132 (i)
TIME TO PEAK (hrs)= 5.167
RUNOFF VOLUME (mm)= 53.659
TOTAL RAINFALL (mm)= 86.678
RUNOFF COEFFICIENT = 0.619

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

| Junction Command(0030) |

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2(0123) 1.39 0.13 5.17 53.66
OUTFLOW: ID= 2(0030) 1.39 0.13 5.17 53.66

FINISH

==========

==========

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

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO
Developed and Distributed by Smart City Water Inc

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\6e387a51-8324-4cf7-8c75-29970a772c4a\sc
Summary filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\6e387a51-8324-4cf7-8c75-29970a772c4a\sc

DATE: 08/19/2024 TIME: 11:11:31

USER:

COMMENTS: _____

****
** SIMULATION : 5yr 12hr 5min Chicago **
****

| CHICAGO STORM | IDF curve parameters: A= 983.699
| Ptotal= 55.97 mm | B= 8.100
---------- C= 0.812
used in: INTENSITY = A / (t + B)^C

Duration of storm = 12.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.38

| TIME RAIN | TIME RAIN |' TIME RAIN | TIME RAIN
| hrs mm/hr | hrs mm/hr |' hrs mm/hr | hrs mm/hr
| 0.00 0.93 | 3.00 2.44 | 6.00 3.79 | 9.00 1.41
| 0.08 0.95 | 3.08 2.57 | 6.08 3.61 | 9.08 1.39
| 0.17 0.96 | 3.17 2.72 | 6.17 3.44 | 9.17 1.37
| 0.25 0.98 | 3.25 2.89 | 6.25 3.29 | 9.25 1.35
| 0.33 0.99 | 3.33 3.08 | 6.33 3.15 | 9.33 1.33
| 0.42 1.01 | 3.42 3.30 | 6.42 3.02 | 9.42 1.31
| 0.50 1.03 | 3.50 3.56 | 6.50 2.91 | 9.50 1.29
| 0.58 1.05 | 3.58 3.87 | 6.58 2.80 | 9.58 1.27
| 0.67 1.07 | 3.67 4.24 | 6.67 2.70 | 9.67 1.25
| 0.75 1.09 | 3.75 4.70 | 6.75 2.61 | 9.75 1.24
| 0.83 1.11 | 3.83 5.28 | 6.83 2.52 | 9.83 1.22
| 0.92 1.13 | 3.92 6.03 | 6.92 2.45 | 9.92 1.20
| 1.00 1.15 | 4.00 7.05 | 7.00 2.37 | 10.00 1.19
| 1.08 1.18 | 4.08 8.52 | 7.08 2.30 | 10.08 1.17
| 1.17 1.20 | 4.17 10.78 | 7.17 2.24 | 10.17 1.16
| 1.25 1.23 | 4.25 14.69 | 7.25 2.18 | 10.25 1.14
| 1.33 1.26 | 4.33 22.94 | 7.33 2.12 | 10.33 1.13
| 1.42 1.29 | 4.42 49.28 | 7.42 2.07 | 10.42 1.12
| 1.50 1.32 | 4.50 121.80 | 7.50 2.02 | 10.50 1.10
| 1.58 1.35 | 4.58 58.14 | 7.58 1.97 | 10.58 1.09
| 1.67 1.39 | 4.67 32.66 | 7.67 1.92 | 10.67 1.08
| 1.75 1.42 | 4.75 22.23 | 7.75 1.88 | 10.75 1.06
| 1.83 1.46 | 4.83 16.72 | 7.83 1.84 | 10.83 1.05
| 1.92 1.50 | 4.92 13.36 | 7.92 1.80 | 10.92 1.04
| 2.00 1.55 | 5.00 11.12 | 8.00 1.76 | 11.00 1.03
| 2.08 1.59 | 5.08 9.52 | 8.08 1.72 | 11.08 1.02
| 2.17 1.64 | 5.17 8.33 | 8.17 1.69 | 11.17 1.01
| 2.25 1.70 | 5.25 7.41 | 8.25 1.66 | 11.25 1.00

```
              2.33   1.75 |  5.33   6.68 |  8.33   1.62 | 11.33   0.99
              2.42   1.82 |  5.42   6.08 |  8.42   1.59 | 11.42   0.98
              2.50   1.88 |  5.50   5.59 |  8.50   1.56 | 11.50   0.97
              2.58   1.96 |  5.58   5.17 |  8.58   1.54 | 11.58   0.96
              2.67   2.04 |  5.67   4.82 |  8.67   1.51 | 11.67   0.95
              2.75   2.12 |  5.75   4.51 |  8.75   1.48 | 11.75   0.94
              2.83   2.22 |  5.83   4.24 |  8.83   1.46 | 11.83   0.93
              2.92   2.33 |  5.92   4.00 |  8.92   1.44 | 11.92   0.92


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0122)|  Area    (ha)=   3.16   Curve Number   (CN)= 82.6
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.66

    Unit Hyd Qpeak  (cms)=   0.182

    PEAK FLOW      (cms)=   0.089 (i)
    TIME TO PEAK   (hrs)=   5.417
    RUNOFF VOLUME   (mm)=  23.399
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =   0.418

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0103)|  Area    (ha)=   1.41   Curve Number   (CN)= 83.7
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.26

    Unit Hyd Qpeak  (cms)=   0.209

    PEAK FLOW      (cms)=   0.078 (i)
    TIME TO PEAK   (hrs)=   4.833
    RUNOFF VOLUME   (mm)=  24.343
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =   0.435

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

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


--------------------
| ADD HYD  (  0020)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0103):    1.41   0.078    4.83    24.34
    + ID2= 2 (  0122):    3.16   0.089    5.42    23.40
     ==============================================
      ID = 3 (  0020):    4.57   0.137    5.08    23.69
```



```
--------------------
| ADD HYD  (  0022)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0100):   10.57   0.223    5.83    24.01
    + ID2= 2 (  0101):    0.04   0.004    4.67    26.88
     ==============================================
      ID = 3 (  0022):   10.61   0.223    5.83    24.02

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


--------------------
| ADD HYD  (  0022)|
|  3 +  2 =  1    |       AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0022):   10.61   0.223    5.83    24.02
    + ID2= 2 (  0120):    4.33   0.146    5.25    24.36
     ==============================================
      ID = 1 (  0022):   14.94   0.338    5.58    24.12

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0102)|  Area    (ha)=   7.24   Curve Number   (CN)= 82.0
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.30

    Unit Hyd Qpeak  (cms)=   0.916

    PEAK FLOW      (cms)=   0.337 (i)
    TIME TO PEAK   (hrs)=   4.917
    RUNOFF VOLUME   (mm)=  22.889
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =   0.409

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0126)|  Area    (ha)=   1.06   Curve Number   (CN)= 79.1
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.62

    Unit Hyd Qpeak  (cms)=   0.066

    PEAK FLOW      (cms)=   0.027 (i)
    TIME TO PEAK   (hrs)=   5.333
    RUNOFF VOLUME   (mm)=  20.655
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =   0.369
```



```
    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0120)|  Area    (ha)=   4.33   Curve Number   (CN)= 83.7
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.55

    Unit Hyd Qpeak  (cms)=   0.302

    PEAK FLOW      (cms)=   0.146 (i)
    TIME TO PEAK   (hrs)=   5.250
    RUNOFF VOLUME   (mm)=  24.360
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =   0.435

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0100)|  Area    (ha)=  10.57   Curve Number   (CN)= 83.3
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   1.02

    Unit Hyd Qpeak  (cms)=   0.395

    PEAK FLOW      (cms)=   0.223 (i)
    TIME TO PEAK   (hrs)=   5.833
    RUNOFF VOLUME   (mm)=  24.005
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =   0.429

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0101)|  Area    (ha)=   0.04   Curve Number   (CN)= 87.5
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.09

    Unit Hyd Qpeak  (cms)=   0.018

    PEAK FLOW      (cms)=   0.004 (i)
    TIME TO PEAK   (hrs)=   4.667
    RUNOFF VOLUME   (mm)=  26.880
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =   0.480

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

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



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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0124)|  Area    (ha)=   0.71   Curve Number   (CN)= 85.4
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.25

    Unit Hyd Qpeak  (cms)=   0.109

    PEAK FLOW      (cms)=   0.043 (i)
    TIME TO PEAK   (hrs)=   4.833
    RUNOFF VOLUME   (mm)=  25.932
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =   0.463

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

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


--------------------
| ADD HYD  (  0027)|
|  1 +  2 =  3    |       AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0102):    7.24   0.337    4.92    22.89
    + ID2= 2 (  0124):    0.71   0.043    4.83    25.93
     ==============================================
      ID = 3 (  0027):    7.95   0.380    4.92    23.16

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


--------------------
| ADD HYD  (  0027)|
|  3 +  2 =  1    |       AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0027):    7.95   0.380    4.92    23.16
    + ID2= 2 (  0126):    1.06   0.027    5.33    20.66
     ==============================================
      ID = 1 (  0027):    9.01   0.398    4.92    22.87

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD  (  0125)|  Area    (ha)=   0.18   Curve Number   (CN)= 84.3
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------  U.H. Tp(hrs)=   0.18

    Unit Hyd Qpeak  (cms)=   0.037

    PEAK FLOW      (cms)=   0.012 (i)
```

```
    TIME TO PEAK    (hrs)=  4.750
    RUNOFF VOLUME   (mm)=  24.840
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =  0.444

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

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

-------------------
| ADD HYD  (  0023)|
|  1 +  2 =  3   |      AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0125):    0.18   0.012    4.75    24.84
    + ID2= 2 (  0027):    9.01   0.398    4.92    22.87
      ==========================================
      ID = 3 (  0023):    9.19   0.408    4.92    22.90

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0121)|  Area    (ha)=   2.12  Curve Number   (CN)= 83.3
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.93

    Unit Hyd Qpeak  (cms)=   0.087

    PEAK FLOW       (cms)=   0.048 (i)
    TIME TO PEAK    (hrs)=   5.750
    RUNOFF VOLUME   (mm)=  24.004
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =  0.429

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

---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0105)|  Area    (ha)=   9.75  Curve Number   (CN)= 83.8
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.82

    Unit Hyd Qpeak  (cms)=   0.455

    PEAK FLOW       (cms)=   0.247 (i)
    TIME TO PEAK    (hrs)=   5.583
    RUNOFF VOLUME   (mm)=  24.450
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =  0.437

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

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



```
-------------------
| ADD HYD  (  0019)|
|  1 +  2 =  3   |      AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0105):    9.75   0.247    5.58    24.45
    + ID2= 2 (  0121):    2.12   0.048    5.75    24.00
      ==========================================
      ID = 3 (  0019):   11.87   0.294    5.58    24.37

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0104)|  Area    (ha)=   3.63  Curve Number   (CN)= 82.6
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.59

    Unit Hyd Qpeak  (cms)=   0.233

    PEAK FLOW       (cms)=   0.110 (i)
    TIME TO PEAK    (hrs)=   5.333
    RUNOFF VOLUME   (mm)=  23.399
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =  0.418

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

---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0106)|  Area    (ha)=   1.27  Curve Number   (CN)= 80.8
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.67

    Unit Hyd Qpeak  (cms)=   0.072

    PEAK FLOW       (cms)=   0.033 (i)
    TIME TO PEAK    (hrs)=   5.417
    RUNOFF VOLUME   (mm)=  21.932
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =  0.392

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

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

-------------------
| ADD HYD  (  0029)|
|  1 +  2 =  3   |      AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 1 (  0104):    3.63   0.110    5.33    23.40
    + ID2= 2 (  0106):    1.27   0.033    5.42    21.93
      ==========================================
```

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

```
      ID = 3 (  0029):    4.90   0.143    5.33    23.02

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

-------------------
| ADD HYD  (  0029)|
|  3 +  2 =  1   |      AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)   (cms)   (hrs)    (mm)
      ID1= 3 (  0029):    4.90   0.143    5.33    23.02
    + ID2= 2 (  0019):   11.87   0.294    5.58    24.37
      ==========================================
      ID = 1 (  0029):   16.77   0.429    5.50    23.98

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------
-------------------
| CALIB          |
| NASHYD  (  0123)|  Area    (ha)=   1.39  Curve Number   (CN)= 86.8
|ID= 1 DT= 5.0 min |  Ia      (mm)=   7.00  # of Linear Res.(N)= 3.00
-------------------  U.H. Tp(hrs)=   0.48

    Unit Hyd Qpeak  (cms)=   0.110

    PEAK FLOW       (cms)=   0.059 (i)
    TIME TO PEAK    (hrs)=   5.167
    RUNOFF VOLUME   (mm)=  27.373
    TOTAL RAINFALL  (mm)=  55.968
    RUNOFF COEFFICIENT  =  0.489

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

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

 -------------------------
| Junction Command(0030) |
 -------------------------

                AREA    QPEAK   TPEAK    R.V.
                (ha)    (cms)   (hrs)    (mm)
INFLOW : ID= 2(  0123)   1.39    0.06    5.17    27.37
OUTFLOW: ID= 2(  0030)   1.39    0.06    5.17    27.37

 ---------------------------------------------------------------------------
================================================================================
====================


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

    OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
```



```
    O   O  T    T   H   H  Y Y   MM MM  O   O
    O   O  T    T   H   H   Y    M  M  O   O
     OOO   T    T   H   H   Y    M  M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\974b1075-440f-41a6-b927-769d3356253d\sc
  Summary filename: C:\Users\bweersink\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-
f883467b2a44\974b1075-440f-41a6-b927-769d3356253d\sc


DATE: 08/19/2024                    TIME: 11:11:32

USER:


COMMENTS: _____


---------------------------------------------------------------------------------------------
  ************************************************
  ** SIMULATION : Hurricane Hazel- 48hr          **
  ************************************************


-------------------
|   READ STORM    |   Filename: C:\Users\bweersink\AppD
|                 |             ata\Local\Temp\
|                 |             13796ace-156a-407f-a703-6c4af299ca3b\17cacc8e
| Ptotal=285.00 mm |   Comments: Hurricane Hazel- 48hr
-------------------
            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
             hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
            0.00    2.00 | 12.00    2.00 | 24.00    2.00 | 36.00    6.00
            0.25    2.00 | 12.25    2.00 | 24.25    2.00 | 36.25    6.00
            0.50    2.00 | 12.50    2.00 | 24.50    2.00 | 36.50    6.00
            0.75    2.00 | 12.75    2.00 | 24.75    2.00 | 36.75    6.00
            1.00    2.00 | 13.00    2.00 | 25.00    2.00 | 37.00    4.00
            1.25    2.00 | 13.25    2.00 | 25.25    2.00 | 37.25    4.00
            1.50    2.00 | 13.50    2.00 | 25.50    2.00 | 37.50    4.00
            1.75    2.00 | 13.75    2.00 | 25.75    2.00 | 37.75    4.00
            2.00    2.00 | 14.00    2.00 | 26.00    2.00 | 38.00    6.00
            2.25    2.00 | 14.25    2.00 | 26.25    2.00 | 38.25    6.00
            2.50    2.00 | 14.50    2.00 | 26.50    2.00 | 38.50    6.00
            2.75    2.00 | 14.75    2.00 | 26.75    2.00 | 38.75    6.00
            3.00    2.00 | 15.00    2.00 | 27.00    2.00 | 39.00   13.00
```

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

3.25	2.00	15.25	2.00	27.25	2.00	39.25	13.00
3.50	2.00	15.50	2.00	27.50	2.00	39.50	13.00
3.75	2.00	15.75	2.00	27.75	2.00	39.75	13.00
4.00	2.00	16.00	2.00	28.00	2.00	40.00	17.00
4.25	2.00	16.25	2.00	28.25	2.00	40.25	17.00
4.50	2.00	16.50	2.00	28.50	2.00	40.50	17.00
4.75	2.00	16.75	2.00	28.75	2.00	40.75	17.00
5.00	2.00	17.00	2.00	29.00	2.00	41.00	13.00
5.25	2.00	17.25	2.00	29.25	2.00	41.25	13.00
5.50	2.00	17.50	2.00	29.50	2.00	41.50	13.00
5.75	2.00	17.75	2.00	29.75	2.00	41.75	13.00
6.00	2.00	18.00	2.00	30.00	2.00	42.00	23.00
6.25	2.00	18.25	2.00	30.25	2.00	42.25	23.00
6.50	2.00	18.50	2.00	30.50	2.00	42.50	23.00
6.75	2.00	18.75	2.00	30.75	2.00	42.75	23.00
7.00	2.00	19.00	2.00	31.00	2.00	43.00	13.00
7.25	2.00	19.25	2.00	31.25	2.00	43.25	13.00
7.50	2.00	19.50	2.00	31.50	2.00	43.50	13.00
7.75	2.00	19.75	2.00	31.75	2.00	43.75	13.00
8.00	2.00	20.00	2.00	32.00	2.00	44.00	13.00
8.25	2.00	20.25	2.00	32.25	2.00	44.25	13.00
8.50	2.00	20.50	2.00	32.50	2.00	44.50	13.00
8.75	2.00	20.75	2.00	32.75	2.00	44.75	13.00
9.00	2.00	21.00	2.00	33.00	2.00	45.00	53.00
9.25	2.00	21.25	2.00	33.25	2.00	45.25	53.00
9.50	2.00	21.50	2.00	33.50	2.00	45.50	53.00
9.75	2.00	21.75	2.00	33.75	2.00	45.75	53.00
10.00	2.00	22.00	2.00	34.00	2.00	46.00	38.00
10.25	2.00	22.25	2.00	34.25	2.00	46.25	38.00
10.50	2.00	22.50	2.00	34.50	2.00	46.50	38.00
10.75	2.00	22.75	2.00	34.75	2.00	46.75	38.00
11.00	2.00	23.00	2.00	35.00	3.00	47.00	13.00
11.25	2.00	23.25	2.00	35.25	3.00	47.25	13.00
11.50	2.00	23.50	2.00	35.50	3.00	47.50	13.00
11.75	2.00	23.75	2.00	35.75	3.00	47.75	13.00

| CALIB |
| NASHYD (0122)| Area (ha)= 3.16 Curve Number (CN)= 82.6
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.66

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00

0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.182

PEAK FLOW (cms)= 0.364 (i)
TIME TO PEAK (hrs)= 46.583
RUNOFF VOLUME (mm)= 233.126
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.818

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

| CALIB |
| NASHYD (0103)| Area (ha)= 1.41 Curve Number (CN)= 83.7
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.26

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

---- TRANSFORMED HYETOGRAPH ----

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00

4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00

8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.209

PEAK FLOW (cms)= 0.198 (i)
TIME TO PEAK (hrs)= 46.000
RUNOFF VOLUME (mm)= 235.841
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.828

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

ADD HYD (0020)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0103):	1.41	0.198	46.00	235.84
+ ID2= 2 (0122):	3.16	0.364	46.58	233.13
ID = 3 (0020):	4.57	0.529	46.25	233.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0120)	Area (ha)= 4.33	Curve Number (CN)= 83.7		
ID= 1 DT= 5.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 0.55			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00

2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00

7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.302

PEAK FLOW (cms)= 0.529 (i)
TIME TO PEAK (hrs)= 46.333
RUNOFF VOLUME (mm)= 235.999
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.828

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

| CALIB |
| NASHYD (0100)| Area (ha)= 10.57 Curve Number (CN)= 83.3
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 1.02

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

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

Unit Hyd Qpeak (cms)= 0.395

PEAK FLOW (cms)= 1.097 (i)
TIME TO PEAK (hrs)= 47.167
RUNOFF VOLUME (mm)= 234.961
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.824

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

CALIB	
NASHYD (0101)	Area (ha)= 0.04 Curve Number (CN)= 87.5
ID= 1 DT= 5.0 min	Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.09

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00

10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.018

PEAK FLOW (cms)= 0.006 (i)
TIME TO PEAK (hrs)= 46.000
RUNOFF VOLUME (mm)= 235.028
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.825

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

ADD HYD (0022)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0100):	10.57	1.097	47.17	234.96
+ ID2= 2 (0101):	0.04	0.006	46.00	235.03
ID = 3 (0022):	10.61	1.098	47.17	234.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0022)	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0022):	10.61	1.098	47.17	234.96
+ ID2= 2 (0120):	4.33	0.529	46.33	236.00
ID = 1 (0022):	14.94	1.573	47.00	235.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
NASHYD (0102)	Area (ha)= 7.24 Curve Number (CN)= 82.0
ID= 1 DT= 5.0 min	Ia (mm)= 7.00 # of Linear Res.(N)= 3.00

---------- U.H. Tp(hrs)= 0.30

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.916

PEAK FLOW (cms)= 0.993 (i)
TIME TO PEAK (hrs)= 46.000
RUNOFF VOLUME (mm)= 231.471
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.812

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

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

CALIB							
NASHYD (0126)	Area (ha)= 1.06	Curve Number (CN)= 79.1					
ID= 1 DT= 5.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00					
U.H. Tp(hrs)= 0.62							

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.066

PEAK FLOW (cms)= 0.122 (i)

TIME TO PEAK (hrs)= 46.417
RUNOFF VOLUME (mm)= 223.933
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.786

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

CALIB							
NASHYD (0124)	Area (ha)= 0.71	Curve Number (CN)= 85.4					
ID= 1 DT= 5.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00					
U.H. Tp(hrs)= 0.25							

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00

2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00

7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.109

PEAK FLOW (cms)= 0.101 (i)
TIME TO PEAK (hrs)= 46.000
RUNOFF VOLUME (mm)= 240.248
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.843

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

| ADD HYD (0027)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.

(ha) (cms) (hrs) (mm)
ID1= 1 (0102): 7.24 0.993 46.00 231.47
+ ID2= 2 (0124): 0.71 0.101 46.00 240.25
==========
ID = 3 (0027): 7.95 1.093 46.00 232.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0027)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.

(ha) (cms) (hrs) (mm)
ID1= 3 (0027): 7.95 1.093 46.00 232.25
+ ID2= 2 (0126): 1.06 0.122 46.42 223.93
==========
ID = 1 (0027): 9.01 1.201 46.00 231.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0125)| Area (ha)= 0.18 Curve Number (CN)= 84.3
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.18

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00

9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.037

PEAK FLOW (cms)= 0.026 (i)
TIME TO PEAK (hrs)= 46.000
RUNOFF VOLUME (mm)= 236.948
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.831

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

| ADD HYD (0023)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.

(ha) (cms) (hrs) (mm)
ID1= 1 (0125): 0.18 0.026 46.00 236.95
+ ID2= 2 (0027): 9.01 1.201 46.00 231.28
==========
ID = 3 (0023): 9.19 1.226 46.00 231.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0121)| Area (ha)= 2.12 Curve Number (CN)= 83.3
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
--- U.H. Tp(hrs)= 0.93

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00

3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00

7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.087

PEAK FLOW (cms)= 0.226 (i)

TIME TO PEAK (hrs)= 47.083
RUNOFF VOLUME (mm)= 234.960
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.824

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

CALIB	
NASHYD (0105)	Area (ha)= 9.75 Curve Number (CN)= 83.8
ID= 1 DT= 5.0 min	Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.82

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00

2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00

7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00

11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.455

PEAK FLOW (cms)= 1.073 (i)
TIME TO PEAK (hrs)= 46.917
RUNOFF VOLUME (mm)= 236.266
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.829

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

ADD HYD (0019)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0105):	9.75	1.073	46.92	236.27	
+ ID2= 2 (0121):	2.12	0.226	47.08	234.96	
ID = 3 (0019):	11.87	1.297	47.00	236.03	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0104)	Area (ha)=	3.63	Curve Number (CN)=	82.6	
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)=	3.00	
U.H. Tp(hrs)=	0.59				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.233

PEAK FLOW (cms)= 0.432 (i)
TIME TO PEAK (hrs)= 46.417
RUNOFF VOLUME (mm)= 233.124
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.818

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

CALIB					
NASHYD (0106)	Area (ha)=	1.27	Curve Number (CN)=	80.8	
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)=	3.00	
U.H. Tp(hrs)=	0.67				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00

0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00
2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00

5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00
7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00

9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00
11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.072

PEAK FLOW (cms)= 0.145 (i)
TIME TO PEAK (hrs)= 46.583
RUNOFF VOLUME (mm)= 228.405
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.801

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

| ADD HYD (0029)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
---------- (ha) (cms) (hrs) (mm)
ID1= 1 (0104): 3.63 0.432 46.42 233.12
+ ID2= 2 (0106): 1.27 0.145 46.58 228.41
==========
ID = 3 (0029): 4.90 0.575 46.42 231.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0029)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.

---------- (ha) (cms) (hrs) (mm)
ID1= 3 (0029): 4.90 0.575 46.42 231.90
+ ID2= 2 (0019): 11.87 1.297 47.00 236.03
==========
ID = 1 (0029): 16.77 1.851 46.75 234.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| NASHYD (0123)| Area (ha)= 1.39 Curve Number (CN)= 86.8
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # 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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.00	12.083	2.00	24.083	2.00	36.08	6.00
0.167	2.00	12.167	2.00	24.167	2.00	36.17	6.00
0.250	2.00	12.250	2.00	24.250	2.00	36.25	6.00
0.333	2.00	12.333	2.00	24.333	2.00	36.33	6.00
0.417	2.00	12.417	2.00	24.417	2.00	36.42	6.00
0.500	2.00	12.500	2.00	24.500	2.00	36.50	6.00
0.583	2.00	12.583	2.00	24.583	2.00	36.58	6.00
0.667	2.00	12.667	2.00	24.667	2.00	36.67	6.00
0.750	2.00	12.750	2.00	24.750	2.00	36.75	6.00
0.833	2.00	12.833	2.00	24.833	2.00	36.83	6.00
0.917	2.00	12.917	2.00	24.917	2.00	36.92	6.00
1.000	2.00	13.000	2.00	25.000	2.00	37.00	6.00
1.083	2.00	13.083	2.00	25.083	2.00	37.08	4.00
1.167	2.00	13.167	2.00	25.167	2.00	37.17	4.00
1.250	2.00	13.250	2.00	25.250	2.00	37.25	4.00
1.333	2.00	13.333	2.00	25.333	2.00	37.33	4.00
1.417	2.00	13.417	2.00	25.417	2.00	37.42	4.00
1.500	2.00	13.500	2.00	25.500	2.00	37.50	4.00
1.583	2.00	13.583	2.00	25.583	2.00	37.58	4.00
1.667	2.00	13.667	2.00	25.667	2.00	37.67	4.00
1.750	2.00	13.750	2.00	25.750	2.00	37.75	4.00
1.833	2.00	13.833	2.00	25.833	2.00	37.83	4.00
1.917	2.00	13.917	2.00	25.917	2.00	37.92	4.00
2.000	2.00	14.000	2.00	26.000	2.00	38.00	4.00
2.083	2.00	14.083	2.00	26.083	2.00	38.08	6.00
2.167	2.00	14.167	2.00	26.167	2.00	38.17	6.00
2.250	2.00	14.250	2.00	26.250	2.00	38.25	6.00
2.333	2.00	14.333	2.00	26.333	2.00	38.33	6.00
2.417	2.00	14.417	2.00	26.417	2.00	38.42	6.00
2.500	2.00	14.500	2.00	26.500	2.00	38.50	6.00
2.583	2.00	14.583	2.00	26.583	2.00	38.58	6.00
2.667	2.00	14.667	2.00	26.667	2.00	38.67	6.00
2.750	2.00	14.750	2.00	26.750	2.00	38.75	6.00
2.833	2.00	14.833	2.00	26.833	2.00	38.83	6.00

2.917	2.00	14.917	2.00	26.917	2.00	38.92	6.00
3.000	2.00	15.000	2.00	27.000	2.00	39.00	6.00
3.083	2.00	15.083	2.00	27.083	2.00	39.08	13.00
3.167	2.00	15.167	2.00	27.167	2.00	39.17	13.00
3.250	2.00	15.250	2.00	27.250	2.00	39.25	13.00
3.333	2.00	15.333	2.00	27.333	2.00	39.33	13.00
3.417	2.00	15.417	2.00	27.417	2.00	39.42	13.00
3.500	2.00	15.500	2.00	27.500	2.00	39.50	13.00
3.583	2.00	15.583	2.00	27.583	2.00	39.58	13.00
3.667	2.00	15.667	2.00	27.667	2.00	39.67	13.00
3.750	2.00	15.750	2.00	27.750	2.00	39.75	13.00
3.833	2.00	15.833	2.00	27.833	2.00	39.83	13.00
3.917	2.00	15.917	2.00	27.917	2.00	39.92	13.00
4.000	2.00	16.000	2.00	28.000	2.00	40.00	13.00
4.083	2.00	16.083	2.00	28.083	2.00	40.08	17.00
4.167	2.00	16.167	2.00	28.167	2.00	40.17	17.00
4.250	2.00	16.250	2.00	28.250	2.00	40.25	17.00
4.333	2.00	16.333	2.00	28.333	2.00	40.33	17.00
4.417	2.00	16.417	2.00	28.417	2.00	40.42	17.00
4.500	2.00	16.500	2.00	28.500	2.00	40.50	17.00
4.583	2.00	16.583	2.00	28.583	2.00	40.58	17.00
4.667	2.00	16.667	2.00	28.667	2.00	40.67	17.00
4.750	2.00	16.750	2.00	28.750	2.00	40.75	17.00
4.833	2.00	16.833	2.00	28.833	2.00	40.83	17.00
4.917	2.00	16.917	2.00	28.917	2.00	40.92	17.00
5.000	2.00	17.000	2.00	29.000	2.00	41.00	17.00
5.083	2.00	17.083	2.00	29.083	2.00	41.08	13.00
5.167	2.00	17.167	2.00	29.167	2.00	41.17	13.00
5.250	2.00	17.250	2.00	29.250	2.00	41.25	13.00
5.333	2.00	17.333	2.00	29.333	2.00	41.33	13.00
5.417	2.00	17.417	2.00	29.417	2.00	41.42	13.00
5.500	2.00	17.500	2.00	29.500	2.00	41.50	13.00
5.583	2.00	17.583	2.00	29.583	2.00	41.58	13.00
5.667	2.00	17.667	2.00	29.667	2.00	41.67	13.00
5.750	2.00	17.750	2.00	29.750	2.00	41.75	13.00
5.833	2.00	17.833	2.00	29.833	2.00	41.83	13.00
5.917	2.00	17.917	2.00	29.917	2.00	41.92	13.00
6.000	2.00	18.000	2.00	30.000	2.00	42.00	13.00
6.083	2.00	18.083	2.00	30.083	2.00	42.08	22.99
6.167	2.00	18.167	2.00	30.167	2.00	42.17	23.00
6.250	2.00	18.250	2.00	30.250	2.00	42.25	23.00
6.333	2.00	18.333	2.00	30.333	2.00	42.33	23.00
6.417	2.00	18.417	2.00	30.417	2.00	42.42	23.00
6.500	2.00	18.500	2.00	30.500	2.00	42.50	23.00
6.583	2.00	18.583	2.00	30.583	2.00	42.58	23.00
6.667	2.00	18.667	2.00	30.667	2.00	42.67	23.00
6.750	2.00	18.750	2.00	30.750	2.00	42.75	23.00
6.833	2.00	18.833	2.00	30.833	2.00	42.83	23.00
6.917	2.00	18.917	2.00	30.917	2.00	42.92	23.00
7.000	2.00	19.000	2.00	31.000	2.00	43.00	23.00
7.083	2.00	19.083	2.00	31.083	2.00	43.08	13.01
7.167	2.00	19.167	2.00	31.167	2.00	43.17	13.00
7.250	2.00	19.250	2.00	31.250	2.00	43.25	13.00
7.333	2.00	19.333	2.00	31.333	2.00	43.33	13.00

7.417	2.00	19.417	2.00	31.417	2.00	43.42	13.00
7.500	2.00	19.500	2.00	31.500	2.00	43.50	13.00
7.583	2.00	19.583	2.00	31.583	2.00	43.58	13.00
7.667	2.00	19.667	2.00	31.667	2.00	43.67	13.00
7.750	2.00	19.750	2.00	31.750	2.00	43.75	13.00
7.833	2.00	19.833	2.00	31.833	2.00	43.83	13.00
7.917	2.00	19.917	2.00	31.917	2.00	43.92	13.00
8.000	2.00	20.000	2.00	32.000	2.00	44.00	13.00
8.083	2.00	20.083	2.00	32.083	2.00	44.08	13.00
8.167	2.00	20.167	2.00	32.167	2.00	44.17	13.00
8.250	2.00	20.250	2.00	32.250	2.00	44.25	13.00
8.333	2.00	20.333	2.00	32.333	2.00	44.33	13.00
8.417	2.00	20.417	2.00	32.417	2.00	44.42	13.00
8.500	2.00	20.500	2.00	32.500	2.00	44.50	13.00
8.583	2.00	20.583	2.00	32.583	2.00	44.58	13.00
8.667	2.00	20.667	2.00	32.667	2.00	44.67	13.00
8.750	2.00	20.750	2.00	32.750	2.00	44.75	13.00
8.833	2.00	20.833	2.00	32.833	2.00	44.83	13.00
8.917	2.00	20.917	2.00	32.917	2.00	44.92	13.00
9.000	2.00	21.000	2.00	33.000	2.00	45.00	13.00
9.083	2.00	21.083	2.00	33.083	2.00	45.08	52.95
9.167	2.00	21.167	2.00	33.167	2.00	45.17	53.00
9.250	2.00	21.250	2.00	33.250	2.00	45.25	53.00
9.333	2.00	21.333	2.00	33.333	2.00	45.33	53.00
9.417	2.00	21.417	2.00	33.417	2.00	45.42	53.00
9.500	2.00	21.500	2.00	33.500	2.00	45.50	53.00
9.583	2.00	21.583	2.00	33.583	2.00	45.58	53.00
9.667	2.00	21.667	2.00	33.667	2.00	45.67	53.00
9.750	2.00	21.750	2.00	33.750	2.00	45.75	53.00
9.833	2.00	21.833	2.00	33.833	2.00	45.83	53.00
9.917	2.00	21.917	2.00	33.917	2.00	45.92	53.00
10.000	2.00	22.000	2.00	34.000	2.00	46.00	53.00
10.083	2.00	22.083	2.00	34.083	2.00	46.08	38.02
10.167	2.00	22.167	2.00	34.167	2.00	46.17	38.00
10.250	2.00	22.250	2.00	34.250	2.00	46.25	38.00
10.333	2.00	22.333	2.00	34.333	2.00	46.33	38.00
10.417	2.00	22.417	2.00	34.417	2.00	46.42	38.00
10.500	2.00	22.500	2.00	34.500	2.00	46.50	38.00
10.583	2.00	22.583	2.00	34.583	2.00	46.58	38.00
10.667	2.00	22.667	2.00	34.667	2.00	46.67	38.00
10.750	2.00	22.750	2.00	34.750	2.00	46.75	38.00
10.833	2.00	22.833	2.00	34.833	2.00	46.83	38.00
10.917	2.00	22.917	2.00	34.917	2.00	46.92	38.00
11.000	2.00	23.000	2.00	35.000	2.00	47.00	38.00
11.083	2.00	23.083	2.00	35.083	3.00	47.08	13.04
11.167	2.00	23.167	2.00	35.167	3.00	47.17	13.00
11.250	2.00	23.250	2.00	35.250	3.00	47.25	13.00
11.333	2.00	23.333	2.00	35.333	3.00	47.33	13.00
11.417	2.00	23.417	2.00	35.417	3.00	47.42	13.00
11.500	2.00	23.500	2.00	35.500	3.00	47.50	13.00
11.583	2.00	23.583	2.00	35.583	3.00	47.58	13.00
11.667	2.00	23.667	2.00	35.667	3.00	47.67	13.00
11.750	2.00	23.750	2.00	35.750	3.00	47.75	13.00
11.833	2.00	23.833	2.00	35.833	3.00	47.83	13.00

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

11.917	2.00	23.917	2.00	35.917	3.00	47.92	13.00
12.000	2.00	24.000	2.00	36.000	3.00	48.00	13.00

Unit Hyd Qpeak (cms)= 0.110

PEAK FLOW (cms)= 0.178 (i)
TIME TO PEAK (hrs)= 46.250
RUNOFF VOLUME (mm)= 244.071
TOTAL RAINFALL (mm)= 285.000
RUNOFF COEFFICIENT = 0.856

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

Junction Command(0030)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2(0123)	1.39	0.18	46.25	244.07
OUTFLOW: ID= 2(0030)	1.39	0.18	46.25	244.07

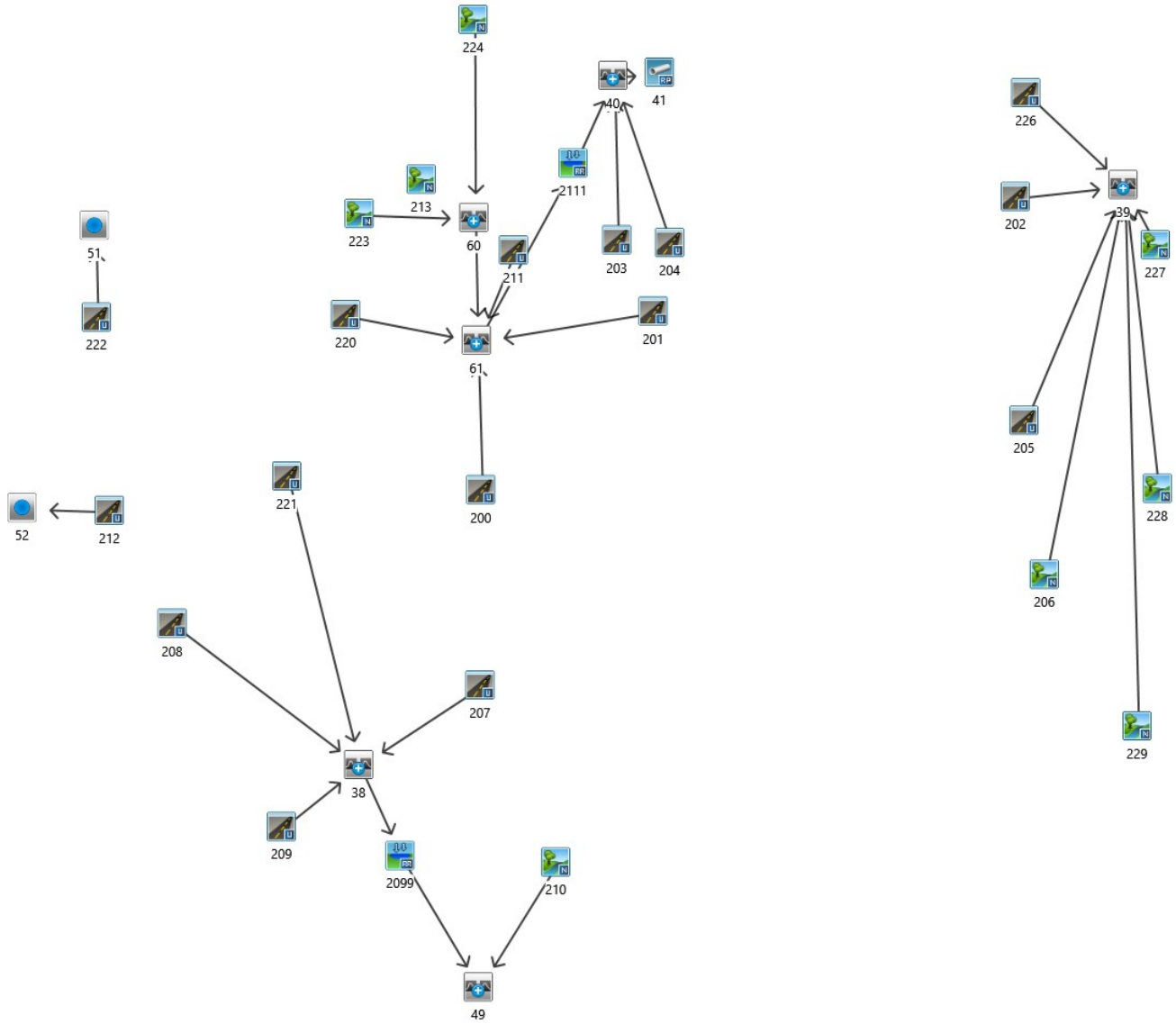
---

file:///Ca0004-ppfss01/...61414473/design/report/FSR/SWM%20writeup/Appendix%20C%20-%20VO%20Modelling/ExistingVOoutput.txt[8/19/2024 12:25:03 PM]

APPENDIX C-3

PROPOSED CONDITIONS SCHEMATIC

VO Schematic - Proposed Conditions



APPENDIX C-4

PROPOSED OUTPUT

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

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\3971d9
92-ac90-4848-a995-f8d8bbe38e1d\scena
  Summary filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\3971d9
92-ac90-4848-a995-f8d8bbe38e1d\scena


DATE: 08/19/2024                          TIME: 12:07:49

USER:



COMMENTS: _____


--------------------------------------------------------------------------------
------------------------
  ************************************************
  ** SIMULATION : 100yr 12hr 5min Chicago       **
  ************************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=2987.057
| Ptotal= 96.22 mm |                          B=  15.200
--------------------                          C=   0.897
```

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

                        Duration of storm  = 12.00 hrs
                        Storm time step    =  5.00 min
                        Time to peak ratio =  0.38

|  TIME   RAIN  |  TIME   RAIN  |'  TIME   RAIN  |  TIME   RAIN
|   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
|  0.00   0.99  |  3.00   3.32  |'  6.00   5.86  |  9.00   1.65
|  0.08   1.01  |  3.08   3.55  |'  6.08   5.49  |  9.08   1.62
|  0.17   1.03  |  3.17   3.81  |'  6.17   5.16  |  9.17   1.59
|  0.25   1.05  |  3.25   4.12  |'  6.25   4.87  |  9.25   1.56
|  0.33   1.07  |  3.33   4.48  |'  6.33   4.60  |  9.33   1.53
|  0.42   1.10  |  3.42   4.90  |'  6.42   4.37  |  9.42   1.50
|  0.50   1.12  |  3.50   5.40  |'  6.50   4.15  |  9.50   1.48
|  0.58   1.14  |  3.58   6.02  |'  6.58   3.96  |  9.58   1.45
|  0.67   1.17  |  3.67   6.77  |'  6.67   3.78  |  9.67   1.43
|  0.75   1.20  |  3.75   7.73  |'  6.75   3.61  |  9.75   1.40
|  0.83   1.23  |  3.83   8.96  |'  6.83   3.46  |  9.83   1.38
|  0.92   1.26  |  3.92  10.62  |'  6.92   3.32  |  9.92   1.36
|  1.00   1.29  |  4.00  12.92  |'  7.00   3.20  | 10.00   1.33
|  1.08   1.32  |  4.08  16.29  |'  7.08   3.08  | 10.08   1.31
|  1.17   1.36  |  4.17  21.59  |'  7.17   2.97  | 10.17   1.29
|  1.25   1.39  |  4.25  30.82  |'  7.25   2.86  | 10.25   1.27
|  1.33   1.43  |  4.33  49.63  |'  7.33   2.77  | 10.33   1.25
|  1.42   1.47  |  4.42 100.76  |'  7.42   2.68  | 10.42   1.23
|  1.50   1.52  |  4.50 201.53  |'  7.50   2.59  | 10.50   1.22
|  1.58   1.57  |  4.58 116.59  |'  7.58   2.51  | 10.58   1.20
|  1.67   1.62  |  4.67  70.34  |'  7.67   2.44  | 10.67   1.18
|  1.75   1.67  |  4.75  48.12  |'  7.75   2.37  | 10.75   1.17
|  1.83   1.73  |  4.83  35.56  |'  7.83   2.30  | 10.83   1.15
|  1.92   1.79  |  4.92  27.69  |'  7.92   2.24  | 10.92   1.13
|  2.00   1.85  |  5.00  22.40  |'  8.00   2.18  | 11.00   1.12
|  2.08   1.92  |  5.08  18.63  |'  8.08   2.12  | 11.08   1.10
|  2.17   2.00  |  5.17  15.85  |'  8.17   2.07  | 11.17   1.09
|  2.25   2.08  |  5.25  13.73  |'  8.25   2.02  | 11.25   1.08
|  2.33   2.17  |  5.33  12.06  |'  8.33   1.97  | 11.33   1.06
|  2.42   2.27  |  5.42  10.73  |'  8.42   1.92  | 11.42   1.05
|  2.50   2.38  |  5.50   9.64  |'  8.50   1.88  | 11.50   1.04
|  2.58   2.50  |  5.58   8.73  |'  8.58   1.84  | 11.58   1.02
|  2.67   2.63  |  5.67   7.97  |'  8.67   1.80  | 11.67   1.01
|  2.75   2.77  |  5.75   7.32  |'  8.75   1.76  | 11.75   1.00
|  2.83   2.93  |  5.83   6.77  |'  8.83   1.72  | 11.83   0.99
|  2.92   3.11  |  5.92   6.28  |'  8.92   1.69  | 11.92   0.98

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0213)|   Area    (ha)=   0.12   Curve Number   (CN)= 79.1
```

```
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.34

     Unit Hyd Qpeak  (cms)=   0.013

     PEAK FLOW       (cms)=   0.013 (i)
     TIME TO PEAK    (hrs)=   5.000
     RUNOFF VOLUME    (mm)=  50.899
     TOTAL RAINFALL   (mm)=  96.218
     RUNOFF COEFFICIENT   =   0.529

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0227)|   Area    (ha)=   0.13   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   0.022

     PEAK FLOW       (cms)=   0.021 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  55.264
     TOTAL RAINFALL   (mm)=  96.218
     RUNOFF COEFFICIENT   =   0.574

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0228)|   Area    (ha)=   0.71   Curve Number   (CN)= 84.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.088

     PEAK FLOW       (cms)=   0.100 (i)
     TIME TO PEAK    (hrs)=   4.917
     RUNOFF VOLUME    (mm)=  58.436
     TOTAL RAINFALL   (mm)=  96.218
     RUNOFF COEFFICIENT   =   0.607

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
```

```
| NASHYD   (  0229)|   Area    (ha)=   1.06   Curve Number   (CN)= 85.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.51

     Unit Hyd Qpeak  (cms)=   0.080

     PEAK FLOW       (cms)=   0.111 (i)
     TIME TO PEAK    (hrs)=   5.167
     RUNOFF VOLUME    (mm)=  60.006
     TOTAL RAINFALL   (mm)=  96.218
     RUNOFF COEFFICIENT   =   0.624

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0206)|   Area    (ha)=   2.57   Curve Number   (CN)= 77.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.391

     PEAK FLOW       (cms)=   0.330 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  48.807
     TOTAL RAINFALL   (mm)=  96.218
     RUNOFF COEFFICIENT   =   0.507

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0205)|   Area    (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=   1.00
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         0.28
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      61.10        10.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       239.10
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.17 (ii)    3.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.26
                                                    *TOTALS*
```

```
     PEAK FLOW       (cms)=       0.00         0.19          0.198 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      95.22        66.50          66.78
     TOTAL RAINFALL   (mm)=      96.22        96.22          96.22
     RUNOFF COEFFICIENT   =       0.99         0.69           0.69

***** 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*  =  77.0    Ia = Dep. 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 (  0226)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.03         0.02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      18.26        10.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       129.80
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.57 (ii)    2.50 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.29
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.01          0.022 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      95.22        56.33          77.71
     TOTAL RAINFALL   (mm)=      96.22        96.22          96.22
     RUNOFF COEFFICIENT   =       0.99         0.59           0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. 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 (  0202)|   Area    (ha)=   0.36
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.23         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      48.99        10.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       129.80
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.02 (ii)    2.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.28
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.11         0.05          0.158 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      95.22        56.33          77.71
     TOTAL RAINFALL   (mm)=      96.22        96.22          96.22
     RUNOFF COEFFICIENT   =       0.99         0.59           0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0202):     0.36   0.158     4.58    77.71
     + ID2= 2 (  0205):     0.56   0.198     4.58    66.78
       ==================================================
       ID = 3 (  0039):     0.92   0.356     4.58    71.06

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

--------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```

```
       ID1= 3 (  0039):     0.92   0.356     4.58    71.06
     + ID2= 2 (  0206):     2.57   0.330     4.83    48.81
       ==================================================
       ID = 1 (  0039):     3.49   0.486     4.67    54.67

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

--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.49   0.486     4.67    54.67
     + ID2= 2 (  0226):     0.05   0.022     4.58    77.71
       ==================================================
       ID = 3 (  0039):     3.54   0.505     4.58    55.00

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

--------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     3.54   0.505     4.58    55.00
     + ID2= 2 (  0227):     0.13   0.021     4.83    55.26
       ==================================================
       ID = 1 (  0039):     3.67   0.516     4.67    55.01

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

--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.67   0.516     4.67    55.01
     + ID2= 2 (  0228):     0.71   0.100     4.92    58.44
       ==================================================
       ID = 3 (  0039):     4.38   0.580     4.75    55.56

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

--------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     4.38   0.580     4.75    55.56
     + ID2= 2 (  0229):     1.06   0.111     5.17    60.01
```

```
       ==================================================
       ID = 1 (  0039):     5.44   0.647     4.83    56.43

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0223)|   Area    (ha)=   0.70   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.24

     Unit Hyd Qpeak  (cms)=   0.110

     PEAK FLOW       (cms)=   0.113 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  57.796
     TOTAL RAINFALL   (mm)=  96.218
     RUNOFF COEFFICIENT   =   0.601

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0224)|   Area    (ha)=   0.64   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.080

     PEAK FLOW       (cms)=   0.085 (i)
     TIME TO PEAK    (hrs)=   4.917
     RUNOFF VOLUME    (mm)=  55.316
     TOTAL RAINFALL   (mm)=  96.218
     RUNOFF COEFFICIENT   =   0.575

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

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

--------------------
| ADD HYD  (  0060)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0223):     0.70   0.113     4.83    57.80
     + ID2= 2 (  0224):     0.64   0.085     4.92    55.32
       ==================================================
       ID = 3 (  0060):     1.34   0.194     4.83    56.61

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

```
--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0200)|   Area    (ha)=   9.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.90         3.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     246.04        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       129.80
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.69 (ii)    4.63 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.29         0.22
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.56         1.05          3.606 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      95.22        56.33         77.72
     TOTAL RAINFALL   (mm)=      96.22        96.22         96.22
     RUNOFF COEFFICIENT   =       0.99         0.59          0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0201)|   Area    (ha)=   0.68
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  75.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.58         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      67.33        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       188.89
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.24 (ii)    2.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.30
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.28         0.06          0.343 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      95.22        62.63         87.07
     TOTAL RAINFALL   (mm)=      96.22        96.22         96.22
     RUNOFF COEFFICIENT   =       0.99         0.65          0.90

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0211)|   Area    (ha)=   1.01
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.66         0.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.06        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       129.80
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.39 (ii)    3.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.26
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.31         0.13          0.437 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      95.22        56.33         77.72
     TOTAL RAINFALL   (mm)=      96.22        96.22         96.22
     RUNOFF COEFFICIENT   =       0.99         0.59          0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0220)|   Area    (ha)=   1.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.03         0.55
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     102.63        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       129.80
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.59 (ii)    3.53 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.26
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.48         0.20          0.676 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      89.22        56.33         74.42
     TOTAL RAINFALL   (mm)=      96.22        96.22         96.22
     RUNOFF COEFFICIENT   =       0.93         0.59          0.77

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     9.08   3.606     4.58    77.72
     + ID2= 2 (  0201):     0.68   0.343     4.58    87.07
       ================================================
       ID = 3 (  0061):     9.76   3.948     4.58    78.37

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

-------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):     9.76   3.948     4.58    78.37
     + ID2= 2 (  0211):     1.01   0.437     4.58    77.72
       ================================================
       ID = 1 (  0061):    10.77   4.385     4.58    78.31

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

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0061):    10.77   4.385     4.58    78.31
     + ID2= 2 (  0220):     1.58   0.676     4.58    74.42
       ================================================
       ID = 3 (  0061):    12.35   5.061     4.58    77.81

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

-------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):    12.35   5.061     4.58    77.81
     + ID2= 2 (  0060):     1.34   0.194     4.83    56.61
       ================================================
       ID = 1 (  0061):    13.69   5.136     4.58    75.74

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  2111)|     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.
                           0.0040     0.0492    |   0.4840      0.5022
                           0.0070     0.1000    |   0.6890      0.5665
                           0.0090     0.1524    |   0.7300      0.6325
                           0.0100     0.2065    |   0.9250      0.7004
                           0.0110     0.2622    |   1.3030      0.7700
                           0.0130     0.3197    |   1.8620      0.8415
                           0.0140     0.3788    |   2.6100      0.9149
                           0.1740     0.4396    |   0.0000      0.0000

                                    AREA     QPEAK     TPEAK       R.V.
                                    (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0061)     13.690      5.136      4.58      75.74
   OUTFLOW: ID= 1 (  2111)     13.690      0.725      5.17      74.97
```

```
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.12
                  TIME SHIFT OF PEAK FLOW         (min)= 35.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.6249

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0203)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.18         0.04
     Dep. Storage     (mm)=       5.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      38.30        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53        88.00
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.88 (ii)    2.21 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.30
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.10         0.01          0.110 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      91.22        49.80          82.93
     TOTAL RAINFALL   (mm)=      96.22        96.22          96.22
     RUNOFF COEFFICIENT   =       0.95         0.52           0.86

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0204)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  55.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12         0.04
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      32.66        10.00
     Mannings n           =      0.013        0.250
```

```
     Max.Eff.Inten.(mm/hr)=     201.53       210.13
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.80 (ii)    2.49 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.29
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.03          0.075 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      95.22        64.39          81.34
     TOTAL RAINFALL   (mm)=      96.22        96.22          96.22
     RUNOFF COEFFICIENT   =       0.99         0.67           0.85

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0203):     0.22   0.110     4.58    82.93
     + ID2= 2 (  0204):     0.16   0.075     4.58    81.34
       ================================================
       ID = 3 (  0040):     0.38   0.185     4.58    82.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0040)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0040):     0.38   0.185     4.58    82.26
     + ID2= 2 (  2111):    13.69   0.725     5.17    74.97
       ================================================
       ID = 1 (  0040):    14.07   0.745     5.08    75.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ROUTEPIPE(  0041)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)= 900.00
| DT=  5.0 min     |     Length       (m)=  50.00
```

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

     <----------------- TRAVEL TIME TABLE ------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)      (cms)        (m/s)        min
       0.05     .642E+00       0.0          0.53         1.56
       0.09     .178E+01       0.0          0.83         1.00
       0.14     .322E+01       0.1          1.07         0.78
       0.19     .487E+01       0.1          1.28         0.65
       0.24     .668E+01       0.2          1.45         0.57
       0.28     .862E+01       0.3          1.61         0.52
       0.33     .106E+02       0.4          1.74         0.48
       0.38     .127E+02       0.5          1.86         0.45
       0.43     .148E+02       0.6          1.97         0.42
       0.47     .170E+02       0.7          2.06         0.41
       0.52     .191E+02       0.8          2.13         0.39
       0.57     .212E+02       0.9          2.20         0.38
       0.62     .232E+02       1.0          2.24         0.37
       0.66     .251E+02       1.1          2.28         0.37
       0.71     .269E+02       1.2          2.29         0.36
       0.76     .286E+02       1.3          2.29         0.36
       0.81     .300E+02       1.4          2.27         0.37
       0.85     .312E+02       1.4          2.21         0.38
       0.90     .318E+02       1.3          2.01         0.41
                                  <---- hydrograph ---->   <-pipe / channel->
                               AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0040)   14.07     0.75    5.08  75.16      0.49      2.09
   OUTFLOW: ID= 1 (  0041)   14.07     0.76    4.83  75.16      0.50      2.10


--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0210)|   Area    (ha)=   0.62   Curve Number   (CN)= 79.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   0.112

     PEAK FLOW       (cms)=   0.092 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  50.971
     TOTAL RAINFALL   (mm)=  96.218
     RUNOFF COEFFICIENT   =   0.530

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

```
--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0207)|   Area    (ha)=  12.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.22         4.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     290.29        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       129.80
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.97 (ii)    4.91 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.28         0.22
                                                    *TOTALS*
     PEAK FLOW       (cms)=       3.49         1.42          4.917 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      95.22        56.33          77.72
     TOTAL RAINFALL   (mm)=      96.22        96.22          96.22
     RUNOFF COEFFICIENT   =       0.99         0.59           0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0209)|   Area    (ha)=   1.84
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.20         0.64
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     110.75        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       129.80
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.67 (ii)    3.60 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
```

```
     Unit Hyd. peak  (cms)=       0.32         0.25
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.55         0.23          0.783 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      95.22        56.33         77.72
     TOTAL RAINFALL   (mm)=      96.22        96.22         96.22
     RUNOFF COEFFICIENT   =       0.99         0.59          0.81

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. 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 (  0221)|   Area    (ha)=   4.96
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.22         1.74
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     181.84        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       129.80
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.24 (ii)    4.18 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.30         0.24
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.44         0.59          2.034 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      89.22        56.33         74.42
     TOTAL RAINFALL   (mm)=      96.22        96.22         96.22
     RUNOFF COEFFICIENT   =       0.93         0.59          0.77

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. 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 (  0208)|   Area    (ha)=   1.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.67         0.36
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.87        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       129.80
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.40 (ii)    3.34 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.26
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.31         0.13          0.445 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      89.22        56.33         74.42
     TOTAL RAINFALL   (mm)=      96.22        96.22         96.22
     RUNOFF COEFFICIENT   =       0.93         0.59          0.77

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0207):    12.64   4.917     4.58    77.72
     + ID2= 2 (  0208):     1.03   0.445     4.58    74.42
       ==================================================
       ID = 3 (  0038):    13.67   5.362     4.58    77.47

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

--------------------
| ADD HYD  (  0038)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```

```
       ID1= 3 (  0038):    13.67   5.362     4.58    77.47
     + ID2= 2 (  0209):     1.84   0.783     4.58    77.72
       ==================================================
       ID = 1 (  0038):    15.51   6.145     4.58    77.50

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0038):    15.51   6.145     4.58    77.50
     + ID2= 2 (  0221):     4.96   2.034     4.58    74.42
       ==================================================
       ID = 3 (  0038):    20.47   8.179     4.58    76.75

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2099)|     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    |   0.0508      0.7415
                          0.0049     0.0845    |   0.1103      0.8448
                          0.0085     0.1713    |   0.1869      0.9504
                          0.0110     0.2604    |   0.2773      1.0584
                          0.0130     0.3519    |   0.3797      1.1687
                          0.0147     0.4458    |   0.5592      1.2814
                          0.0163     0.5420    |   0.8940      1.3964
                          0.0177     0.6406    |   1.4269      1.5138

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     20.470     8.179      4.58      76.75
   OUTFLOW: ID= 1 (  2099)     20.470     0.383      5.83      73.05

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.68
                  TIME SHIFT OF PEAK FLOW         (min)= 75.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.1706

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

--------------------
| ADD HYD  (  0049)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2099):    20.47   0.383     5.83    73.05
     + ID2= 2 (  0210):     0.62   0.092     4.83    50.97
```

```
       ==================================================
       ID = 3 (  0049):    21.09   0.396     5.75    72.40

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0222)|   Area    (ha)=   1.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.90         0.48
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      95.92        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     201.53       129.80
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.53 (ii)    3.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.26
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.42         0.18          0.592 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      89.22        56.33         74.42
     TOTAL RAINFALL   (mm)=      96.22        96.22         96.22
     RUNOFF COEFFICIENT   =       0.93         0.59          0.77

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

  -------------------------
  | Junction Command(0051) |
  -------------------------

                          AREA     QPEAK    TPEAK     R.V.
                          (ha)     (cms)    (hrs)     (mm)
  INFLOW : ID= 2(  0222)    1.38     0.59     4.58    74.42
  OUTFLOW: ID= 2(  0051)    1.38     0.59     4.58    74.42

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

```
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      3.10         1.67
     Dep. Storage     (mm)=      7.00         5.00
     Average Slope     (%)=      2.00         2.00
     Length            (m)=    178.33        10.00
     Mannings n           =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=    201.53       129.80
               over (min)         5.00         5.00
     Storage Coeff.  (min)=      2.22 (ii)    4.16 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.30         0.24
                                                    *TOTALS*
     PEAK FLOW       (cms)=      1.39         0.57      1.959 (iii)
     TIME TO PEAK    (hrs)=      4.58         4.58       4.58
     RUNOFF VOLUME    (mm)=     89.22        56.33      74.42
     TOTAL RAINFALL   (mm)=     96.22        96.22      96.22
     RUNOFF COEFFICIENT   =      0.93         0.59       0.77

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

  -------------------------
  | Junction Command(0052) |
  -------------------------

                         AREA     QPEAK   TPEAK     R.V.
                         (ha)     (cms)    (hrs)    (mm)
  INFLOW : ID= 2(  0212)    4.77     1.96    4.58    74.42
  OUTFLOW: ID= 2(  0052)    4.77     1.96    4.58    74.42

  --------------------------------------------------------------------------------
================================================================================
========================

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

```
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H  H   Y Y   MM MM  O   O
       O   O    T      T    H   H  H    Y    M  M  O   O
        OOO     T      T    H   H  H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\52bc21
e5-d135-407e-a6a7-8c215a5fb66e\scena
  Summary filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\52bc21
e5-d135-407e-a6a7-8c215a5fb66e\scena


DATE: 08/19/2024                          TIME: 12:07:49

USER:


COMMENTS: _____

--------------------------------------------------------------------------------
----------------------
  ***********************************************
  ** SIMULATION : 10yr 12hr 5min Chicago        **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1303.567
| Ptotal= 65.32 mm |                          B=   9.700
--------------------                          C=   0.831
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  = 12.00 hrs
                         Storm time step    =  5.00 min
                         Time to peak ratio =  0.38

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
```

```
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.00    0.99 |  3.00    2.72 |  6.00    4.34 |  9.00    1.53
                 0.08    1.01 |  3.08    2.88 |  6.08    4.11 |  9.08    1.51
                 0.17    1.03 |  3.17    3.05 |  6.17    3.91 |  9.17    1.48
                 0.25    1.05 |  3.25    3.25 |  6.25    3.72 |  9.25    1.46
                 0.33    1.06 |  3.33    3.48 |  6.33    3.56 |  9.33    1.44
                 0.42    1.08 |  3.42    3.74 |  6.42    3.41 |  9.42    1.41
                 0.50    1.10 |  3.50    4.06 |  6.50    3.27 |  9.50    1.39
                 0.58    1.12 |  3.58    4.43 |  6.58    3.14 |  9.58    1.37
                 0.67    1.15 |  3.67    4.88 |  6.67    3.03 |  9.67    1.35
                 0.75    1.17 |  3.75    5.44 |  6.75    2.92 |  9.75    1.33
                 0.83    1.19 |  3.83    6.15 |  6.83    2.82 |  9.83    1.32
                 0.92    1.22 |  3.92    7.08 |  6.92    2.73 |  9.92    1.30
                 1.00    1.24 |  4.00    8.35 |  7.00    2.64 | 10.00    1.28
                 1.08    1.27 |  4.08   10.19 |  7.08    2.56 | 10.08    1.26
                 1.17    1.30 |  4.17   13.04 |  7.17    2.48 | 10.17    1.25
                 1.25    1.33 |  4.25   18.00 |  7.25    2.41 | 10.25    1.23
                 1.33    1.36 |  4.33   28.38 |  7.33    2.35 | 10.33    1.21
                 1.42    1.39 |  4.42   60.23 |  7.42    2.28 | 10.42    1.20
                 1.50    1.43 |  4.50  139.67 |  7.50    2.22 | 10.50    1.18
                 1.58    1.46 |  4.58   70.72 |  7.58    2.17 | 10.58    1.17
                 1.67    1.50 |  4.67   40.43 |  7.67    2.12 | 10.67    1.16
                 1.75    1.54 |  4.75   27.50 |  7.75    2.06 | 10.75    1.14
                 1.83    1.59 |  4.83   20.56 |  7.83    2.02 | 10.83    1.13
                 1.92    1.64 |  4.92   16.31 |  7.92    1.97 | 10.92    1.12
                 2.00    1.69 |  5.00   13.47 |  8.00    1.93 | 11.00    1.10
                 2.08    1.74 |  5.08   11.45 |  8.08    1.89 | 11.08    1.09
                 2.17    1.80 |  5.17    9.95 |  8.17    1.85 | 11.17    1.08
                 2.25    1.86 |  5.25    8.80 |  8.25    1.81 | 11.25    1.07
                 2.33    1.92 |  5.33    7.88 |  8.33    1.77 | 11.33    1.06
                 2.42    2.00 |  5.42    7.14 |  8.42    1.74 | 11.42    1.04
                 2.50    2.07 |  5.50    6.53 |  8.50    1.71 | 11.50    1.03
                 2.58    2.16 |  5.58    6.02 |  8.58    1.67 | 11.58    1.02
                 2.67    2.25 |  5.67    5.58 |  8.67    1.64 | 11.67    1.01
                 2.75    2.35 |  5.75    5.20 |  8.75    1.61 | 11.75    1.00
                 2.83    2.46 |  5.83    4.88 |  8.83    1.59 | 11.83    0.99
                 2.92    2.59 |  5.92    4.59 |  8.92    1.56 | 11.92    0.98


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0213)|   Area    (ha)=   0.12   Curve Number   (CN)= 79.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.34

     Unit Hyd Qpeak  (cms)=   0.013

     PEAK FLOW       (cms)=   0.006 (i)
     TIME TO PEAK    (hrs)=   5.000
     RUNOFF VOLUME    (mm)=  27.101
     TOTAL RAINFALL   (mm)=  65.319
     RUNOFF COEFFICIENT   =   0.415

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0227)|   Area    (ha)=   0.13   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   0.022

     PEAK FLOW       (cms)=   0.010 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  30.072
     TOTAL RAINFALL   (mm)=  65.319
     RUNOFF COEFFICIENT   =   0.460

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0228)|   Area    (ha)=   0.71   Curve Number   (CN)= 84.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.088

     PEAK FLOW       (cms)=   0.049 (i)
     TIME TO PEAK    (hrs)=   4.917
     RUNOFF VOLUME    (mm)=  32.298
     TOTAL RAINFALL   (mm)=  65.319
     RUNOFF COEFFICIENT   =   0.494

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0229)|   Area    (ha)=   1.06   Curve Number   (CN)= 85.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.51

     Unit Hyd Qpeak  (cms)=   0.080

     PEAK FLOW       (cms)=   0.055 (i)
```

```
     TIME TO PEAK    (hrs)=   5.167
     RUNOFF VOLUME    (mm)=  33.426
     TOTAL RAINFALL   (mm)=  65.319
     RUNOFF COEFFICIENT   =   0.512

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0206)|   Area    (ha)=   2.57   Curve Number   (CN)= 77.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.391

     PEAK FLOW       (cms)=   0.153 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  25.734
     TOTAL RAINFALL   (mm)=  65.319
     RUNOFF COEFFICIENT   =   0.394

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0205)|   Area    (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=   1.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         0.28
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      61.10        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67       134.40
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.35 (ii)    4.08 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.24
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.10      0.106 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58       4.58
     RUNOFF VOLUME    (mm)=      64.32        39.00      39.25
     TOTAL RAINFALL   (mm)=      65.32        65.32      65.32
     RUNOFF COEFFICIENT   =       0.98         0.60       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*  =  77.0    Ia = Dep. 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 (  0226)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.03         0.02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      18.26        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67        68.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.65 (ii)    2.90 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.28
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00       0.014 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58       4.58
     RUNOFF VOLUME    (mm)=      64.32        31.33      49.47
     TOTAL RAINFALL   (mm)=      65.32        65.32      65.32
     RUNOFF COEFFICIENT   =       0.98         0.48       0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0202)|   Area    (ha)=   0.36
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.23         0.13
```

```
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      48.99        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67        68.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.18 (ii)    3.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.26
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.08         0.02       0.101 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58       4.58
     RUNOFF VOLUME    (mm)=      64.32        31.33      49.47
     TOTAL RAINFALL   (mm)=      65.32        65.32      65.32
     RUNOFF COEFFICIENT   =       0.98         0.48       0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0202):     0.36   0.101     4.58    49.47
     + ID2= 2 (  0205):     0.56   0.106     4.58    39.25
       ================================================
       ID = 3 (  0039):     0.92   0.207     4.58    43.25

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

--------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     0.92   0.207     4.58    43.25
     + ID2= 2 (  0206):     2.57   0.153     4.83    25.73
       ================================================
       ID = 1 (  0039):     3.49   0.262     4.58    30.35

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

```
--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.49   0.262     4.58    30.35
     + ID2= 2 (  0226):     0.05   0.014     4.58    49.47
       ================================================
       ID = 3 (  0039):     3.54   0.276     4.58    30.62

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

--------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     3.54   0.276     4.58    30.62
     + ID2= 2 (  0227):     0.13   0.010     4.83    30.07
       ================================================
       ID = 1 (  0039):     3.67   0.280     4.58    30.60

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

--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.67   0.280     4.58    30.60
     + ID2= 2 (  0228):     0.71   0.049     4.92    32.30
       ================================================
       ID = 3 (  0039):     4.38   0.294     4.58    30.88

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

--------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     4.38   0.294     4.58    30.88
     + ID2= 2 (  0229):     1.06   0.055     5.17    33.43
       ================================================
       ID = 1 (  0039):     5.44   0.315     4.83    31.37

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

--------------------
| CALIB            |
```

```
| NASHYD   (  0223)|   Area    (ha)=   0.70   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.24

     Unit Hyd Qpeak  (cms)=   0.110

     PEAK FLOW       (cms)=   0.055 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  31.846
     TOTAL RAINFALL   (mm)=  65.319
     RUNOFF COEFFICIENT   =   0.488

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0224)|   Area    (ha)=   0.64   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.080

     PEAK FLOW       (cms)=   0.041 (i)
     TIME TO PEAK    (hrs)=   4.917
     RUNOFF VOLUME    (mm)=  30.101
     TOTAL RAINFALL   (mm)=  65.319
     RUNOFF COEFFICIENT   =   0.461

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

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

--------------------
| ADD HYD  (  0060)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0223):     0.70   0.055     4.83    31.85
     + ID2= 2 (  0224):     0.64   0.041     4.92    30.10
       ================================================
       ID = 3 (  0060):     1.34   0.094     4.92    31.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   9.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
```

```
     Surface Area     (ha)=       5.90         3.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     246.04        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67        68.18
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.12 (ii)    5.36 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.70         0.51          2.001 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      64.32        31.33          49.47
     TOTAL RAINFALL   (mm)=      65.32        65.32          65.32
     RUNOFF COEFFICIENT   =       0.98         0.48           0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0201)|   Area    (ha)=   0.68
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  75.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.58         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      67.33        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67       103.50
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.43 (ii)    2.84 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.28
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.19         0.03          0.227 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      64.32        36.01          57.24
     TOTAL RAINFALL   (mm)=      65.32        65.32          65.32
     RUNOFF COEFFICIENT   =       0.98         0.55           0.88
```

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0211)|   Area    (ha)=   1.01
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.66         0.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.06        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67        68.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.61 (ii)    3.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.25
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.21         0.07          0.276 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      64.32        31.33          49.47
     TOTAL RAINFALL   (mm)=      65.32        65.32          65.32
     RUNOFF COEFFICIENT   =       0.98         0.48           0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0220)|   Area    (ha)=   1.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.03         0.55
```

```
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     102.63        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67        68.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.84 (ii)    4.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.24
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.32         0.10          0.425 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      58.32        31.33          46.17
     TOTAL RAINFALL   (mm)=      65.32        65.32          65.32
     RUNOFF COEFFICIENT   =       0.89         0.48           0.71

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     9.08   2.001     4.58    49.47
     + ID2= 2 (  0201):     0.68   0.227     4.58    57.24
       ================================================
       ID = 3 (  0061):     9.76   2.228     4.58    50.02

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

--------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):     9.76   2.228     4.58    50.02
     + ID2= 2 (  0211):     1.01   0.276     4.58    49.47
       ================================================
       ID = 1 (  0061):    10.77   2.504     4.58    49.96

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

```
--------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0061):    10.77   2.504     4.58    49.96
     + ID2= 2 (  0220):     1.58   0.425     4.58    46.17
       ================================================
       ID = 3 (  0061):    12.35   2.929     4.58    49.48

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

--------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):    12.35   2.929     4.58    49.48
     + ID2= 2 (  0060):     1.34   0.094     4.92    31.01
       ================================================
       ID = 1 (  0061):    13.69   2.963     4.58    47.67

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2111)|     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.
                          0.0040     0.0492   |   0.4840      0.5022
                          0.0070     0.1000   |   0.6890      0.5665
                          0.0090     0.1524   |   0.7300      0.6325
                          0.0100     0.2065   |   0.9250      0.7004
                          0.0110     0.2622   |   1.3030      0.7700
                          0.0130     0.3197   |   1.8620      0.8415
                          0.0140     0.3788   |   2.6100      0.9149
                          0.1740     0.4396   |   0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0061)     13.690      2.963      4.58      47.67
   OUTFLOW: ID= 1 (  2111)     13.690      0.211      5.67      46.90

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.13
                  TIME SHIFT OF PEAK FLOW         (min)= 65.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.4472

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

```
| CALIB            |
| STANDHYD (  0203)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.18         0.04
     Dep. Storage     (mm)=       5.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      38.30        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67        44.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.02 (ii)    2.56 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.29
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.07         0.01          0.074 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      60.32        26.72          53.60
     TOTAL RAINFALL   (mm)=      65.32        65.32          65.32
     RUNOFF COEFFICIENT   =       0.92         0.41           0.82

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0204)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  55.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12         0.04
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      32.66        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67       116.48
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.93 (ii)    2.89 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.28
                                                        *TOTALS*
```

```
     PEAK FLOW       (cms)=       0.03         0.01          0.048 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      64.32        37.36          52.18
     TOTAL RAINFALL   (mm)=      65.32        65.32          65.32
     RUNOFF COEFFICIENT   =       0.98         0.57           0.80

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0203):     0.22   0.074     4.58    53.60
     + ID2= 2 (  0204):     0.16   0.048     4.58    52.18
       ================================================
       ID = 3 (  0040):     0.38   0.122     4.58    53.00

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

--------------------
| ADD HYD  (  0040)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0040):     0.38   0.122     4.58    53.00
     + ID2= 2 (  2111):    13.69   0.211     5.67    46.90
       ================================================
       ID = 1 (  0040):    14.07   0.217     5.67    47.07

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0041)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)= 900.00
| DT=  5.0 min     |     Length       (m)=  50.00
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013

     <----------------- TRAVEL TIME TABLE ---------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
         (m)      (cu.m.)      (cms)       (m/s)        min
        0.05     .642E+00       0.0          0.53         1.56
        0.09     .178E+01       0.0          0.83         1.00
        0.14     .322E+01       0.1          1.07         0.78
        0.19     .487E+01       0.1          1.28         0.65
        0.24     .668E+01       0.2          1.45         0.57
        0.28     .862E+01       0.3          1.61         0.52
        0.33     .106E+02       0.4          1.74         0.48
        0.38     .127E+02       0.5          1.86         0.45
        0.43     .148E+02       0.6          1.97         0.42
        0.47     .170E+02       0.7          2.06         0.41
        0.52     .191E+02       0.8          2.13         0.39
        0.57     .212E+02       0.9          2.20         0.38
        0.62     .232E+02       1.0          2.24         0.37
        0.66     .251E+02       1.1          2.28         0.37
        0.71     .269E+02       1.2          2.29         0.36
        0.76     .286E+02       1.3          2.29         0.36
        0.81     .300E+02       1.4          2.27         0.37
        0.85     .312E+02       1.4          2.21         0.38
        0.90     .318E+02       1.3          2.01         0.41
                                      <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0040)   14.07     0.22    5.67  47.07      0.25      1.49
   OUTFLOW: ID= 1 (  0041)   14.07     0.22    5.67  47.07      0.25      1.49


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0210)|   Area    (ha)=   0.62   Curve Number   (CN)= 79.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   0.112

     PEAK FLOW       (cms)=   0.043 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  27.161
     TOTAL RAINFALL   (mm)=  65.319
     RUNOFF COEFFICIENT   =   0.416

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0207)|   Area    (ha)=  12.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
```

```
     Surface Area     (ha)=       8.22         4.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     290.29        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67        68.18
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.44 (ii)    5.68 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.26         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.30         0.69          2.716 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      64.32        31.33          49.47
     TOTAL RAINFALL   (mm)=      65.32        65.32          65.32
     RUNOFF COEFFICIENT   =       0.98         0.48           0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0209)|   Area    (ha)=   1.84
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.20         0.64
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     110.75        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67        68.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.93 (ii)    4.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.31         0.24
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.38         0.12          0.492 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      64.32        31.33          49.47
     TOTAL RAINFALL   (mm)=      65.32        65.32          65.32
     RUNOFF COEFFICIENT   =       0.98         0.48           0.76
```

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0221)|   Area    (ha)=   4.96
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.22         1.74
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     181.84        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67        68.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.60 (ii)    4.84 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.29         0.22
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.97         0.30          1.262 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      58.32        31.33          46.17
     TOTAL RAINFALL   (mm)=      65.32        65.32          65.32
     RUNOFF COEFFICIENT   =       0.89         0.48           0.71

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0208)|   Area    (ha)=   1.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.67         0.36
```

```
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.87        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     139.67        68.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.62 (ii)    3.87 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.25
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.21         0.07          0.281 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      58.32        31.33          46.17
     TOTAL RAINFALL   (mm)=      65.32        65.32          65.32
     RUNOFF COEFFICIENT   =       0.89         0.48           0.71

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0207):    12.64   2.716     4.58    49.47
     + ID2= 2 (  0208):     1.03   0.281     4.58    46.17
       ================================================
       ID = 3 (  0038):    13.67   2.997     4.58    49.23

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

--------------------
| ADD HYD  (  0038)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0038):    13.67   2.997     4.58    49.23
     + ID2= 2 (  0209):     1.84   0.492     4.58    49.47
       ================================================
       ID = 1 (  0038):    15.51   3.490     4.58    49.26

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

```
--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0038):    15.51   3.490     4.58    49.26
     + ID2= 2 (  0221):     4.96   1.262     4.58    46.17
       ================================================
       ID = 3 (  0038):    20.47   4.752     4.58    48.51

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2099)|     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    |   0.0508     0.7415
                          0.0049     0.0845    |   0.1103     0.8448
                          0.0085     0.1713    |   0.1869     0.9504
                          0.0110     0.2604    |   0.2773     1.0584
                          0.0130     0.3519    |   0.3797     1.1687
                          0.0147     0.4458    |   0.5592     1.2814
                          0.0163     0.5420    |   0.8940     1.3964
                          0.0177     0.6406    |   1.4269     1.5138

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     20.470     4.752      4.58      48.51
   OUTFLOW: ID= 1 (  2099)     20.470     0.092      8.33      45.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.93
                  TIME SHIFT OF PEAK FLOW         (min)=225.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.8124

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

--------------------
| ADD HYD  (  0049)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2099):    20.47   0.092     8.33    45.00
     + ID2= 2 (  0210):     0.62   0.043     4.83    27.16
       ================================================
       ID = 3 (  0049):    21.09   0.094     8.25    44.47

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

| STANDHYD (0222)| Area (ha)= 1.38
|ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 55.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.90	0.48
Dep. Storage (mm)=	7.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	95.92	10.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	139.67	68.18
over (min)	5.00	5.00
Storage Coeff. (min)=	1.77 (ii)	4.01 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.32	0.24

		TOTALS
PEAK FLOW (cms)=	0.28	0.09	0.373 (iii)
TIME TO PEAK (hrs)=	4.58	4.58	4.58
RUNOFF VOLUME (mm)=	58.32	31.33	46.17
TOTAL RAINFALL (mm)=	65.32	65.32	65.32
RUNOFF COEFFICIENT =	0.89	0.48	0.71

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| Junction Command(0051) |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2(0222)	1.38	0.37	4.58	46.17
OUTFLOW: ID= 2(0051)	1.38	0.37	4.58	46.17

| CALIB |
| STANDHYD (0212)| Area (ha)= 4.77
|ID= 1 DT= 5.0 min | Total Imp(%)= 65.00 Dir. Conn.(%)= 55.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	3.10	1.67
Dep. Storage (mm)=	7.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	178.33	10.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	139.67	68.18
over (min)	5.00	5.00
Storage Coeff. (min)=	2.57 (ii)	4.81 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.29	0.22

		TOTALS
PEAK FLOW (cms)=	0.93	0.29	1.217 (iii)
TIME TO PEAK (hrs)=	4.58	4.58	4.58
RUNOFF VOLUME (mm)=	58.32	31.33	46.17
TOTAL RAINFALL (mm)=	65.32	65.32	65.32
RUNOFF COEFFICIENT =	0.89	0.48	0.71

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| Junction Command(0052) |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2(0212)	4.77	1.22	4.58	46.17
OUTFLOW: ID= 2(0052)	4.77	1.22	4.58	46.17

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

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O
 OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
```


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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\c978e044-33d5-428f-afbf-d947e6e52f7f\scena
Summary filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\c978e044-33d5-428f-afbf-d947e6e52f7f\scena

DATE: 08/19/2024 TIME: 12:07:50

USER:

COMMENTS: _____

** SIMULATION : 25-mm Quality Storm **

| CHICAGO STORM |
| Ptotal= 25.00 mm |

IDF curve parameters: A= 425.000
B= 5.000
C= 0.767
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.40

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	1.65	1.00	4.31	2.00	5.82	3.00	2.27
0.17	1.82	1.17	6.37	2.17	4.52	3.17	2.08
0.33	2.04	1.33	13.83	2.33	3.72	3.33	1.92
0.50	2.33	1.50	53.25	2.50	3.19	3.50	1.79
0.67	2.72	1.67	16.08	2.67	2.80	3.67	1.68
0.83	3.31	1.83	8.40	2.83	2.50	3.83	1.58

| CALIB |
| NASHYD (0213)| Area (ha)= 0.12 Curve Number (CN)= 79.1
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.34

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.013

PEAK FLOW (cms)= 0.001 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 3.798
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.152

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

| CALIB |
| NASHYD (0227)| Area (ha)= 0.13 Curve Number (CN)= 82.3
|ID= 1 DT= 5.0 min | Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.22

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.022

PEAK FLOW (cms)= 0.001 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 4.452
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.178

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

CALIB							
NASHYD (0228)	Area (ha)=	0.71	Curve Number (CN)= 84.4				
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)= 3.00				
	U.H. Tp(hrs)=	0.31					

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.088

PEAK FLOW (cms)= 0.007 (i)
TIME TO PEAK (hrs)= 2.083
RUNOFF VOLUME (mm)= 4.986
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.199

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

CALIB							
NASHYD (0229)	Area (ha)=	1.06	Curve Number (CN)= 85.4				
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# 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 hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.080

PEAK FLOW (cms)= 0.009 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 5.274
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.211

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

CALIB							
NASHYD (0206)	Area (ha)=	2.57	Curve Number (CN)= 77.5				

ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)= 3.00				
	U.H. Tp(hrs)=	0.25					

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.391

PEAK FLOW (cms)= 0.021 (i)
TIME TO PEAK (hrs)= 2.000
RUNOFF VOLUME (mm)= 3.529
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.141

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

CALIB					
STANDHYD (0205)	Area (ha)=	0.56			
ID= 1 DT= 5.0 min	Total Imp(%)=	50.00	Dir. Conn.(%)=	1.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.28	0.28
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	61.10	10.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

				TOTALS
Max.Eff.Inten.(mm/hr)=	53.25	33.58		
over (min)	5.00	10.00		
Storage Coeff. (min)=	1.99 (ii)	6.74 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.31	0.14		
PEAK FLOW (cms)=	0.00	0.02	0.020 (iii)	
TIME TO PEAK (hrs)=	1.67	1.75	1.75	
RUNOFF VOLUME (mm)=	24.00	8.31	8.46	
TOTAL RAINFALL (mm)=	25.00	25.00	25.00	
RUNOFF COEFFICIENT =	0.96	0.33	0.34	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. 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 (0226)	Area (ha)=	0.05			
ID= 1 DT= 5.0 min	Total Imp(%)=	65.00	Dir. Conn.(%)=	55.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.03	0.02
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	18.26	10.00
Mannings n =	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

			TOTALS
Max.Eff.Inten.(mm/hr)=	53.25	13.41	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.96 (ii)	4.26 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.34	0.23	
PEAK FLOW (cms)=	0.00	0.00	0.005 (iii)
TIME TO PEAK (hrs)=	1.67	1.67	1.67
RUNOFF VOLUME (mm)=	24.00	5.56	15.69
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.96	0.22	0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. 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 (0202)	Area (ha)= 0.36		
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00	Dir. Conn.(%)= 55.00	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.23	0.13	
Dep. Storage (mm)=	1.00	5.00	
Average Slope (%)=	2.00	2.00	
Length (m)=	48.99	10.00	
Mannings n =	0.013	0.250	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

			TOTALS
Max.Eff.Inten.(mm/hr)=	53.25	13.41	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.74 (ii)	5.04 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.32	0.16	
PEAK FLOW (cms)=	0.03	0.00	0.032 (iii)
TIME TO PEAK (hrs)=	1.67	1.75	1.67
RUNOFF VOLUME (mm)=	24.00	5.56	15.69
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.96	0.22	0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0039)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0039):	0.92	0.049	1.67	11.29
	+ ID2= 2 (0205):	0.56	0.020	1.75	8.46
	ID = 3 (0039):	0.92	0.049	1.67	11.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0039)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0039):	3.49	0.056	1.67	5.57
	+ ID2= 2 (0206):	2.57	0.021	2.00	3.53
	ID = 1 (0039):	3.49	0.056	1.67	5.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0039)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0039):	3.49	0.056	1.67	5.57
	+ ID2= 2 (0226):	0.05	0.005	1.67	15.69
	ID = 3 (0039):	3.54	0.061	1.67	5.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0039)					
1 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 3 (0039):	3.54	0.061	1.67	5.72
	+ ID2= 2 (0227):	0.13	0.001	1.92	4.45
	ID = 1 (0039):	3.67	0.061	1.67	5.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0039)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0039):	3.67	0.061	1.67	5.67
	+ ID2= 2 (0228):	0.71	0.007	2.08	4.99
	ID = 3 (0039):	4.38	0.063	1.67	5.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0039)					
3 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 3 (0039):	4.38	0.063	1.67	5.56
	+ ID2= 2 (0229):	1.06	0.009	2.33	5.27
	ID = 1 (0039):	5.44	0.064	1.67	5.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0223)	Area (ha)= 0.70	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.24		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.110

PEAK FLOW (cms)= 0.008 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 4.876
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = 0.195

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

```
| CALIB            |
| NASHYD   (  0224)|   Area    (ha)=   0.64   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

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


                          ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    1.65 | 1.083    4.31 | 2.083    5.82 |  3.08    2.27
 0.167    1.65 | 1.167    4.31 | 2.167    5.82 |  3.17    2.27
 0.250    1.82 | 1.250    6.37 | 2.250    4.52 |  3.25    2.08
 0.333    1.82 | 1.333    6.37 | 2.333    4.52 |  3.33    2.08
 0.417    2.04 | 1.417   13.83 | 2.417    3.72 |  3.42    1.92
 0.500    2.04 | 1.500   13.83 | 2.500    3.72 |  3.50    1.92
 0.583    2.33 | 1.583   53.25 | 2.583    3.19 |  3.58    1.79
 0.667    2.33 | 1.667   53.25 | 2.667    3.19 |  3.67    1.79
 0.750    2.72 | 1.750   16.08 | 2.750    2.80 |  3.75    1.68
 0.833    2.72 | 1.833   16.08 | 2.833    2.80 |  3.83    1.68
 0.917    3.31 | 1.917    8.40 | 2.917    2.50 |  3.92    1.58
 1.000    3.31 | 2.000    8.40 | 3.000    2.50 |  4.00    1.58

     Unit Hyd Qpeak  (cms)=   0.080

     PEAK FLOW       (cms)=   0.006 (i)
     TIME TO PEAK    (hrs)=   2.083
     RUNOFF VOLUME    (mm)=   4.459
     TOTAL RAINFALL   (mm)=  25.000
     RUNOFF COEFFICIENT   =   0.178

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

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

--------------------
| ADD HYD  (  0060)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0223):     0.70   0.008     1.92     4.88
     + ID2= 2 (  0224):     0.64   0.006     2.08     4.46
       ==========================================================
       ID = 3 (  0060):     1.34   0.014     2.00     4.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   9.08
```

```
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.90         3.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     246.04        10.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    1.65 | 1.083    4.31 | 2.083    5.82 |  3.08    2.27
 0.167    1.65 | 1.167    4.31 | 2.167    5.82 |  3.17    2.27
 0.250    1.82 | 1.250    6.37 | 2.250    4.52 |  3.25    2.08
 0.333    1.82 | 1.333    6.37 | 2.333    4.52 |  3.33    2.08
 0.417    2.04 | 1.417   13.83 | 2.417    3.72 |  3.42    1.92
 0.500    2.04 | 1.500   13.83 | 2.500    3.72 |  3.50    1.92
 0.583    2.33 | 1.583   53.25 | 2.583    3.19 |  3.58    1.79
 0.667    2.33 | 1.667   53.25 | 2.667    3.19 |  3.67    1.79
 0.750    2.72 | 1.750   16.08 | 2.750    2.80 |  3.75    1.68
 0.833    2.72 | 1.833   16.08 | 2.833    2.80 |  3.83    1.68
 0.917    3.31 | 1.917    8.40 | 2.917    2.50 |  3.92    1.58
 1.000    3.31 | 2.000    8.40 | 3.000    2.50 |  4.00    1.58

     Max.Eff.Inten.(mm/hr)=      53.25        13.41
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      4.58 (ii)    7.88 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.23         0.13
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.68         0.09      0.739 (iii)
     TIME TO PEAK    (hrs)=      1.67         1.75       1.67
     RUNOFF VOLUME    (mm)=     24.00         5.56      15.70
     TOTAL RAINFALL   (mm)=     25.00        25.00      25.00
     RUNOFF COEFFICIENT   =      0.96         0.22       0.63

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0201)|   Area    (ha)=   0.68
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  75.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.58         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      67.33        10.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    1.65 | 1.083    4.31 | 2.083    5.82 |  3.08    2.27
 0.167    1.65 | 1.167    4.31 | 2.167    5.82 |  3.17    2.27
 0.250    1.82 | 1.250    6.37 | 2.250    4.52 |  3.25    2.08
 0.333    1.82 | 1.333    6.37 | 2.333    4.52 |  3.33    2.08
 0.417    2.04 | 1.417   13.83 | 2.417    3.72 |  3.42    1.92
 0.500    2.04 | 1.500   13.83 | 2.500    3.72 |  3.50    1.92
 0.583    2.33 | 1.583   53.25 | 2.583    3.19 |  3.58    1.79
 0.667    2.33 | 1.667   53.25 | 2.667    3.19 |  3.67    1.79
 0.750    2.72 | 1.750   16.08 | 2.750    2.80 |  3.75    1.68
 0.833    2.72 | 1.833   16.08 | 2.833    2.80 |  3.83    1.68
 0.917    3.31 | 1.917    8.40 | 2.917    2.50 |  3.92    1.58
 1.000    3.31 | 2.000    8.40 | 3.000    2.50 |  4.00    1.58

     Max.Eff.Inten.(mm/hr)=      53.25        23.70
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      2.11 (ii)    4.18 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.31         0.24
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.07         0.01       0.082 (iii)
     TIME TO PEAK    (hrs)=      1.67         1.67       1.67
     RUNOFF VOLUME    (mm)=     24.00         7.17      19.79
     TOTAL RAINFALL   (mm)=     25.00        25.00      25.00
     RUNOFF COEFFICIENT   =      0.96         0.29       0.79

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0211)|   Area    (ha)=   1.01
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.66         0.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.06        10.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    1.65 | 1.083    4.31 | 2.083    5.82 |  3.08    2.27
 0.167    1.65 | 1.167    4.31 | 2.167    5.82 |  3.17    2.27
 0.250    1.82 | 1.250    6.37 | 2.250    4.52 |  3.25    2.08
 0.333    1.82 | 1.333    6.37 | 2.333    4.52 |  3.33    2.08
 0.417    2.04 | 1.417   13.83 | 2.417    3.72 |  3.42    1.92
 0.500    2.04 | 1.500   13.83 | 2.500    3.72 |  3.50    1.92
 0.583    2.33 | 1.583   53.25 | 2.583    3.19 |  3.58    1.79
 0.667    2.33 | 1.667   53.25 | 2.667    3.19 |  3.67    1.79
 0.750    2.72 | 1.750   16.08 | 2.750    2.80 |  3.75    1.68
 0.833    2.72 | 1.833   16.08 | 2.833    2.80 |  3.83    1.68
 0.917    3.31 | 1.917    8.40 | 2.917    2.50 |  3.92    1.58
 1.000    3.31 | 2.000    8.40 | 3.000    2.50 |  4.00    1.58

     Max.Eff.Inten.(mm/hr)=      53.25        13.41
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.37 (ii)    5.67 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.30         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.08         0.01       0.090 (iii)
     TIME TO PEAK    (hrs)=      1.67         1.75       1.67
     RUNOFF VOLUME    (mm)=     24.00         5.56      15.70
     TOTAL RAINFALL   (mm)=     25.00        25.00      25.00
     RUNOFF COEFFICIENT   =      0.96         0.22       0.63

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (0220)	Area (ha)= 1.58		
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00	Dir. Conn.(%)= 55.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.03	0.55
Dep. Storage	(mm)=	7.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	102.63	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Max.Eff.Inten.(mm/hr)=		53.25	13.41	
over (min)		5.00	10.00	
Storage Coeff. (min)=		2.71 (ii)	6.01 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.29	0.15	
				TOTALS
PEAK FLOW	(cms)=	0.12	0.02	0.136 (iii)
TIME TO PEAK	(hrs)=	1.67	1.75	1.67
RUNOFF VOLUME	(mm)=	18.00	5.56	12.40
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	0.72	0.22	0.50

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0061)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0200):	9.08	0.739	1.67	15.70
+ ID2= 2 (0201):	0.68	0.082	1.67	19.79
ID = 3 (0061):	9.76	0.821	1.67	15.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0061)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0061):	9.76	0.821	1.67	15.99
+ ID2= 2 (0211):	1.01	0.090	1.67	15.70
ID = 1 (0061):	10.77	0.911	1.67	15.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0061)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0061):	10.77	0.911	1.67	15.96
+ ID2= 2 (0220):	1.58	0.136	1.67	12.40
ID = 3 (0061):	12.35	1.047	1.67	15.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0061)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0061):	12.35	1.047	1.67	15.51
+ ID2= 2 (0060):	1.34	0.014	2.00	4.68
ID = 1 (0061):	13.69	1.051	1.67	14.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(2111)	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.

0.0040	0.0492	0.4840	0.5022
0.0070	0.1000	0.6890	0.5665
0.0090	0.1524	0.7300	0.6325
0.0100	0.2065	0.9250	0.7004
0.0110	0.2622	1.3030	0.7700
0.0130	0.3197	1.8620	0.8415
0.0140	0.3788	2.6100	0.9149
0.1740	0.4396	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0061)	13.690	1.051	1.67	14.45
OUTFLOW: ID= 1 (2111)	13.690	0.010	4.17	14.22

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.92
TIME SHIFT OF PEAK FLOW (min)=150.00
MAXIMUM STORAGE USED (ha.m.)= 0.1887

CALIB			
STANDHYD (0203)	Area (ha)= 0.22		
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00	Dir. Conn.(%)= 80.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.18	0.04
Dep. Storage	(mm)=	5.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	38.30	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Max.Eff.Inten.(mm/hr)=		53.25	7.20	
over (min)		5.00	5.00	
Storage Coeff. (min)=		1.50 (ii)	3.77 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.33	0.25	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.00	0.027 (iii)
TIME TO PEAK	(hrs)=	1.67	1.67	1.67
RUNOFF VOLUME	(mm)=	20.00	4.17	16.83
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	0.80	0.17	0.67

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. 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 (0204)	Area (ha)= 0.16		
ID= 1 DT= 5.0 min	Total Imp(%)= 75.00	Dir. Conn.(%)= 55.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.04
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	32.66	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27

0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Max.Eff.Inten.(mm/hr)=	53.25	27.77	
over (min)	5.00	5.00	
Storage Coeff. (min)=	1.36 (ii)	4.25 (ii)	
Unit Hyd. Tpeak (min)=	5.00	5.00	
Unit Hyd. peak (cms)=	0.33	0.24	
			TOTALS
PEAK FLOW (cms)=	0.01	0.00	0.016 (iii)
TIME TO PEAK (hrs)=	1.67	1.67	1.67
RUNOFF VOLUME (mm)=	24.00	7.67	16.64
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.96	0.31	0.67

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0040)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0203):	0.22	0.027	1.67	16.83
	+ ID2= 2 (0204):	0.16	0.016	1.67	16.64
	ID = 3 (0040):	0.38	0.043	1.67	16.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0040)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0040):	0.38	0.043	1.67	16.75

+ ID2= 2 (2111): 13.69 0.010 4.17 14.22
ID = 1 (0040): 14.07 0.048 1.67 14.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTEPIPE(0041)		
IN= 2---> OUT= 1	PIPE Number	= 1.00
DT= 5.0 min	Diameter	(mm)= 900.00
	Length	(m)= 50.00
	Slope	(m/m)= 0.005
	Manning n	= 0.013

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

DEPTH (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME min
0.05	.642E+00	0.0	0.53	1.56
0.09	.178E+01	0.0	0.83	1.00
0.14	.322E+01	0.1	1.07	0.78
0.19	.487E+01	0.1	1.28	0.65
0.24	.668E+01	0.2	1.45	0.57
0.28	.862E+01	0.3	1.61	0.52
0.33	.106E+02	0.4	1.74	0.48
0.38	.127E+02	0.5	1.86	0.45
0.43	.148E+02	0.6	1.97	0.42
0.47	.170E+02	0.7	2.06	0.41
0.52	.191E+02	0.8	2.13	0.39
0.57	.212E+02	0.9	2.20	0.38
0.62	.232E+02	1.0	2.24	0.37
0.66	.251E+02	1.1	2.28	0.37
0.71	.269E+02	1.2	2.29	0.36
0.76	.286E+02	1.3	2.29	0.36
0.81	.300E+02	1.4	2.27	0.37
0.85	.312E+02	1.4	2.21	0.38
0.90	.318E+02	1.3	2.01	0.41

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0040)	14.07	0.05	1.67	14.29	0.12	0.93
OUTFLOW: ID= 1 (0041)	14.07	0.05	1.67	14.28	0.12	0.97

CALIB		
NASHYD (0210)	Area (ha)=	0.62
ID= 1 DT= 5.0 min	Ia (mm)=	7.00
	U.H. Tp(hrs)=	0.21

Curve Number (CN)= 79.2
# of Linear Res.(N)= 3.00

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Unit Hyd Qpeak (cms)= 0.112

PEAK FLOW	(cms)=	0.006 (i)
TIME TO PEAK	(hrs)=	1.917
RUNOFF VOLUME	(mm)=	3.819
TOTAL RAINFALL	(mm)=	25.000
RUNOFF COEFFICIENT	=	0.153

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

CALIB		
STANDHYD (0207)	Area (ha)=	12.64
ID= 1 DT= 5.0 min	Total Imp(%)=	65.00
	Dir. Conn.(%)=	55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.22	4.42
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	290.29	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27

0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Max.Eff.Inten.(mm/hr)=	53.25	13.41	
over (min)	5.00	10.00	
Storage Coeff. (min)=	5.06 (ii)	8.36 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.21	0.12	
			TOTALS
PEAK FLOW (cms)=	0.92	0.12	1.006 (iii)
TIME TO PEAK (hrs)=	1.67	1.75	1.67
RUNOFF VOLUME (mm)=	24.00	5.56	15.70
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.96	0.22	0.63

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. 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 (0209)	Area (ha)=	1.84
ID= 1 DT= 5.0 min	Total Imp(%)=	65.00
	Dir. Conn.(%)=	55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.20	0.64
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	110.75	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27

0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Max.Eff.Inten.(mm/hr)=	53.25	13.41	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.84 (ii)	6.14 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.15	
			TOTALS
PEAK FLOW (cms)=	0.15	0.02	0.161 (iii)
TIME TO PEAK (hrs)=	1.67	1.75	1.67
RUNOFF VOLUME (mm)=	24.00	5.56	15.70
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.96	0.22	0.63

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. 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 (0221)	Area (ha)=	4.96	
ID= 1 DT= 5.0 min	Total Imp(%)=	65.00	Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	3.22	1.74
Dep. Storage	(mm)=	7.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	181.84	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Max.Eff.Inten.(mm/hr)=	53.25	13.41	
over (min)	5.00	10.00	
Storage Coeff. (min)=	3.82 (ii)	7.12 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.25	0.14	
			TOTALS
PEAK FLOW (cms)=	0.36	0.05	0.400 (iii)
TIME TO PEAK (hrs)=	1.67	1.75	1.67
RUNOFF VOLUME (mm)=	18.00	5.56	12.40
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.72	0.22	0.50

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. 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 (0208)	Area (ha)=	1.03	
ID= 1 DT= 5.0 min	Total Imp(%)=	65.00	Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.67	0.36
Dep. Storage	(mm)=	7.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	82.87	10.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	1.65	1.083	4.31	2.083	5.82	3.08	2.27
0.167	1.65	1.167	4.31	2.167	5.82	3.17	2.27
0.250	1.82	1.250	6.37	2.250	4.52	3.25	2.08
0.333	1.82	1.333	6.37	2.333	4.52	3.33	2.08
0.417	2.04	1.417	13.83	2.417	3.72	3.42	1.92
0.500	2.04	1.500	13.83	2.500	3.72	3.50	1.92
0.583	2.33	1.583	53.25	2.583	3.19	3.58	1.79
0.667	2.33	1.667	53.25	2.667	3.19	3.67	1.79
0.750	2.72	1.750	16.08	2.750	2.80	3.75	1.68
0.833	2.72	1.833	16.08	2.833	2.80	3.83	1.68
0.917	3.31	1.917	8.40	2.917	2.50	3.92	1.58
1.000	3.31	2.000	8.40	3.000	2.50	4.00	1.58

Max.Eff.Inten.(mm/hr)=	53.25	13.41	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.39 (ii)	5.68 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.30	0.15	
			TOTALS
PEAK FLOW (cms)=	0.08	0.01	0.090 (iii)
TIME TO PEAK (hrs)=	1.67	1.75	1.67
RUNOFF VOLUME (mm)=	18.00	5.56	12.40
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	0.72	0.22	0.50

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0038)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0207):	12.64	1.006	1.67	15.70
+ ID2= 2 (0208):	1.03	0.090	1.67	12.40
ID = 3 (0038):	13.67	1.096	1.67	15.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0038)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 3 (0038):	13.67	1.096	1.67	15.45
+ ID2= 2 (0209):	1.84	0.161	1.67	15.70
ID = 1 (0038):	15.51	1.257	1.67	15.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0038)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0038):	15.51	1.257	1.67	15.48
+ ID2= 2 (0221):	4.96	0.400	1.67	12.40
ID = 3 (0038):	20.47	1.657	1.67	14.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(2099) 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	0.0508	0.7415
0.0049	0.0845	0.1103	0.8448
0.0085	0.1713	0.1869	0.9504
0.0110	0.2604	0.2773	1.0584
0.0130	0.3519	0.3797	1.1687
0.0147	0.4458	0.5592	1.2814
0.0163	0.5420	0.8940	1.3964
0.0177	0.6406	1.4269	1.5138

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0038)	20.470	1.657	1.67	14.74
OUTFLOW: ID= 1 (2099)	20.470	0.012	4.17	14.14

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.70
TIME SHIFT OF PEAK FLOW (min)=150.00
MAXIMUM STORAGE USED (ha.m.)= 0.2912

ADD HYD (0049)

```
|   1 +  2 =  3    |        AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2099):    20.47   0.012     4.17    14.14
     + ID2= 2 (  0210):     0.62   0.006     1.92     3.82
       ====================================================
       ID = 3 (  0049):    21.09   0.015     2.00    13.83

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0222)|   Area    (ha)=   1.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.90         0.48
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      95.92        10.00
     Mannings n           =      0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    1.65 | 1.083    4.31 | 2.083    5.82 |  3.08    2.27
 0.167    1.65 | 1.167    4.31 | 2.167    5.82 |  3.17    2.27
 0.250    1.82 | 1.250    6.37 | 2.250    4.52 |  3.25    2.08
 0.333    1.82 | 1.333    6.37 | 2.333    4.52 |  3.33    2.08
 0.417    2.04 | 1.417   13.83 | 2.417    3.72 |  3.42    1.92
 0.500    2.04 | 1.500   13.83 | 2.500    3.72 |  3.50    1.92
 0.583    2.33 | 1.583   53.25 | 2.583    3.19 |  3.58    1.79
 0.667    2.33 | 1.667   53.25 | 2.667    3.19 |  3.67    1.79
 0.750    2.72 | 1.750   16.08 | 2.750    2.80 |  3.75    1.68
 0.833    2.72 | 1.833   16.08 | 2.833    2.80 |  3.83    1.68
 0.917    3.31 | 1.917    8.40 | 2.917    2.50 |  3.92    1.58
 1.000    3.31 | 2.000    8.40 | 3.000    2.50 |  4.00    1.58

     Max.Eff.Inten.(mm/hr)=      53.25        13.41
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.60 (ii)    5.90 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.29         0.15
                                                  *TOTALS*
     PEAK FLOW       (cms)=      0.11         0.01          0.119 (iii)
     TIME TO PEAK    (hrs)=      1.67         1.75           1.67
     RUNOFF VOLUME    (mm)=     18.00         5.56          12.40
     TOTAL RAINFALL   (mm)=     25.00        25.00          25.00
```

```
     RUNOFF COEFFICIENT   =       0.72         0.22          0.50

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

  -------------------------
  | Junction Command(0051) |
  -------------------------

                          AREA     QPEAK    TPEAK     R.V.
                          (ha)     (cms)    (hrs)     (mm)
  INFLOW : ID= 2(  0222)    1.38     0.12     1.67    12.40
  OUTFLOW: ID= 2(  0051)    1.38     0.12     1.67    12.40

  --------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.10         1.67
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     178.33        10.00
     Mannings n           =      0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    1.65 | 1.083    4.31 | 2.083    5.82 |  3.08    2.27
 0.167    1.65 | 1.167    4.31 | 2.167    5.82 |  3.17    2.27
 0.250    1.82 | 1.250    6.37 | 2.250    4.52 |  3.25    2.08
 0.333    1.82 | 1.333    6.37 | 2.333    4.52 |  3.33    2.08
 0.417    2.04 | 1.417   13.83 | 2.417    3.72 |  3.42    1.92
 0.500    2.04 | 1.500   13.83 | 2.500    3.72 |  3.50    1.92
 0.583    2.33 | 1.583   53.25 | 2.583    3.19 |  3.58    1.79
 0.667    2.33 | 1.667   53.25 | 2.667    3.19 |  3.67    1.79
 0.750    2.72 | 1.750   16.08 | 2.750    2.80 |  3.75    1.68
 0.833    2.72 | 1.833   16.08 | 2.833    2.80 |  3.83    1.68
```

```
 0.917    3.31 | 1.917    8.40 | 2.917    2.50 |  3.92    1.58
 1.000    3.31 | 2.000    8.40 | 3.000    2.50 |  4.00    1.58

     Max.Eff.Inten.(mm/hr)=      53.25        13.41
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      3.78 (ii)    7.08 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.25         0.14
                                                  *TOTALS*
     PEAK FLOW       (cms)=      0.35         0.05          0.386 (iii)
     TIME TO PEAK    (hrs)=      1.67         1.75           1.67
     RUNOFF VOLUME    (mm)=     18.00         5.56          12.40
     TOTAL RAINFALL   (mm)=     25.00        25.00          25.00
     RUNOFF COEFFICIENT   =      0.72         0.22           0.50

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

  -------------------------
  | Junction Command(0052) |
  -------------------------

                          AREA     QPEAK    TPEAK     R.V.
                          (ha)     (cms)    (hrs)     (mm)
  INFLOW : ID= 2(  0212)    4.77     0.39     1.67    12.40
  OUTFLOW: ID= 2(  0052)    4.77     0.39     1.67    12.40

  --------------------------------------------------------------------------------
================================================================================
======================


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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
```



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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\2fc2c5
05-47c6-4df2-b34b-ee7e2da1ba7b\scena
  Summary filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\2fc2c5
05-47c6-4df2-b34b-ee7e2da1ba7b\scena


DATE: 08/19/2024                          TIME: 12:07:50

USER:


COMMENTS: _____

--------------------------------------------------------------------------------
----------------------
  **********************************************
  ** SIMULATION : 25yr 12hr 5min Chicago        **
  **********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1837.546
| Ptotal= 77.38 mm |                          B=  11.800
--------------------                          C=   0.857
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  = 12.00 hrs
                         Storm time step    =  5.00 min
                         Time to peak ratio =  0.38

  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
  0.00    1.03 |  3.00    3.01 |  6.00    4.97 |  9.00    1.62
  0.08    1.04 |  3.08    3.19 |  6.08    4.69 |  9.08    1.60
  0.17    1.06 |  3.17    3.40 |  6.17    4.44 |  9.17    1.57
  0.25    1.08 |  3.25    3.64 |  6.25    4.22 |  9.25    1.54
  0.33    1.10 |  3.33    3.92 |  6.33    4.02 |  9.33    1.52
  0.42    1.12 |  3.42    4.24 |  6.42    3.83 |  9.42    1.49
  0.50    1.15 |  3.50    4.62 |  6.50    3.67 |  9.50    1.47
```

0.58	1.17	3.58	5.08	6.58	3.51	9.58	1.45
0.67	1.19	3.67	5.65	6.67	3.37	9.67	1.42
0.75	1.22	3.75	6.35	6.75	3.24	9.75	1.40
0.83	1.24	3.83	7.25	6.83	3.12	9.83	1.38
0.92	1.27	3.92	8.44	6.92	3.01	9.92	1.36
1.00	1.30	4.00	10.07	7.00	2.91	10.00	1.34
1.08	1.33	4.08	12.45	7.08	2.82	10.08	1.32
1.17	1.36	4.17	16.17	7.17	2.73	10.17	1.30
1.25	1.40	4.25	22.65	7.25	2.64	10.25	1.29
1.33	1.43	4.33	36.11	7.33	2.56	10.33	1.27
1.42	1.47	4.42	75.42	7.42	2.49	10.42	1.25
1.50	1.51	4.50	163.74	7.50	2.42	10.50	1.24
1.58	1.55	4.58	88.04	7.58	2.36	10.58	1.22
1.67	1.59	4.67	51.42	7.67	2.29	10.67	1.20
1.75	1.64	4.75	34.99	7.75	2.23	10.75	1.19
1.83	1.69	4.83	25.99	7.83	2.18	10.83	1.17
1.92	1.74	4.92	20.44	7.92	2.13	10.92	1.16
2.00	1.80	5.00	16.73	8.00	2.08	11.00	1.15
2.08	1.86	5.08	14.09	8.08	2.03	11.08	1.13
2.17	1.93	5.17	12.14	8.17	1.98	11.17	1.12
2.25	2.00	5.25	10.65	8.25	1.94	11.25	1.11
2.33	2.07	5.33	9.47	8.33	1.90	11.33	1.09
2.42	2.15	5.42	8.51	8.42	1.86	11.42	1.08
2.50	2.24	5.50	7.73	8.50	1.82	11.50	1.07
2.58	2.34	5.58	7.08	8.58	1.79	11.58	1.06
2.67	2.45	5.67	6.53	8.67	1.75	11.67	1.05
2.75	2.57	5.75	6.05	8.75	1.72	11.75	1.03
2.83	2.70	5.83	5.64	8.83	1.69	11.83	1.02
2.92	2.85	5.92	5.28	8.92	1.65	11.92	1.01

CALIB			
NASHYD (0213)	Area (ha)=	0.12	Curve Number (CN)= 79.1
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.34	

Unit Hyd Qpeak (cms)= 0.013

PEAK FLOW (cms)= 0.009 (i)
TIME TO PEAK (hrs)= 5.000
RUNOFF VOLUME (mm)= 36.013
TOTAL RAINFALL (mm)= 77.381
RUNOFF COEFFICIENT = 0.465

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

CALIB			
NASHYD (0227)	Area (ha)=	0.13	Curve Number (CN)= 82.3
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.22	

Unit Hyd Qpeak (cms)= 0.022

PEAK FLOW (cms)= 0.014 (i)
TIME TO PEAK (hrs)= 4.833
RUNOFF VOLUME (mm)= 39.572
TOTAL RAINFALL (mm)= 77.381
RUNOFF COEFFICIENT = 0.511

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

CALIB			
NASHYD (0228)	Area (ha)=	0.71	Curve Number (CN)= 84.4
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.31	

Unit Hyd Qpeak (cms)= 0.088

PEAK FLOW (cms)= 0.068 (i)
TIME TO PEAK (hrs)= 4.917
RUNOFF VOLUME (mm)= 42.203
TOTAL RAINFALL (mm)= 77.381
RUNOFF COEFFICIENT = 0.545

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

CALIB			
NASHYD (0229)	Area (ha)=	1.06	Curve Number (CN)= 85.4
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.51	

Unit Hyd Qpeak (cms)= 0.080

PEAK FLOW (cms)= 0.076 (i)
TIME TO PEAK (hrs)= 5.167
RUNOFF VOLUME (mm)= 43.523
TOTAL RAINFALL (mm)= 77.381
RUNOFF COEFFICIENT = 0.562

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

CALIB			
NASHYD (0206)	Area (ha)=	2.57	Curve Number (CN)= 77.5
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.25	

Unit Hyd Qpeak (cms)= 0.391

PEAK FLOW (cms)= 0.217 (i)
TIME TO PEAK (hrs)= 4.833
RUNOFF VOLUME (mm)= 34.343
TOTAL RAINFALL (mm)= 77.381
RUNOFF COEFFICIENT = 0.444

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

CALIB			
STANDHYD (0205)	Area (ha)=	0.56	
ID= 1 DT= 5.0 min	Total Imp(%)=	50.00	Dir. Conn.(%)= 1.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.28	0.28
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	61.10	10.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=		163.74	173.90
over (min)		5.00	5.00
Storage Coeff. (min)=		1.27 (ii)	3.73 (ii)
Unit Hyd. Tpeak (min)=		5.00	5.00
Unit Hyd. peak (cms)=		0.33	0.25

				TOTALS
PEAK FLOW	(cms)=	0.00	0.14	0.141 (iii)
TIME TO PEAK	(hrs)=	4.58	4.58	4.58
RUNOFF VOLUME	(mm)=	76.38	49.51	49.77
TOTAL RAINFALL	(mm)=	77.38	77.38	77.38
RUNOFF COEFFICIENT	=	0.99	0.64	0.64

***** 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* = 77.0 Ia = Dep. 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 (0226)	Area (ha)=	0.05	
ID= 1 DT= 5.0 min	Total Imp(%)=	65.00	Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.03	0.02
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	18.26	10.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=		163.74	91.00
over (min)		5.00	5.00
Storage Coeff. (min)=		0.61 (ii)	2.72 (ii)
Unit Hyd. Tpeak (min)=		5.00	5.00
Unit Hyd. peak (cms)=		0.34	0.29

				TOTALS
PEAK FLOW	(cms)=	0.01	0.00	0.017 (iii)
TIME TO PEAK	(hrs)=	4.58	4.58	4.58
RUNOFF VOLUME	(mm)=	76.38	40.76	60.35
TOTAL RAINFALL	(mm)=	77.38	77.38	77.38
RUNOFF COEFFICIENT	=	0.99	0.53	0.78

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. 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 (0202)	Area (ha)=	0.36	
ID= 1 DT= 5.0 min	Total Imp(%)=	65.00	Dir. Conn.(%)= 55.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.23	0.13
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	48.99	10.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=		163.74	91.00
over (min)		5.00	5.00
Storage Coeff. (min)=		1.11 (ii)	3.22 (ii)

```
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.27
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.09         0.03          0.123 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      76.38        40.76          60.34
     TOTAL RAINFALL   (mm)=      77.38        77.38          77.38
     RUNOFF COEFFICIENT   =       0.99         0.53           0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0202):     0.36   0.123     4.58    60.34
     + ID2= 2 (  0205):     0.56   0.141     4.58    49.77
       ================================================
       ID = 3 (  0039):     0.92   0.263     4.58    53.91

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

--------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     0.92   0.263     4.58    53.91
     + ID2= 2 (  0206):     2.57   0.217     4.83    34.34
       ================================================
       ID = 1 (  0039):     3.49   0.343     4.58    39.50

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

--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.49   0.343     4.58    39.50
     + ID2= 2 (  0226):     0.05   0.017     4.58    60.35
       ================================================
```

```
       ID = 3 (  0039):     3.54   0.361     4.58    39.80

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

--------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     3.54   0.361     4.58    39.80
     + ID2= 2 (  0227):     0.13   0.014     4.83    39.57
       ================================================
       ID = 1 (  0039):     3.67   0.367     4.58    39.79

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

--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.67   0.367     4.58    39.79
     + ID2= 2 (  0228):     0.71   0.068     4.92    42.20
       ================================================
       ID = 3 (  0039):     4.38   0.395     4.67    40.18

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

--------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     4.38   0.395     4.67    40.18
     + ID2= 2 (  0229):     1.06   0.076     5.17    43.52
       ================================================
       ID = 1 (  0039):     5.44   0.435     4.83    40.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0223)|   Area    (ha)=   0.70   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.24

     Unit Hyd Qpeak  (cms)=   0.110

     PEAK FLOW       (cms)=   0.076 (i)
     TIME TO PEAK    (hrs)=   4.833
```

```
     RUNOFF VOLUME    (mm)=  41.671
     TOTAL RAINFALL   (mm)=  77.381
     RUNOFF COEFFICIENT   =   0.539

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0224)|   Area    (ha)=   0.64   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.080

     PEAK FLOW       (cms)=   0.057 (i)
     TIME TO PEAK    (hrs)=   4.917
     RUNOFF VOLUME    (mm)=  39.610
     TOTAL RAINFALL   (mm)=  77.381
     RUNOFF COEFFICIENT   =   0.512

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

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

--------------------
| ADD HYD  (  0060)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0223):     0.70   0.076     4.83    41.67
     + ID2= 2 (  0224):     0.64   0.057     4.92    39.61
       ================================================
       ID = 3 (  0060):     1.34   0.130     4.83    40.69

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   9.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.90         3.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     246.04        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74        91.00
               over (min)        5.00        10.00
```

```
     Storage Coeff.  (min)=       2.92 (ii)    5.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.16
                                                        *TOTALS*
     PEAK FLOW       (cms)=       2.03         0.69          2.458 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      76.38        40.76          60.35
     TOTAL RAINFALL   (mm)=      77.38        77.38          77.38
     RUNOFF COEFFICIENT   =       0.99         0.53           0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0201)|   Area    (ha)=   0.68
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  75.00
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.58         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      67.33        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74       135.50
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.34 (ii)    2.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.29
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.23         0.04          0.271 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      76.38        46.14          68.82
     TOTAL RAINFALL   (mm)=      77.38        77.38          77.38
     RUNOFF COEFFICIENT   =       0.99         0.60           0.89

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0211)|   Area    (ha)=   1.01
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.66         0.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.06        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74        91.00
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.51 (ii)    3.62 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.25
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.25         0.09          0.337 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      76.38        40.76         60.35
     TOTAL RAINFALL   (mm)=      77.38        77.38         77.38
     RUNOFF COEFFICIENT   =       0.99         0.53          0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0220)|   Area    (ha)=   1.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.03         0.55
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     102.63        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74        91.00
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.73 (ii)    3.84 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.25
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.38         0.14          0.521 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      70.38        40.76         57.05
     TOTAL RAINFALL   (mm)=      77.38        77.38         77.38
     RUNOFF COEFFICIENT   =       0.91         0.53          0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     9.08   2.458     4.58    60.35
     + ID2= 2 (  0201):     0.68   0.271     4.58    68.82
       ================================================
       ID = 3 (  0061):     9.76   2.730     4.58    60.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):     9.76   2.730     4.58    60.94
     + ID2= 2 (  0211):     1.01   0.337     4.58    60.35
       ================================================
       ID = 1 (  0061):    10.77   3.067     4.58    60.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0061):    10.77   3.067     4.58    60.89
     + ID2= 2 (  0220):     1.58   0.521     4.58    57.05
       ================================================

       ID = 3 (  0061):    12.35   3.588     4.58    60.40

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):    12.35   3.588     4.58    60.40
     + ID2= 2 (  0060):     1.34   0.130     4.83    40.69
       ================================================
       ID = 1 (  0061):    13.69   3.636     4.58    58.47

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  2111)|     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.
                       0.0040     0.0492     |   0.4840      0.5022
                       0.0070     0.1000     |   0.6890      0.5665
                       0.0090     0.1524     |   0.7300      0.6325
                       0.0100     0.2065     |   0.9250      0.7004
                       0.0110     0.2622     |   1.3030      0.7700
                       0.0130     0.3197     |   1.8620      0.8415
                       0.0140     0.3788     |   2.6100      0.9149
                       0.1740     0.4396     |   0.0000      0.0000

                            AREA     QPEAK     TPEAK       R.V.
                            (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0061)     13.690      3.636      4.58      58.47
   OUTFLOW: ID= 1 (  2111)     13.690      0.478      5.25      57.70

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 13.15
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.5010

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0203)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.18         0.04
     Dep. Storage     (mm)=       5.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      38.30        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74        60.20
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.96 (ii)    2.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.30
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.08         0.01          0.088 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      72.38        35.34         64.97
     TOTAL RAINFALL   (mm)=      77.38        77.38         77.38
     RUNOFF COEFFICIENT   =       0.94         0.46          0.84

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0204)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  55.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12         0.04
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      32.66        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74       151.69
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.87 (ii)    2.71 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.29
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.02          0.059 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      76.38        47.67         63.45
     TOTAL RAINFALL   (mm)=      77.38        77.38         77.38
     RUNOFF COEFFICIENT   =       0.99         0.62          0.82

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

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0203):     0.22   0.088     4.58    64.97
     + ID2= 2 (  0204):     0.16   0.059     4.58    63.45
       ====================================================
       ID = 3 (  0040):     0.38   0.147     4.58    64.33

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

--------------------
| ADD HYD  (  0040)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0040):     0.38   0.147     4.58    64.33
     + ID2= 2 (  2111):    13.69   0.478     5.25    57.70
       ====================================================
       ID = 1 (  0040):    14.07   0.490     5.25    57.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0041)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)= 900.00
| DT=  5.0 min     |     Length       (m)=  50.00
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013

     <----------------- TRAVEL TIME TABLE ---------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)      (cms)        (m/s)        min
       0.05     .642E+00       0.0          0.53         1.56
       0.09     .178E+01       0.0          0.83         1.00
       0.14     .322E+01       0.1          1.07         0.78
       0.19     .487E+01       0.1          1.28         0.65
       0.24     .668E+01       0.2          1.45         0.57
       0.28     .862E+01       0.3          1.61         0.52
       0.33     .106E+02       0.4          1.74         0.48
       0.38     .127E+02       0.5          1.86         0.45
       0.43     .148E+02       0.6          1.97         0.42
       0.47     .170E+02       0.7          2.06         0.41
       0.52     .191E+02       0.8          2.13         0.39
       0.57     .212E+02       0.9          2.20         0.38
       0.62     .232E+02       1.0          2.24         0.37
       0.66     .251E+02       1.1          2.28         0.37
       0.71     .269E+02       1.2          2.29         0.36
       0.76     .286E+02       1.3          2.29         0.36
       0.81     .300E+02       1.4          2.27         0.37
       0.85     .312E+02       1.4          2.21         0.38
       0.90     .318E+02       1.3          2.01         0.41
                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0040)   14.07     0.49    5.25  57.88      0.39      1.88
   OUTFLOW: ID= 1 (  0041)   14.07     0.49    5.25  57.88      0.39      1.88

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0210)|   Area    (ha)=   0.62   Curve Number   (CN)= 79.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   0.112

     PEAK FLOW       (cms)=   0.061 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  36.078
     TOTAL RAINFALL   (mm)=  77.381
     RUNOFF COEFFICIENT   =   0.466

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0207)|   Area    (ha)=  12.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.22         4.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     290.29        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74        91.00
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.23 (ii)    5.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.16
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.76         0.94          3.345 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      76.38        40.76          60.35
     TOTAL RAINFALL   (mm)=      77.38        77.38          77.38
     RUNOFF COEFFICIENT   =       0.99         0.53           0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0209)|   Area    (ha)=   1.84
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.20         0.64
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     110.75        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74        91.00
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.81 (ii)    3.92 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.25
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.44         0.16          0.603 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      76.38        40.76          60.35
     TOTAL RAINFALL   (mm)=      77.38        77.38          77.38
     RUNOFF COEFFICIENT   =       0.99         0.53           0.78

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0221)|   Area    (ha)=   4.96
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.22         1.74
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     181.84        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74        91.00
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.44 (ii)    4.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.30         0.23
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.15         0.41          1.555 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      70.38        40.76          57.05
     TOTAL RAINFALL   (mm)=      77.38        77.38          77.38
     RUNOFF COEFFICIENT   =       0.91         0.53           0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0208)|   Area    (ha)=   1.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.67         0.36
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.87        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74        91.00
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.52 (ii)    3.63 (ii)
```

```
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.25
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.25         0.09          0.344 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      70.38        40.76          57.05
     TOTAL RAINFALL   (mm)=      77.38        77.38          77.38
     RUNOFF COEFFICIENT   =       0.91         0.53           0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0207):    12.64   3.345     4.58    60.35
     + ID2= 2 (  0208):     1.03   0.344     4.58    57.05
       ================================================
       ID = 3 (  0038):    13.67   3.689     4.58    60.10

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

--------------------
| ADD HYD  (  0038)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0038):    13.67   3.689     4.58    60.10
     + ID2= 2 (  0209):     1.84   0.603     4.58    60.35
       ================================================
       ID = 1 (  0038):    15.51   4.292     4.58    60.13

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0038):    15.51   4.292     4.58    60.13
     + ID2= 2 (  0221):     4.96   1.555     4.58    57.05
       ================================================
```

```
       ID = 3 (  0038):    20.47   5.846     4.58    59.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2099)|     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   |  0.0508      0.7415
                          0.0049     0.0845   |  0.1103      0.8448
                          0.0085     0.1713   |  0.1869      0.9504
                          0.0110     0.2604   |  0.2773      1.0584
                          0.0130     0.3519   |  0.3797      1.1687
                          0.0147     0.4458   |  0.5592      1.2814
                          0.0163     0.5420   |  0.8940      1.3964
                          0.0177     0.6406   |  1.4269      1.5138

                                    AREA     QPEAK     TPEAK       R.V.
                                    (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     20.470      5.846      4.58      59.39
   OUTFLOW: ID= 1 (  2099)     20.470      0.179      6.75      55.76

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.06
                  TIME SHIFT OF PEAK FLOW         (min)=130.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.9398

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

--------------------
| ADD HYD  (  0049)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2099):    20.47   0.179     6.75    55.76
     + ID2= 2 (  0210):     0.62   0.061     4.83    36.08
       ================================================
       ID = 3 (  0049):    21.09   0.184     6.58    55.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0222)|   Area    (ha)=   1.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.90         0.48
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      95.92        10.00
```

```
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74        91.00
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       1.66 (ii)    3.77 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.25
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.34         0.12          0.457 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      70.38        40.76          57.05
     TOTAL RAINFALL   (mm)=      77.38        77.38          77.38
     RUNOFF COEFFICIENT   =       0.91         0.53           0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

  --------------------------
  | Junction Command(0051) |
  --------------------------

                          AREA     QPEAK   TPEAK     R.V.
                          (ha)     (cms)    (hrs)    (mm)
  INFLOW : ID= 2(  0222)    1.38     0.46    4.58    57.05
  OUTFLOW: ID= 2(  0051)    1.38     0.46    4.58    57.05

  --------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.10         1.67
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     178.33        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     163.74        91.00
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       2.41 (ii)    4.52 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
```

```
     Unit Hyd. peak  (cms)=       0.30         0.23
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.11         0.39          1.498 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      70.38        40.76          57.05
     TOTAL RAINFALL   (mm)=      77.38        77.38          77.38
     RUNOFF COEFFICIENT   =       0.91         0.53           0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

  --------------------------
  | Junction Command(0052) |
  --------------------------

                          AREA     QPEAK   TPEAK     R.V.
                          (ha)     (cms)    (hrs)    (mm)
  INFLOW : ID= 2(  0212)    4.77     1.50    4.58    57.05
  OUTFLOW: ID= 2(  0052)    4.77     1.50    4.58    57.05

  --------------------------------------------------------------------------------
================================================================================
======================

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M M M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.

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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
```

Output filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\d2c3d4
09-c081-418d-9f73-412897c41257\scena
Summary filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\d2c3d4
09-c081-418d-9f73-412897c41257\scena

DATE: 08/19/2024 TIME: 12:07:49

USER:

COMMENTS: _____

** SIMULATION : 2yr 12hr 5min Chicago **

CHICAGO STORM
Ptotal= 42.50 mm

IDF curve parameters: A= 632.129
B= 6.000
C= 0.787
used in: INTENSITY = A / (t + B)^C

Duration of storm = 12.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.79	3.00	1.96	6.00	2.96	9.00	1.17
0.08	0.80	3.08	2.06	6.08	2.82	9.08	1.15
0.17	0.81	3.17	2.17	6.17	2.70	9.17	1.14
0.25	0.82	3.25	2.29	6.25	2.59	9.25	1.12
0.33	0.84	3.33	2.44	6.33	2.49	9.33	1.10
0.42	0.85	3.42	2.60	6.42	2.39	9.42	1.09
0.50	0.87	3.50	2.79	6.50	2.31	9.50	1.07
0.58	0.88	3.58	3.01	6.58	2.23	9.58	1.06
0.67	0.90	3.67	3.28	6.67	2.15	9.67	1.04
0.75	0.91	3.75	3.61	6.75	2.09	9.75	1.03
0.83	0.93	3.83	4.02	6.83	2.02	9.83	1.02
0.92	0.95	3.92	4.55	6.92	1.96	9.92	1.01
1.00	0.97	4.00	5.26	7.00	1.91	10.00	0.99
1.08	0.99	4.08	6.26	7.08	1.86	10.08	0.98
1.17	1.01	4.17	7.80	7.17	1.81	10.17	0.97
1.25	1.03	4.25	10.43	7.25	1.76	10.25	0.96
1.33	1.05	4.33	16.00	7.33	1.72	10.33	0.95
1.42	1.07	4.42	34.76	7.42	1.68	10.42	0.94
1.50	1.10	4.50	95.77	7.50	1.64	10.50	0.92
1.58	1.12	4.58	41.27	7.58	1.60	10.58	0.91
1.67	1.15	4.67	22.67	7.67	1.56	10.67	0.90
1.75	1.18	4.75	15.51	7.75	1.53	10.75	0.89
1.83	1.21	4.83	11.79	7.83	1.50	10.83	0.88
1.92	1.24	4.92	9.54	7.92	1.47	10.92	0.88
2.00	1.28	5.00	8.03	8.00	1.44	11.00	0.87
2.08	1.31	5.08	6.95	8.08	1.41	11.08	0.86
2.17	1.35	5.17	6.13	8.17	1.39	11.17	0.85
2.25	1.39	5.25	5.50	8.25	1.36	11.25	0.84
2.33	1.44	5.33	5.00	8.33	1.34	11.33	0.83
2.42	1.48	5.42	4.58	8.42	1.31	11.42	0.82
2.50	1.54	5.50	4.24	8.50	1.29	11.50	0.82
2.58	1.59	5.58	3.94	8.58	1.27	11.58	0.81
2.67	1.65	5.67	3.69	8.67	1.25	11.67	0.80
2.75	1.72	5.75	3.47	8.75	1.23	11.75	0.79
2.83	1.79	5.83	3.28	8.83	1.21	11.83	0.79
2.92	1.87	5.92	3.11	8.92	1.19	11.92	0.78

CALIB
NASHYD (0213) ID= 1 DT= 5.0 min

Area (ha)= 0.12 Curve Number (CN)= 79.1
Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.34

Unit Hyd Qpeak (cms)= 0.013

PEAK FLOW (cms)= 0.002 (i)
TIME TO PEAK (hrs)= 5.000
RUNOFF VOLUME (mm)= 12.273
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.289

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

CALIB
NASHYD (0227) ID= 1 DT= 5.0 min

Area (ha)= 0.13 Curve Number (CN)= 82.3
Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.22

Unit Hyd Qpeak (cms)= 0.022

PEAK FLOW (cms)= 0.004 (i)
TIME TO PEAK (hrs)= 4.833
RUNOFF VOLUME (mm)= 13.964
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.329

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

CALIB
NASHYD (0228) ID= 1 DT= 5.0 min

Area (ha)= 0.71 Curve Number (CN)= 84.4
Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.31

Unit Hyd Qpeak (cms)= 0.088

PEAK FLOW (cms)= 0.020 (i)
TIME TO PEAK (hrs)= 4.917
RUNOFF VOLUME (mm)= 15.282
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.360

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

CALIB
NASHYD (0229) ID= 1 DT= 5.0 min

Area (ha)= 1.06 Curve Number (CN)= 85.4
Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.51

Unit Hyd Qpeak (cms)= 0.080

PEAK FLOW (cms)= 0.023 (i)
TIME TO PEAK (hrs)= 5.167
RUNOFF VOLUME (mm)= 15.969
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.376

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

CALIB
NASHYD (0206) ID= 1 DT= 5.0 min

Area (ha)= 2.57 Curve Number (CN)= 77.5
Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.25

Unit Hyd Qpeak (cms)= 0.391

PEAK FLOW (cms)= 0.059 (i)
TIME TO PEAK (hrs)= 4.833
RUNOFF VOLUME (mm)= 11.529
TOTAL RAINFALL (mm)= 42.504
RUNOFF COEFFICIENT = 0.271

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

CALIB
STANDHYD (0205) ID= 1 DT= 5.0 min

Area (ha)= 0.56
Total Imp(%)= 50.00 Dir. Conn.(%)= 1.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.28	0.28
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	2.00	2.00
Length (m)=	61.10	10.00
Mannings n =	0.013	0.250
Max.Eff.Inten.(mm/hr)=	95.77	68.11
over (min)	5.00	10.00
Storage Coeff. (min)=	1.57 (ii)	5.15 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.33	0.16

	TOTALS
PEAK FLOW (cms)=	0.046 (iii)
TIME TO PEAK (hrs)=	4.67
RUNOFF VOLUME (mm)=	20.62
TOTAL RAINFALL (mm)=	42.50
RUNOFF COEFFICIENT =	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* = 77.0 Ia = Dep. 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 (0226) ID= 1 DT= 5.0 min

Area (ha)= 0.05
Total Imp(%)= 65.00 Dir. Conn.(%)= 55.00

```
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.03         0.02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      18.26        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.76 (ii)    3.37 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.26
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.009 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      41.50        15.27          29.07
     TOTAL RAINFALL   (mm)=      42.50        42.50          42.50
     RUNOFF COEFFICIENT   =       0.98         0.36           0.68

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0202)|   Area    (ha)=   0.36
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.23         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      48.99        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.38 (ii)    3.98 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.24
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.01          0.063 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      41.50        15.27          29.69
     TOTAL RAINFALL   (mm)=      42.50        42.50          42.50
```

```
     RUNOFF COEFFICIENT   =       0.98         0.36           0.70

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0202):     0.36   0.063     4.58    29.69
     + ID2= 2 (  0205):     0.56   0.046     4.67    20.62
       ================================================
       ID = 3 (  0039):     0.92   0.091     4.58    24.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     0.92   0.091     4.58    24.17
     + ID2= 2 (  0206):     2.57   0.059     4.83    11.53
       ================================================
       ID = 1 (  0039):     3.49   0.116     4.67    14.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.49   0.116     4.67    14.86
     + ID2= 2 (  0226):     0.05   0.009     4.58    29.07
       ================================================
       ID = 3 (  0039):     3.54   0.121     4.67    15.06

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0039)|
```

```
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     3.54   0.121     4.67    15.06
     + ID2= 2 (  0227):     0.13   0.004     4.83    13.96
       ================================================
       ID = 1 (  0039):     3.67   0.124     4.67    15.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.67   0.124     4.67    15.02
     + ID2= 2 (  0228):     0.71   0.020     4.92    15.28
       ================================================
       ID = 3 (  0039):     4.38   0.134     4.67    15.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     4.38   0.134     4.67    15.07
     + ID2= 2 (  0229):     1.06   0.023     5.17    15.97
       ================================================
       ID = 1 (  0039):     5.44   0.140     4.75    15.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0223)|   Area    (ha)=   0.70   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.24

     Unit Hyd Qpeak  (cms)=   0.110

     PEAK FLOW       (cms)=   0.023 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  15.012
     TOTAL RAINFALL   (mm)=  42.504
     RUNOFF COEFFICIENT   =   0.353

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

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

```
-------------------
| CALIB           |
| NASHYD   (  0224)|   Area    (ha)=   0.64   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.080

     PEAK FLOW       (cms)=   0.016 (i)
     TIME TO PEAK    (hrs)=   4.917
     RUNOFF VOLUME    (mm)=  13.979
     TOTAL RAINFALL   (mm)=  42.504
     RUNOFF COEFFICIENT   =   0.329

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

--------------------------------------------------------------------------------
-------------------
| ADD HYD  (  0060)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0223):     0.70   0.023     4.83    15.01
     + ID2= 2 (  0224):     0.64   0.016     4.92    13.98
       ================================================
       ID = 3 (  0060):     1.34   0.038     4.92    14.52

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0200)|   Area    (ha)=   9.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.90         3.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     246.04        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.62 (ii)    6.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.25         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.10         0.22          1.220 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      41.50        15.27          29.70
```

```
     TOTAL RAINFALL   (mm)=      42.50        42.50          42.50
     RUNOFF COEFFICIENT   =       0.98         0.36           0.70

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0201)|   Area    (ha)=   0.68
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  75.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.58         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      67.33        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        50.73
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.67 (ii)    3.31 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.26
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.13         0.02          0.147 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      41.50        18.35          35.72
     TOTAL RAINFALL   (mm)=      42.50        42.50          42.50
     RUNOFF COEFFICIENT   =       0.98         0.43           0.84

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0211)|   Area    (ha)=   1.01
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
```

```
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.66         0.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.06        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.88 (ii)    4.48 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.23
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.14         0.03           0.170 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      41.50        15.27          29.70
     TOTAL RAINFALL   (mm)=      42.50        42.50          42.50
     RUNOFF COEFFICIENT   =       0.98         0.36           0.70

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0220)|   Area    (ha)=   1.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.03         0.55
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     102.63        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.14 (ii)    4.75 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.31         0.22
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.22         0.04           0.261 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      35.50        15.27          26.40
     TOTAL RAINFALL   (mm)=      42.50        42.50          42.50
```

```
     RUNOFF COEFFICIENT   =       0.84         0.36           0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     9.08   1.220     4.58    29.70
     + ID2= 2 (  0201):     0.68   0.147     4.58    35.72
       ========================================================
       ID = 3 (  0061):     9.76   1.367     4.58    30.12

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

-------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):     9.76   1.367     4.58    30.12
     + ID2= 2 (  0211):     1.01   0.170     4.58    29.70
       ========================================================
       ID = 1 (  0061):    10.77   1.538     4.58    30.08

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

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0061):    10.77   1.538     4.58    30.08
     + ID2= 2 (  0220):     1.58   0.261     4.58    26.40
       ========================================================
       ID = 3 (  0061):    12.35   1.799     4.58    29.61

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

-------------------
| ADD HYD  (  0061)|
```

```
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):    12.35   1.799     4.58    29.61
     + ID2= 2 (  0060):     1.34   0.038     4.92    14.52
       ========================================================
       ID = 1 (  0061):    13.69   1.810     4.58    28.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  2111)|     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.
                            0.0040     0.0492   |   0.4840      0.5022
                            0.0070     0.1000   |   0.6890      0.5665
                            0.0090     0.1524   |   0.7300      0.6325
                            0.0100     0.2065   |   0.9250      0.7004
                            0.0110     0.2622   |   1.3030      0.7700
                            0.0130     0.3197   |   1.8620      0.8415
                            0.0140     0.3788   |   2.6100      0.9149
                            0.1740     0.4396   |   0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0061)     13.690      1.810      4.58      28.13
   OUTFLOW: ID= 1 (  2111)     13.690      0.013     12.08      27.51

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.75
                  TIME SHIFT OF PEAK FLOW         (min)=450.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.3490

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0203)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.18         0.04
     Dep. Storage     (mm)=       5.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      38.30        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        19.27
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.19 (ii)    2.98 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
```

```
     Unit Hyd. peak  (cms)=       0.33         0.28
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.00          0.049 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      37.50        12.41          32.48
     TOTAL RAINFALL   (mm)=      42.50        42.50          42.50
     RUNOFF COEFFICIENT   =       0.88         0.29           0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. 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 (  0204)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  55.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12         0.04
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      32.66        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        57.97
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.08 (ii)    3.36 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.26
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.01          0.030 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      41.50        19.28          31.49
     TOTAL RAINFALL   (mm)=      42.50        42.50          42.50
     RUNOFF COEFFICIENT   =       0.98         0.45           0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

```
-------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0203):     0.22   0.049     4.58    32.48
     + ID2= 2 (  0204):     0.16   0.030     4.58    31.49
       ==================================================
       ID = 3 (  0040):     0.38   0.079     4.58    32.07

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

-------------------
| ADD HYD  (  0040)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0040):     0.38   0.079     4.58    32.07
     + ID2= 2 (  2111):    13.69   0.013    12.08    27.51
       ==================================================
       ID = 1 (  0040):    14.07   0.086     4.58    27.63

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| ROUTEPIPE(  0041)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)= 900.00
| DT=  5.0 min     |     Length       (m)=  50.00
-------------------      Slope      (m/m)=  0.005
                         Manning n       =  0.013

     <----------------- TRAVEL TIME TABLE ------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
         (m)      (cu.m.)      (cms)        (m/s)        min
       0.05     .642E+00       0.0          0.53         1.56
       0.09     .178E+01       0.0          0.83         1.00
       0.14     .322E+01       0.1          1.07         0.78
       0.19     .487E+01       0.1          1.28         0.65
       0.24     .668E+01       0.2          1.45         0.57
       0.28     .862E+01       0.3          1.61         0.52
       0.33     .106E+02       0.4          1.74         0.48
       0.38     .127E+02       0.5          1.86         0.45
       0.43     .148E+02       0.6          1.97         0.42
       0.47     .170E+02       0.7          2.06         0.41
       0.52     .191E+02       0.8          2.13         0.39
       0.57     .212E+02       0.9          2.20         0.38
       0.62     .232E+02       1.0          2.24         0.37
       0.66     .251E+02       1.1          2.28         0.37
       0.71     .269E+02       1.2          2.29         0.36
       0.76     .286E+02       1.3          2.29         0.36
```

```
       0.81     .300E+02       1.4          2.27         0.37
       0.85     .312E+02       1.4          2.21         0.38
       0.90     .318E+02       1.3          2.01         0.41
                                <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0040)   14.07     0.09    4.58  27.63      0.16      1.13
   OUTFLOW: ID= 1 (  0041)   14.07     0.08    4.58  27.63      0.15      1.10


--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0210)|   Area    (ha)=   0.62   Curve Number   (CN)= 79.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   0.112

     PEAK FLOW       (cms)=   0.017 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  12.313
     TOTAL RAINFALL   (mm)=  42.504
     RUNOFF COEFFICIENT   =   0.290

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0207)|   Area    (ha)=  12.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.22         4.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     290.29        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       4.00 (ii)    6.61 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.24         0.14
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.48         0.30          1.645 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      41.50        15.27          29.70
```

```
     TOTAL RAINFALL   (mm)=      42.50        42.50          42.50
     RUNOFF COEFFICIENT   =       0.98         0.36           0.70

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. 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 (  0209)|   Area    (ha)=   1.84
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.20         0.64
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     110.75        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.24 (ii)    4.85 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.30         0.22
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.25         0.05          0.302 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      41.50        15.27          29.70
     TOTAL RAINFALL   (mm)=      42.50        42.50          42.50
     RUNOFF COEFFICIENT   =       0.98         0.36           0.70

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. 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 (  0221)|   Area    (ha)=   4.96
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
```

```
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.22         1.74
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     181.84        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.02 (ii)    5.63 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.63         0.12          0.702 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67          4.58
     RUNOFF VOLUME    (mm)=      35.50        15.27         26.40
     TOTAL RAINFALL   (mm)=      42.50        42.50         42.50
     RUNOFF COEFFICIENT   =       0.84         0.36          0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0208)|   Area    (ha)=   1.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.67         0.36
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.87        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.89 (ii)    4.49 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.23
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.14         0.03          0.174 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      35.50        15.27         26.40
     TOTAL RAINFALL   (mm)=      42.50        42.50         42.50
```

```
     RUNOFF COEFFICIENT   =       0.84         0.36          0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0207):    12.64   1.645     4.58    29.70
     + ID2= 2 (  0208):     1.03   0.174     4.58    26.40
       ================================================
       ID = 3 (  0038):    13.67   1.819     4.58    29.45

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

--------------------
| ADD HYD  (  0038)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0038):    13.67   1.819     4.58    29.45
     + ID2= 2 (  0209):     1.84   0.302     4.58    29.70
       ================================================
       ID = 1 (  0038):    15.51   2.121     4.58    29.48

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0038):    15.51   2.121     4.58    29.48
     + ID2= 2 (  0221):     4.96   0.702     4.58    26.40
       ================================================
       ID = 3 (  0038):    20.47   2.822     4.58    28.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2099)|     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   |   0.0508     0.7415
                          0.0049     0.0845   |   0.1103     0.8448
                          0.0085     0.1713   |   0.1869     0.9504
                          0.0110     0.2604   |   0.2773     1.0584
                          0.0130     0.3519   |   0.3797     1.1687
                          0.0147     0.4458   |   0.5592     1.2814
                          0.0163     0.5420   |   0.8940     1.3964
                          0.0177     0.6406   |   1.4269     1.5138

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     20.470     2.822      4.58      28.73
   OUTFLOW: ID= 1 (  2099)     20.470     0.016     12.08      26.71

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.58
                  TIME SHIFT OF PEAK FLOW         (min)=450.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.5449

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

--------------------
| ADD HYD  (  0049)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2099):    20.47   0.016    12.08    26.71
     + ID2= 2 (  0210):     0.62   0.017     4.83    12.31
       ================================================
       ID = 3 (  0049):    21.09   0.029     4.83    26.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0222)|   Area    (ha)=   1.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.90         0.48
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      95.92        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.06 (ii)    4.67 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.31         0.22
```

```
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.19         0.04          0.230 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      35.50        15.27         26.40
     TOTAL RAINFALL   (mm)=      42.50        42.50         42.50
     RUNOFF COEFFICIENT   =       0.84         0.36          0.62

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

  -------------------------
  | Junction Command(0051) |
  -------------------------

                          AREA     QPEAK   TPEAK     R.V.
                          (ha)     (cms)    (hrs)     (mm)
  INFLOW : ID= 2(  0222)    1.38     0.23    4.58    26.40
  OUTFLOW: ID= 2(  0051)    1.38     0.23    4.58    26.40

  --------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.10         1.67
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     178.33        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      95.77        31.63
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.99 (ii)    5.60 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.61         0.12          0.677 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67          4.58
     RUNOFF VOLUME    (mm)=      35.50        15.27         26.40
     TOTAL RAINFALL   (mm)=      42.50        42.50         42.50
     RUNOFF COEFFICIENT   =       0.84         0.36          0.62
```

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 77.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| Junction Command(0052) |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2(0212)	4.77	0.68	4.58	26.40
OUTFLOW: ID= 2(0052)	4.77	0.68	4.58	26.40

==========

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

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

Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\fa18c0dc-9848-4ac2-a0d1-24af616d6222\scena
Summary filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\fa18c0dc-9848-4ac2-a0d1-24af616d6222\scena

DATE: 08/19/2024 TIME: 12:07:51

USER:

COMMENTS: _____

** SIMULATION : 50yr 12hr 5min Chicago **

CHICAGO STORM	Ptotal= 86.68 mm

IDF curve parameters: A=2353.333
B= 13.500
C= 0.877
used in: INTENSITY = A / (t + B)^C

Duration of storm = 12.00 hrs
Storm time step = 5.00 min
Time to peak ratio = 0.38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	1.02	3.00	3.18	6.00	5.43	9.00	1.66
0.08	1.04	3.08	3.39	6.08	5.10	9.08	1.62
0.17	1.06	3.17	3.63	6.17	4.81	9.17	1.60
0.25	1.08	3.25	3.90	6.25	4.56	9.25	1.57
0.33	1.10	3.33	4.21	6.33	4.33	9.33	1.54
0.42	1.12	3.42	4.58	6.42	4.12	9.42	1.51
0.50	1.15	3.50	5.03	6.50	3.93	9.50	1.49
0.58	1.17	3.58	5.56	6.58	3.75	9.58	1.46
0.67	1.19	3.67	6.21	6.67	3.59	9.67	1.44
0.75	1.22	3.75	7.04	6.75	3.45	9.75	1.42
0.83	1.25	3.83	8.10	6.83	3.31	9.83	1.39
0.92	1.28	3.92	9.51	6.92	3.19	9.92	1.37
1.00	1.31	4.00	11.46	7.00	3.07	10.00	1.35
1.08	1.34	4.08	14.31	7.08	2.96	10.08	1.33
1.17	1.37	4.17	18.78	7.17	2.87	10.17	1.31
1.25	1.41	4.25	26.57	7.25	2.77	10.25	1.29
1.33	1.45	4.33	42.60	7.33	2.68	10.33	1.28
1.42	1.49	4.42	87.70	7.42	2.60	10.42	1.26
1.50	1.53	4.50	182.13	7.50	2.53	10.50	1.24
1.58	1.57	4.58	101.91	7.58	2.45	10.58	1.22
1.67	1.62	4.67	60.53	7.67	2.38	10.67	1.21
1.75	1.67	4.75	41.28	7.75	2.32	10.75	1.19
1.83	1.72	4.83	30.58	7.83	2.26	10.83	1.18
1.92	1.78	4.92	23.92	7.92	2.20	10.92	1.16
2.00	1.84	5.00	19.45	8.00	2.15	11.00	1.15
2.08	1.91	5.08	16.28	8.08	2.09	11.08	1.13
2.17	1.98	5.17	13.94	8.17	2.04	11.17	1.12
2.25	2.06	5.25	12.14	8.25	2.00	11.25	1.10
2.33	2.14	5.33	10.73	8.33	1.95	11.33	1.09
2.42	2.23	5.42	9.60	8.42	1.91	11.42	1.08
2.50	2.33	5.50	8.67	8.50	1.87	11.50	1.07
2.58	2.44	5.58	7.90	8.58	1.83	11.58	1.05
2.67	2.56	5.67	7.25	8.67	1.79	11.67	1.04
2.75	2.69	5.75	6.69	8.75	1.76	11.75	1.03
2.83	2.84	5.83	6.21	8.83	1.72	11.83	1.02
2.92	3.00	5.92	5.79	8.92	1.69	11.92	1.01

CALIB	NASHYD (0213)	ID= 1 DT= 5.0 min

Area (ha)= 0.12 Curve Number (CN)= 79.1
Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.34

Unit Hyd Qpeak (cms)= 0.013

PEAK FLOW (cms)= 0.011 (i)
TIME TO PEAK (hrs)= 5.000
RUNOFF VOLUME (mm)= 43.233
TOTAL RAINFALL (mm)= 86.678
RUNOFF COEFFICIENT = 0.499

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

CALIB	NASHYD (0227)	ID= 1 DT= 5.0 min

Area (ha)= 0.13 Curve Number (CN)= 82.3
Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.22

Unit Hyd Qpeak (cms)= 0.022

PEAK FLOW (cms)= 0.017 (i)
TIME TO PEAK (hrs)= 4.833
RUNOFF VOLUME (mm)= 47.207
TOTAL RAINFALL (mm)= 86.678
RUNOFF COEFFICIENT = 0.545

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

CALIB	NASHYD (0228)	ID= 1 DT= 5.0 min

Area (ha)= 0.71 Curve Number (CN)= 84.4
Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.31

Unit Hyd Qpeak (cms)= 0.088

PEAK FLOW (cms)= 0.083 (i)
TIME TO PEAK (hrs)= 4.917
RUNOFF VOLUME (mm)= 50.118
TOTAL RAINFALL (mm)= 86.678
RUNOFF COEFFICIENT = 0.578

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

CALIB	NASHYD (0229)	ID= 1 DT= 5.0 min

Area (ha)= 1.06 Curve Number (CN)= 85.4
Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.51

Unit Hyd Qpeak (cms)= 0.080

PEAK FLOW (cms)= 0.093 (i)
TIME TO PEAK (hrs)= 5.167
RUNOFF VOLUME (mm)= 51.568
TOTAL RAINFALL (mm)= 86.678
RUNOFF COEFFICIENT = 0.595

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

CALIB	NASHYD (0206)	ID= 1 DT= 5.0 min

Area (ha)= 2.57 Curve Number (CN)= 77.5
Ia (mm)= 7.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.25

Unit Hyd Qpeak (cms)= 0.391

PEAK FLOW (cms)= 0.270 (i)
TIME TO PEAK (hrs)= 4.833
RUNOFF VOLUME (mm)= 41.348
TOTAL RAINFALL (mm)= 86.678
RUNOFF COEFFICIENT = 0.477

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

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0205)|   Area    (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=   1.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         0.28
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      61.10        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       205.44
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.21 (ii)    3.52 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.26
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.17          0.168 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      85.68        57.82         58.10
     TOTAL RAINFALL   (mm)=      86.68        86.68         86.68
     RUNOFF COEFFICIENT   =       0.99         0.67          0.67

***** 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*  =  77.0    Ia = Dep. 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 (  0226)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.03         0.02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      18.26        10.00
     Mannings n           =      0.013        0.250
```

```
     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.59 (ii)    2.61 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.29
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.01          0.020 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      85.68        48.34         68.87
     TOTAL RAINFALL   (mm)=      86.68        86.68         86.68
     RUNOFF COEFFICIENT   =       0.99         0.56          0.79

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0202)|   Area    (ha)=   0.36
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.23         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      48.99        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.06 (ii)    3.08 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.27
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.10         0.04          0.140 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      85.68        48.34         68.87
     TOTAL RAINFALL   (mm)=      86.68        86.68         86.68
     RUNOFF COEFFICIENT   =       0.99         0.56          0.79

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
```

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

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

-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0202):     0.36   0.140     4.58    68.87
     + ID2= 2 (  0205):     0.56   0.168     4.58    58.10
       ================================================
       ID = 3 (  0039):     0.92   0.308     4.58    62.31

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

-------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     0.92   0.308     4.58    62.31
     + ID2= 2 (  0206):     2.57   0.270     4.83    41.35
       ================================================
       ID = 1 (  0039):     3.49   0.410     4.58    46.87

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

-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.49   0.410     4.58    46.87
     + ID2= 2 (  0226):     0.05   0.020     4.58    68.87
       ================================================
       ID = 3 (  0039):     3.54   0.430     4.58    47.18

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

-------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     3.54   0.430     4.58    47.18
     + ID2= 2 (  0227):     0.13   0.017     4.83    47.21
       ================================================
       ID = 1 (  0039):     3.67   0.437     4.58    47.19
```

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

-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.67   0.437     4.58    47.19
     + ID2= 2 (  0228):     0.71   0.083     4.92    50.12
       ================================================
       ID = 3 (  0039):     4.38   0.482     4.75    47.66

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

-------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     4.38   0.482     4.75    47.66
     + ID2= 2 (  0229):     1.06   0.093     5.17    51.57
       ================================================
       ID = 1 (  0039):     5.44   0.536     4.83    48.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0223)|   Area    (ha)=   0.70   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.24

     Unit Hyd Qpeak  (cms)=   0.110

     PEAK FLOW       (cms)=   0.094 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  49.530
     TOTAL RAINFALL   (mm)=  86.678
     RUNOFF COEFFICIENT   =   0.571

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

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0224)|   Area    (ha)=   0.64   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.080
```

```
     PEAK FLOW      (cms)=   0.070 (i)
     TIME TO PEAK   (hrs)=   4.917
     RUNOFF VOLUME   (mm)=  47.252
     TOTAL RAINFALL  (mm)=  86.678
     RUNOFF COEFFICIENT  =   0.545

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

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

-------------------
| ADD HYD  (  0060)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0223):     0.70   0.094     4.83    49.53
     + ID2= 2 (  0224):     0.64   0.070     4.92    47.25
       ================================================
       ID = 3 (  0060):     1.34   0.161     4.83    48.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   9.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.90         3.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     246.04        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.80 (ii)    4.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.28         0.22
                                                      *TOTALS*
     PEAK FLOW      (cms)=       2.29         0.87          3.159 (iii)
     TIME TO PEAK   (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME   (mm)=      85.68        48.34          68.87
     TOTAL RAINFALL  (mm)=      86.68        86.68          86.68
     RUNOFF COEFFICIENT  =       0.99         0.56           0.79

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0201)|   Area    (ha)=   0.68
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  75.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.58         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      67.33        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       161.26
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.29 (ii)    2.56 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.29
                                                      *TOTALS*
     PEAK FLOW      (cms)=       0.26         0.05          0.306 (iii)
     TIME TO PEAK   (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME   (mm)=      85.68        54.19          77.80
     TOTAL RAINFALL  (mm)=      86.68        86.68          86.68
     RUNOFF COEFFICIENT  =       0.99         0.63           0.90

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0211)|   Area    (ha)=   1.01
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.66         0.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.06        10.00
     Mannings n           =      0.013        0.250
```

```
     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.45 (ii)    3.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.26
                                                      *TOTALS*
     PEAK FLOW      (cms)=       0.28         0.11          0.385 (iii)
     TIME TO PEAK   (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME   (mm)=      85.68        48.34          68.87
     TOTAL RAINFALL  (mm)=      86.68        86.68          86.68
     RUNOFF COEFFICIENT  =       0.99         0.56           0.79

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0220)|   Area    (ha)=   1.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.03         0.55
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     102.63        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.66 (ii)    3.68 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.25
                                                      *TOTALS*
     PEAK FLOW      (cms)=       0.43         0.17          0.595 (iii)
     TIME TO PEAK   (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME   (mm)=      79.68        48.34          65.57
     TOTAL RAINFALL  (mm)=      86.68        86.68          86.68
     RUNOFF COEFFICIENT  =       0.92         0.56           0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
```

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

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

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     9.08   3.159     4.58    68.87
     + ID2= 2 (  0201):     0.68   0.306     4.58    77.80
       ================================================
       ID = 3 (  0061):     9.76   3.465     4.58    69.50

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

-------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):     9.76   3.465     4.58    69.50
     + ID2= 2 (  0211):     1.01   0.385     4.58    68.87
       ================================================
       ID = 1 (  0061):    10.77   3.850     4.58    69.44

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

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0061):    10.77   3.850     4.58    69.44
     + ID2= 2 (  0220):     1.58   0.595     4.58    65.57
       ================================================
       ID = 3 (  0061):    12.35   4.445     4.58    68.94

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

-------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):    12.35   4.445     4.58    68.94
     + ID2= 2 (  0060):     1.34   0.161     4.83    48.44
       ================================================
       ID = 1 (  0061):    13.69   4.506     4.58    66.94
```

```
     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2111)|     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.
                           0.0040     0.0492    |   0.4840      0.5022
                           0.0070     0.1000    |   0.6890      0.5665
                           0.0090     0.1524    |   0.7300      0.6325
                           0.0100     0.2065    |   0.9250      0.7004
                           0.0110     0.2622    |   1.3030      0.7700
                           0.0130     0.3197    |   1.8620      0.8415
                           0.0140     0.3788    |   2.6100      0.9149
                           0.1740     0.4396    |   0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0061)     13.690      4.506      4.58      66.94
   OUTFLOW: ID= 1 (  2111)     13.690      0.650      5.17      66.17

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 14.41
                  TIME SHIFT OF PEAK FLOW          (min)= 35.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.5542

------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0203)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.18         0.04
     Dep. Storage     (mm)=       5.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      38.30        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13        73.47
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.92 (ii)    2.31 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.30
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.09         0.01          0.099 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      81.68        42.34          73.81
     TOTAL RAINFALL   (mm)=      86.68        86.68          86.68
     RUNOFF COEFFICIENT   =       0.94         0.49           0.85
```

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0204)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12         0.04
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      32.66        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       179.92
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.83 (ii)    2.60 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.29
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.02          0.067 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      85.68        55.84          72.25
     TOTAL RAINFALL   (mm)=      86.68        86.68          86.68
     RUNOFF COEFFICIENT   =       0.99         0.64           0.83

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0203):     0.22   0.099     4.58    73.81
     + ID2= 2 (  0204):     0.16   0.067     4.58    72.25
```

```
       ================================================
       ID = 3 (  0040):     0.38   0.165     4.58    73.15

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

--------------------
| ADD HYD  (  0040)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0040):     0.38   0.165     4.58    73.15
     + ID2= 2 (  2111):    13.69   0.650     5.17    66.17
       ================================================
       ID = 1 (  0040):    14.07   0.666     5.17    66.36

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0041)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)= 900.00
| DT=  5.0 min     |     Length       (m)=  50.00
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013

     <----------------- TRAVEL TIME TABLE ------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)      (cms)        (m/s)        min
       0.05     .642E+00       0.0          0.53         1.56
       0.09     .178E+01       0.0          0.83         1.00
       0.14     .322E+01       0.1          1.07         0.78
       0.19     .487E+01       0.1          1.28         0.65
       0.24     .668E+01       0.2          1.45         0.57
       0.28     .862E+01       0.3          1.61         0.52
       0.33     .106E+02       0.4          1.74         0.48
       0.38     .127E+02       0.5          1.86         0.45
       0.43     .148E+02       0.6          1.97         0.42
       0.47     .170E+02       0.7          2.06         0.41
       0.52     .191E+02       0.8          2.13         0.39
       0.57     .212E+02       0.9          2.20         0.38
       0.62     .232E+02       1.0          2.24         0.37
       0.66     .251E+02       1.1          2.28         0.37
       0.71     .269E+02       1.2          2.29         0.36
       0.76     .286E+02       1.3          2.29         0.36
       0.81     .300E+02       1.4          2.27         0.37
       0.85     .312E+02       1.4          2.21         0.38
       0.90     .318E+02       1.3          2.01         0.41
                                    <---- hydrograph ---->   <-pipe / channel->
                               AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0040)   14.07     0.67    5.17  66.36      0.46      2.03
```

```
   OUTFLOW: ID= 1 (  0041)   14.07     0.67    5.17  66.35      0.46      2.03


------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0210)|   Area    (ha)=   0.62   Curve Number   (CN)= 79.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   0.112

     PEAK FLOW       (cms)=   0.076 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  43.302
     TOTAL RAINFALL   (mm)=  86.678
     RUNOFF COEFFICIENT   =   0.500

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

------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0207)|   Area    (ha)=  12.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.22         4.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     290.29        10.00
     Mannings n            =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.09 (ii)    5.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=       3.12         1.16          3.844 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      85.68        48.34          68.87
     TOTAL RAINFALL   (mm)=      86.68        86.68          86.68
     RUNOFF COEFFICIENT   =       0.99         0.56           0.79

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0209)|   Area    (ha)=   1.84
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.20         0.64
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     110.75        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.74 (ii)    3.75 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.25
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.50         0.19          0.690 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      85.68        48.34         68.87
     TOTAL RAINFALL   (mm)=      86.68        86.68         86.68
     RUNOFF COEFFICIENT   =       0.99         0.56          0.79

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0221)|   Area    (ha)=   4.96
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.22         1.74
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     181.84        10.00
     Mannings n           =      0.013        0.250
```

```
     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.34 (ii)    4.35 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.30         0.23
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.29         0.49          1.786 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      79.68        48.34         65.57
     TOTAL RAINFALL   (mm)=      86.68        86.68         86.68
     RUNOFF COEFFICIENT   =       0.92         0.56          0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0208)|   Area    (ha)=   1.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.67         0.36
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.87        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.46 (ii)    3.48 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.26
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.28         0.11          0.393 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      79.68        48.34         65.57
     TOTAL RAINFALL   (mm)=      86.68        86.68         86.68
     RUNOFF COEFFICIENT   =       0.92         0.56          0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
```

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

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

-------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0207):    12.64   3.844     4.58    68.87
     + ID2= 2 (  0208):     1.03   0.393     4.58    65.57
       ================================================
       ID = 3 (  0038):    13.67   4.237     4.58    68.62

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

-------------------
| ADD HYD  (  0038)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0038):    13.67   4.237     4.58    68.62
     + ID2= 2 (  0209):     1.84   0.690     4.58    68.87
       ================================================
       ID = 1 (  0038):    15.51   4.927     4.58    68.65

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

-------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0038):    15.51   4.927     4.58    68.65
     + ID2= 2 (  0221):     4.96   1.786     4.58    65.57
       ================================================
       ID = 3 (  0038):    20.47   6.713     4.58    67.91

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  2099)|     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   |   0.0508     0.7415
                         0.0049     0.0845   |   0.1103     0.8448
                         0.0085     0.1713   |   0.1869     0.9504
                         0.0110     0.2604   |   0.2773     1.0584
                         0.0130     0.3519   |   0.3797     1.1687
```

```
                         0.0147     0.4458   |   0.5592     1.2814
                         0.0163     0.5420   |   0.8940     1.3964
                         0.0177     0.6406   |   1.4269     1.5138

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     20.470     6.713     4.58      67.91
   OUTFLOW: ID= 1 (  2099)     20.470     0.270     6.17      64.24

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.02
                  TIME SHIFT OF PEAK FLOW         (min)= 95.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.0498

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

-------------------
| ADD HYD  (  0049)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2099):    20.47   0.270     6.17    64.24
     + ID2= 2 (  0210):     0.62   0.076     4.83    43.30
       ================================================
       ID = 3 (  0049):    21.09   0.279     6.00    63.62

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0222)|   Area    (ha)=   1.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.90         0.48
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      95.92        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.59 (ii)    3.61 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.25
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.38         0.15          0.522 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      79.68        48.34         65.57
     TOTAL RAINFALL   (mm)=      86.68        86.68         86.68
     RUNOFF COEFFICIENT   =       0.92         0.56          0.76
```

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

  -------------------------
  | Junction Command(0051) |
  -------------------------

                          AREA     QPEAK   TPEAK     R.V.
                          (ha)     (cms)    (hrs)    (mm)
  INFLOW : ID= 2(  0222)    1.38     0.52    4.58    65.57
  OUTFLOW: ID= 2(  0051)    1.38     0.52    4.58    65.57

  --------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0212)|   Area    (ha)=   4.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                        IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.10         1.67
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     178.33        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     182.13       109.63
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       2.31 (ii)    4.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.30         0.23
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.24         0.48         1.721 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      79.68        48.34         65.57
     TOTAL RAINFALL   (mm)=      86.68        86.68         86.68
     RUNOFF COEFFICIENT   =       0.92         0.56          0.76

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
```

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

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

  -------------------------
  | Junction Command(0052) |
  -------------------------

                          AREA     QPEAK   TPEAK     R.V.
                          (ha)     (cms)    (hrs)    (mm)
  INFLOW : ID= 2(  0212)    4.77     1.72    4.58    65.57
  OUTFLOW: ID= 2(  0052)    4.77     1.72    4.58    65.57

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

 FINISH
================================================================================
======================

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

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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M  M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\80a51b
b9-4f1a-4ff1-ae5d-deaa08836af6\scena
  Summary filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\80a51b
b9-4f1a-4ff1-ae5d-deaa08836af6\scena
```

```
DATE: 08/19/2024                          TIME: 12:07:50

USER:


COMMENTS: _____


--------------------------------------------------------------------------------
----------------------
  ************************************************
  ** SIMULATION : 5yr 12hr 5min Chicago         **
  ************************************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 983.699
| Ptotal= 55.97 mm |                           B=   8.100
--------------------                           C=   0.812
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  = 12.00 hrs
                        Storm time step    =  5.00 min
                        Time to peak ratio =  0.38

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.93 |  3.00    2.44 |  6.00    3.79 |  9.00    1.41
                0.08    0.95 |  3.08    2.57 |  6.08    3.61 |  9.08    1.39
                0.17    0.96 |  3.17    2.72 |  6.17    3.44 |  9.17    1.37
                0.25    0.98 |  3.25    2.89 |  6.25    3.29 |  9.25    1.35
                0.33    0.99 |  3.33    3.08 |  6.33    3.15 |  9.33    1.33
                0.42    1.01 |  3.42    3.30 |  6.42    3.02 |  9.42    1.31
                0.50    1.03 |  3.50    3.56 |  6.50    2.91 |  9.50    1.29
                0.58    1.05 |  3.58    3.87 |  6.58    2.80 |  9.58    1.27
                0.67    1.07 |  3.67    4.24 |  6.67    2.70 |  9.67    1.25
                0.75    1.09 |  3.75    4.70 |  6.75    2.61 |  9.75    1.24
                0.83    1.11 |  3.83    5.28 |  6.83    2.52 |  9.83    1.22
                0.92    1.13 |  3.92    6.03 |  6.92    2.45 |  9.92    1.20
                1.00    1.15 |  4.00    7.05 |  7.00    2.37 | 10.00    1.19
                1.08    1.18 |  4.08    8.52 |  7.08    2.30 | 10.08    1.17
                1.17    1.20 |  4.17   10.78 |  7.17    2.24 | 10.17    1.16
                1.25    1.23 |  4.25   14.69 |  7.25    2.18 | 10.25    1.14
                1.33    1.26 |  4.33   22.94 |  7.33    2.12 | 10.33    1.13
                1.42    1.29 |  4.42   49.28 |  7.42    2.07 | 10.42    1.12
                1.50    1.32 |  4.50  121.80 |  7.50    2.02 | 10.50    1.10
                1.58    1.35 |  4.58   58.14 |  7.58    1.97 | 10.58    1.09
                1.67    1.39 |  4.67   32.66 |  7.67    1.92 | 10.67    1.08
                1.75    1.42 |  4.75   22.23 |  7.75    1.88 | 10.75    1.06
                1.83    1.46 |  4.83   16.72 |  7.83    1.84 | 10.83    1.05
                1.92    1.50 |  4.92   13.36 |  7.92    1.80 | 10.92    1.04
                2.00    1.55 |  5.00   11.12 |  8.00    1.76 | 11.00    1.03
                2.08    1.59 |  5.08    9.52 |  8.08    1.72 | 11.08    1.02
                2.17    1.64 |  5.17    8.33 |  8.17    1.69 | 11.17    1.01
                2.25    1.70 |  5.25    7.41 |  8.25    1.66 | 11.25    1.00
                2.33    1.75 |  5.33    6.68 |  8.33    1.62 | 11.33    0.99
                2.42    1.82 |  5.42    6.08 |  8.42    1.59 | 11.42    0.98
                2.50    1.88 |  5.50    5.59 |  8.50    1.56 | 11.50    0.97
                2.58    1.96 |  5.58    5.17 |  8.58    1.54 | 11.58    0.96
                2.67    2.04 |  5.67    4.82 |  8.67    1.51 | 11.67    0.95
                2.75    2.12 |  5.75    4.51 |  8.75    1.48 | 11.75    0.94
                2.83    2.22 |  5.83    4.24 |  8.83    1.46 | 11.83    0.93
                2.92    2.33 |  5.92    4.00 |  8.92    1.44 | 11.92    0.92


--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0213)|   Area    (ha)=   0.12   Curve Number   (CN)= 79.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.34

     Unit Hyd Qpeak  (cms)=   0.013

     PEAK FLOW       (cms)=   0.005 (i)
     TIME TO PEAK    (hrs)=   5.000
     RUNOFF VOLUME    (mm)=  20.645
     TOTAL RAINFALL   (mm)=  55.968
     RUNOFF COEFFICIENT   =   0.369

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0227)|   Area    (ha)=   0.13   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

     Unit Hyd Qpeak  (cms)=   0.022

     PEAK FLOW       (cms)=   0.007 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  23.115
     TOTAL RAINFALL   (mm)=  55.968
     RUNOFF COEFFICIENT   =   0.413

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

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

```
-------------------
| CALIB           |
| NASHYD   (  0228)|   Area    (ha)=   0.71   Curve Number   (CN)= 84.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.088

     PEAK FLOW       (cms)=   0.036 (i)
     TIME TO PEAK    (hrs)=   4.917
     RUNOFF VOLUME    (mm)=  24.990
     TOTAL RAINFALL   (mm)=  55.968
     RUNOFF COEFFICIENT   =   0.447

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0229)|   Area    (ha)=   1.06   Curve Number   (CN)= 85.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.51

     Unit Hyd Qpeak  (cms)=   0.080

     PEAK FLOW       (cms)=   0.041 (i)
     TIME TO PEAK    (hrs)=   5.167
     RUNOFF VOLUME    (mm)=  25.951
     TOTAL RAINFALL   (mm)=  55.968
     RUNOFF COEFFICIENT   =   0.464

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0206)|   Area    (ha)=   2.57   Curve Number   (CN)= 77.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.391

     PEAK FLOW       (cms)=   0.111 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  19.526
     TOTAL RAINFALL   (mm)=  55.968
     RUNOFF COEFFICIENT   =   0.349

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

```
--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0205)|   Area    (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=   1.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         0.28
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      61.10        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80       105.99
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.43 (ii)    4.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.23
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.00         0.08          0.082 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      54.97        31.13         31.36
     TOTAL RAINFALL   (mm)=      55.97        55.97         55.97
     RUNOFF COEFFICIENT   =       0.98         0.56          0.56

***** 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*  =  77.0    Ia = Dep. 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 (  0226)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.03         0.02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      18.26        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00         5.00
```

```
     Storage Coeff.  (min)=       0.69 (ii)    3.06 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.27
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.01         0.00          0.012 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      54.97        24.42         41.21
     TOTAL RAINFALL   (mm)=      55.97        55.97         55.97
     RUNOFF COEFFICIENT   =       0.98         0.44          0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0202)|   Area    (ha)=   0.36
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.23         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      48.99        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.25 (ii)    3.62 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.25
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.07         0.02          0.085 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58          4.58
     RUNOFF VOLUME    (mm)=      54.97        24.42         41.21
     TOTAL RAINFALL   (mm)=      55.97        55.97         55.97
     RUNOFF COEFFICIENT   =       0.98         0.44          0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

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

-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0202):     0.36   0.085     4.58    41.21
     + ID2= 2 (  0205):     0.56   0.082     4.58    31.36
       ================================================
       ID = 3 (  0039):     0.92   0.167     4.58    35.22

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

-------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     0.92   0.167     4.58    35.22
     + ID2= 2 (  0206):     2.57   0.111     4.83    19.53
       ================================================
       ID = 1 (  0039):     3.49   0.204     4.58    23.66

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

-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.49   0.204     4.58    23.66
     + ID2= 2 (  0226):     0.05   0.012     4.58    41.21
       ================================================
       ID = 3 (  0039):     3.54   0.216     4.58    23.91

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

-------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     3.54   0.216     4.58    23.91
     + ID2= 2 (  0227):     0.13   0.007     4.83    23.11
       ================================================
       ID = 1 (  0039):     3.67   0.219     4.58    23.88

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

```
--------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.67   0.219     4.58    23.88
     + ID2= 2 (  0228):     0.71   0.036     4.92    24.99
       ==================================================
       ID = 3 (  0039):     4.38   0.229     4.58    24.06

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

--------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     4.38   0.229     4.58    24.06
     + ID2= 2 (  0229):     1.06   0.041     5.17    25.95
       ==================================================
       ID = 1 (  0039):     5.44   0.235     4.58    24.43

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0223)|   Area    (ha)=   0.70   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.24

     Unit Hyd Qpeak  (cms)=   0.110

     PEAK FLOW       (cms)=   0.041 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  24.609
     TOTAL RAINFALL   (mm)=  55.968
     RUNOFF COEFFICIENT   =   0.440

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0224)|   Area    (ha)=   0.64   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.080

     PEAK FLOW       (cms)=   0.030 (i)
```

```
     TIME TO PEAK    (hrs)=   4.917
     RUNOFF VOLUME    (mm)=  23.138
     TOTAL RAINFALL   (mm)=  55.968
     RUNOFF COEFFICIENT   =   0.413

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

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

--------------------
| ADD HYD  (  0060)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0223):     0.70   0.041     4.83    24.61
     + ID2= 2 (  0224):     0.64   0.030     4.92    23.14
       ==================================================
       ID = 3 (  0060):     1.34   0.069     4.92    23.91

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   9.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.90         3.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     246.04        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.29 (ii)    5.66 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.45         0.38          1.672 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      54.97        24.42          41.22
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.98         0.44           0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0201)|   Area    (ha)=   0.68
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  75.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.58         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      67.33        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        80.70
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.51 (ii)    3.00 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.28
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.17         0.03          0.194 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      54.97        28.49          48.35
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.98         0.51           0.86

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0211)|   Area    (ha)=   1.01
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.66         0.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.06        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00         5.00
```

```
     Storage Coeff.  (min)=       1.70 (ii)    4.07 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.24
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.18         0.05          0.232 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      54.97        24.42          41.22
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.98         0.44           0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0220)|   Area    (ha)=   1.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.03         0.55
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     102.63        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.95 (ii)    4.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.31         0.23
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.28         0.08          0.356 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      48.97        24.42          37.92
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.87         0.44           0.68

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

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

--------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     9.08   1.672     4.58    41.22
     + ID2= 2 (  0201):     0.68   0.194     4.58    48.35
       ====================================================
       ID = 3 (  0061):     9.76   1.866     4.58    41.72

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

--------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):     9.76   1.866     4.58    41.72
     + ID2= 2 (  0211):     1.01   0.232     4.58    41.22
       ====================================================
       ID = 1 (  0061):    10.77   2.098     4.58    41.67

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

--------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0061):    10.77   2.098     4.58    41.67
     + ID2= 2 (  0220):     1.58   0.356     4.58    37.92
       ====================================================
       ID = 3 (  0061):    12.35   2.454     4.58    41.19

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

--------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):    12.35   2.454     4.58    41.19
     + ID2= 2 (  0060):     1.34   0.069     4.92    23.91
       ====================================================
       ID = 1 (  0061):    13.69   2.478     4.58    39.50

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

```
--------------------
| RESERVOIR(  2111)|     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.
                           0.0040     0.0492    |   0.4840      0.5022
                           0.0070     0.1000    |   0.6890      0.5665
                           0.0090     0.1524    |   0.7300      0.6325
                           0.0100     0.2065    |   0.9250      0.7004
                           0.0110     0.2622    |   1.3030      0.7700
                           0.0130     0.3197    |   1.8620      0.8415
                           0.0140     0.3788    |   2.6100      0.9149
                           0.1740     0.4396    |   0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0061)     13.690      2.478      4.58      39.50
   OUTFLOW: ID= 1 (  2111)     13.690      0.091      6.67      38.73

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.67
                  TIME SHIFT OF PEAK FLOW         (min)=125.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.4081

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0203)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.18         0.04
     Dep. Storage     (mm)=       5.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      38.30        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        33.14
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.08 (ii)    2.71 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.29
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.06         0.00          0.064 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      50.97        20.48          44.87
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.91         0.37           0.80

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

```
      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. 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 (  0204)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12         0.04
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      32.66        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        91.30
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       0.98 (ii)    3.05 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.34         0.27
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.01          0.041 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      54.97        29.68          43.58
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.98         0.53           0.78

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

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  77.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0203):     0.22   0.064     4.58    44.87
     + ID2= 2 (  0204):     0.16   0.041     4.58    43.58
       ====================================================
       ID = 3 (  0040):     0.38   0.104     4.58    44.33
```

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

--------------------
| ADD HYD  (  0040)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0040):     0.38   0.104     4.58    44.33
     + ID2= 2 (  2111):    13.69   0.091     6.67    38.73
       ====================================================
       ID = 1 (  0040):    14.07   0.113     4.58    38.88

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTEPIPE(  0041)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)= 900.00
| DT=  5.0 min     |     Length       (m)=  50.00
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013

    <----------------- TRAVEL TIME TABLE ------------------->
      DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
       (m)      (cu.m.)      (cms)        (m/s)        min
      0.05     .642E+00       0.0          0.53         1.56
      0.09     .178E+01       0.0          0.83         1.00
      0.14     .322E+01       0.1          1.07         0.78
      0.19     .487E+01       0.1          1.28         0.65
      0.24     .668E+01       0.2          1.45         0.57
      0.28     .862E+01       0.3          1.61         0.52
      0.33     .106E+02       0.4          1.74         0.48
      0.38     .127E+02       0.5          1.86         0.45
      0.43     .148E+02       0.6          1.97         0.42
      0.47     .170E+02       0.7          2.06         0.41
      0.52     .191E+02       0.8          2.13         0.39
      0.57     .212E+02       0.9          2.20         0.38
      0.62     .232E+02       1.0          2.24         0.37
      0.66     .251E+02       1.1          2.28         0.37
      0.71     .269E+02       1.2          2.29         0.36
      0.76     .286E+02       1.3          2.29         0.36
      0.81     .300E+02       1.4          2.27         0.37
      0.85     .312E+02       1.4          2.21         0.38
      0.90     .318E+02       1.3          2.01         0.41
                                    <---- hydrograph ---->   <-pipe / channel->
                               AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0040)   14.07     0.11    4.58  38.88      0.18      1.23
   OUTFLOW: ID= 1 (  0041)   14.07     0.10    4.58  38.88      0.17      1.19
```

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0210)|   Area    (ha)=   0.62   Curve Number   (CN)= 79.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.21

     Unit Hyd Qpeak  (cms)=   0.112

     PEAK FLOW       (cms)=   0.032 (i)
     TIME TO PEAK    (hrs)=   4.833
     RUNOFF VOLUME    (mm)=  20.698
     TOTAL RAINFALL   (mm)=  55.968
     RUNOFF COEFFICIENT   =   0.370

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0207)|   Area    (ha)=  12.64
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.22         4.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     290.29        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.63 (ii)    6.00 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.25         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.96         0.51          2.264 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      54.97        24.42          41.22
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.98         0.44           0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     Storage Coeff.  (min)=       2.75 (ii)    5.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.16
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.83         0.21          0.955 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      48.97        24.42          37.92
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.87         0.44           0.68

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0208)|   Area    (ha)=   1.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.67         0.36
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.87        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00        5.00
     Storage Coeff.  (min)=       1.71 (ii)    4.08 (ii)
     Unit Hyd. Tpeak (min)=       5.00        5.00
     Unit Hyd. peak  (cms)=       0.32         0.24
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.19         0.05          0.236 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      48.97        24.42          37.92
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.87         0.44           0.68

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0209)|   Area    (ha)=   1.84
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.20         0.64
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     110.75        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00        5.00
     Storage Coeff.  (min)=       2.04 (ii)    4.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00        5.00
     Unit Hyd. peak  (cms)=       0.31         0.23
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.32         0.09          0.412 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      54.97        24.42          41.22
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.98         0.44           0.74

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. 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 (  0221)|   Area    (ha)=   4.96
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.22         1.74
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     181.84        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00        10.00

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0207):    12.64   2.264     4.58    41.22
     + ID2= 2 (  0208):     1.03   0.236     4.58    37.92
       ================================================
       ID = 3 (  0038):    13.67   2.500     4.58    40.97

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

--------------------
| ADD HYD  (  0038)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0038):    13.67   2.500     4.58    40.97
     + ID2= 2 (  0209):     1.84   0.412     4.58    41.22
       ================================================
       ID = 1 (  0038):    15.51   2.913     4.58    41.00

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0038):    15.51   2.913     4.58    41.00
     + ID2= 2 (  0221):     4.96   0.955     4.58    37.92
       ================================================
       ID = 3 (  0038):    20.47   3.867     4.58    40.25

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2099)|     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    |   0.0508     0.7415
                          0.0049     0.0845    |   0.1103     0.8448
                          0.0085     0.1713    |   0.1869     0.9504
                          0.0110     0.2604    |   0.2773     1.0584
                          0.0130     0.3519    |   0.3797     1.1687
                          0.0147     0.4458    |   0.5592     1.2814
                          0.0163     0.5420    |   0.8940     1.3964
```

```
                          0.0177     0.6406   |   1.4269      1.5138

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0038)     20.470     3.867      4.58      40.25
   OUTFLOW: ID= 1 (  2099)     20.470     0.046     11.92      36.94

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.20
                  TIME SHIFT OF PEAK FLOW         (min)=440.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7281

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

-------------------
| ADD HYD  (  0049)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2099):    20.47   0.046    11.92    36.94
     + ID2= 2 (  0210):     0.62   0.032     4.83    20.70
       ================================================
       ID = 3 (  0049):    21.09   0.048    11.75    36.46

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0222)|   Area    (ha)=   1.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.90         0.48
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      95.92        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.87 (ii)    4.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.32         0.24
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.25         0.07          0.313 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.58           4.58
     RUNOFF VOLUME    (mm)=      48.97        24.42          37.92
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.87         0.44           0.68

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

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

  -------------------------
  | Junction Command(0051) |
  -------------------------

                           AREA     QPEAK   TPEAK     R.V.
                           (ha)     (cms)   (hrs)     (mm)
  INFLOW : ID= 2(  0222)    1.38     0.31    4.58    37.92
  OUTFLOW: ID= 2(  0051)    1.38     0.31    4.58    37.92

  --------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.10         1.67
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     178.33        10.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     121.80        52.18
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.71 (ii)    5.08 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.29         0.16
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.80         0.21          0.920 (iii)
     TIME TO PEAK    (hrs)=       4.58         4.67           4.58
     RUNOFF VOLUME    (mm)=      48.97        24.42          37.92
     TOTAL RAINFALL   (mm)=      55.97        55.97          55.97
     RUNOFF COEFFICIENT   =       0.87         0.44           0.68

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  77.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

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

  -------------------------
  | Junction Command(0052) |
  -------------------------

                           AREA     QPEAK   TPEAK     R.V.
                           (ha)     (cms)   (hrs)     (mm)
  INFLOW : ID= 2(  0212)    4.77     0.92    4.58    37.92
  OUTFLOW: ID= 2(  0052)    4.77     0.92    4.58    37.92

  --------------------------------------------------------------------------------
================================================================================
======================


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

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2022 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\7c91f7
05-0219-4523-8738-c97090e68a7b\scena
  Summary filename:
C:\Users\mornat\AppData\Local\Civica\VH5\4c7d3ae7-f914-4c04-9b62-f883467b2a44\7c91f7
05-0219-4523-8738-c97090e68a7b\scena


DATE: 08/19/2024                          TIME: 12:07:50

USER:


COMMENTS: _____
```

```
--------------------------------------------------------------------------------
----------------------
  ***********************************************
  ** SIMULATION : Huricane Hazel- 48hr          **
  ***********************************************


-------------------
|    READ STORM    |    Filename: C:\Users\mornat\AppD
|                  |              ata\Local\Temp\
|                  |              881d00f7-2df9-448c-966b-9f6c4458abcf\17cacc8e
| Ptotal=  0.00 mm |    Comments: Huricane Hazel- 48hr
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr

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

-------------------
| CALIB            |
| NASHYD   (  0213)|   Area    (ha)=   0.12   Curve Number   (CN)= 79.1
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.34

        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


-------------------
| CALIB            |
| NASHYD   (  0227)|   Area    (ha)=   0.13   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.22

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


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


-------------------
| CALIB            |
```

```
| NASHYD   (  0228)|   Area    (ha)=   0.71   Curve Number   (CN)= 84.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.31

        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


-------------------
| CALIB           |
| NASHYD   (  0229)|   Area    (ha)=   1.06   Curve Number   (CN)= 85.4
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # 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


-------------------
| CALIB           |
| NASHYD   (  0206)|   Area    (ha)=   2.57   Curve Number   (CN)= 77.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.25

        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


-------------------
| CALIB           |
| STANDHYD (  0205)|   Area    (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=   1.00
-------------------
                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         0.28
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      61.10        10.00
     Mannings n            =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

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

-------------------
| CALIB           |
| STANDHYD (  0226)|   Area    (ha)=   0.05
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.03         0.02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      18.26        10.00
     Mannings n            =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

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

-------------------
| CALIB           |
| STANDHYD (  0202)|   Area    (ha)=   0.36
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.23         0.13
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      48.99        10.00
     Mannings n            =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

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

-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0202):     0.36   0.000     0.00     0.00
     + ID2= 2 (  0205):     0.56   0.000     0.00     0.00
       ==========================================================
       ID = 3 (  0039):     0.92   0.000     0.00     0.00

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

-------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     0.92   0.000     0.00     0.00
     + ID2= 2 (  0206):     2.57   0.000     0.00     0.00
       ==========================================================
       ID = 1 (  0039):     3.49   0.000     0.00     0.00

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

-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.49   0.000     0.00     0.00
     + ID2= 2 (  0226):     0.05   0.000     0.00     0.00
       ==========================================================
       ID = 3 (  0039):     3.54   0.000     0.00     0.00

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

-------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     3.54   0.000     0.00     0.00
     + ID2= 2 (  0227):     0.13   0.000     0.00     0.00
       ==========================================================
       ID = 1 (  0039):     3.67   0.000     0.00     0.00

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

-------------------
| ADD HYD  (  0039)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0039):     3.67   0.000     0.00     0.00
     + ID2= 2 (  0228):     0.71   0.000     0.00     0.00
       ==========================================================
       ID = 3 (  0039):     4.38   0.000     0.00     0.00

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

-------------------
| ADD HYD  (  0039)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0039):     4.38   0.000     0.00     0.00
     + ID2= 2 (  0229):     1.06   0.000     0.00     0.00
       ==========================================================
       ID = 1 (  0039):     5.44   0.000     0.00     0.00

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

-------------------
| CALIB           |
| NASHYD   (  0223)|   Area    (ha)=   0.70   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.24

        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


-------------------
| CALIB           |
| NASHYD   (  0224)|   Area    (ha)=   0.64   Curve Number   (CN)= 82.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.31

        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



-------------------
| ADD HYD  (  0060)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0223):     0.70   0.000     0.00     0.00
     + ID2= 2 (  0224):     0.64   0.000     0.00     0.00
       ================================================
       ID = 3 (  0060):     1.34   0.000     0.00     0.00

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   9.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.90         3.18
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     246.04        10.00
     Mannings n           =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   0.68
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  75.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.58         0.10
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      67.33        10.00
```

```
     Mannings n           =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0211)|   Area    (ha)=   1.01
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.66         0.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.06        10.00
     Mannings n           =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0220)|   Area    (ha)=   1.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.03         0.55
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     102.63        10.00
     Mannings n           =      0.013        0.250

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


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

```
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

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

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0200):     9.08   0.000     0.00     0.00
     + ID2= 2 (  0201):     0.68   0.000     0.00     0.00
       ================================================
       ID = 3 (  0061):     9.76   0.000     0.00     0.00

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

-------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):     9.76   0.000     0.00     0.00
     + ID2= 2 (  0211):     1.01   0.000     0.00     0.00
       ================================================
       ID = 1 (  0061):    10.77   0.000     0.00     0.00

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

-------------------
| ADD HYD  (  0061)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0061):    10.77   0.000     0.00     0.00
     + ID2= 2 (  0220):     1.58   0.000     0.00     0.00
       ================================================
       ID = 3 (  0061):    12.35   0.000     0.00     0.00

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

-------------------
| ADD HYD  (  0061)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0061):    12.35   0.000     0.00     0.00
     + ID2= 2 (  0060):     1.34   0.000     0.00     0.00
       ================================================
```

```
       ID = 1 (  0061):    13.69   0.000     0.00     0.00

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  2111)|     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.
                       0.0040     0.0492    |   0.4840      0.5022
                       0.0070     0.1000    |   0.6890      0.5665
                       0.0090     0.1524    |   0.7300      0.6325
                       0.0100     0.2065    |   0.9250      0.7004
                       0.0110     0.2622    |   1.3030      0.7700
                       0.0130     0.3197    |   1.8620      0.8415
                       0.0140     0.3788    |   2.6100      0.9149
                       0.1740     0.4396    |   0.0000      0.0000

                          AREA     QPEAK     TPEAK       R.V.
                          (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0061)     13.690      0.000      0.00       0.00
   OUTFLOW: ID= 1 (  2111)     13.690      0.000      0.00       0.00

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=   NaN
                TIME SHIFT OF PEAK FLOW         (min)=  0.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.0000
                MAXIMUM  STORAGE   USED       (cu.m.)=  0.000000

     **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                    CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0203)|   Area    (ha)=   0.22
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.18         0.04
     Dep. Storage     (mm)=       5.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      38.30        10.00
     Mannings n           =      0.013        0.250

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


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

```
******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0204)|   Area    (ha)=   0.16
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12         0.04
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      32.66        10.00
     Mannings n           =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

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

--------------------
| ADD HYD  (  0040)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0203):     0.22   0.000     0.00     0.00
     + ID2= 2 (  0204):     0.16   0.000     0.00     0.00
       ====================================================
       ID = 3 (  0040):     0.38   0.000     0.00     0.00

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

--------------------
| ADD HYD  (  0040)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0040):     0.38   0.000     0.00     0.00
     + ID2= 2 (  2111):    13.69   0.000     0.00     0.00
       ====================================================
       ID = 1 (  0040):    14.07   0.000     0.00     0.00

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

```
--------------------
| ROUTEPIPE(  0041)|     PIPE Number     =   1.00
| IN= 2---> OUT= 1 |     Diameter    (mm)= 900.00
| DT=  5.0 min     |     Length       (m)=  50.00
--------------------     Slope      (m/m)=  0.005
                         Manning n       =  0.013

     <----------------- TRAVEL TIME TABLE ------------------->
       DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
        (m)      (cu.m.)      (cms)        (m/s)        min
       0.05     .642E+00       0.0         0.53         1.56
       0.09     .178E+01       0.0         0.83         1.00
       0.14     .322E+01       0.1         1.07         0.78
       0.19     .487E+01       0.1         1.28         0.65
       0.24     .668E+01       0.2         1.45         0.57
       0.28     .862E+01       0.3         1.61         0.52
       0.33     .106E+02       0.4         1.74         0.48
       0.38     .127E+02       0.5         1.86         0.45
       0.43     .148E+02       0.6         1.97         0.42
       0.47     .170E+02       0.7         2.06         0.41
       0.52     .191E+02       0.8         2.13         0.39
       0.57     .212E+02       0.9         2.20         0.38
       0.62     .232E+02       1.0         2.24         0.37
       0.66     .251E+02       1.1         2.28         0.37
       0.71     .269E+02       1.2         2.29         0.36
       0.76     .286E+02       1.3         2.29         0.36
       0.81     .300E+02       1.4         2.27         0.37
       0.85     .312E+02       1.4         2.21         0.38
       0.90     .318E+02       1.3         2.01         0.41

     **** WARNING:  INFLOW HYDROGRAPH IS DRY!!

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0210)|   Area    (ha)=   0.62   Curve Number   (CN)= 79.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.21

         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


--------------------
| CALIB            |
| STANDHYD (  0207)|   Area    (ha)=  12.64
```

```
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.22         4.42
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     290.29        10.00
     Mannings n           =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=   1.84
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.20         0.64
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     110.75        10.00
     Mannings n           =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0221)|   Area    (ha)=   4.96
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.22         1.74
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
```

```
     Length            (m)=     181.84        10.00
     Mannings n           =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0208)|   Area    (ha)=   1.03
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.67         0.36
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      82.87        10.00
     Mannings n           =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0207):    12.64   0.000     0.00     0.00
     + ID2= 2 (  0208):     1.03   0.000     0.00     0.00
       ====================================================
       ID = 3 (  0038):    13.67   0.000     0.00     0.00

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

--------------------
| ADD HYD  (  0038)|
```

```
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0038):    13.67   0.000     0.00     0.00
     + ID2= 2 (  0209):     1.84   0.000     0.00     0.00
       ==================================================
       ID = 1 (  0038):    15.51   0.000     0.00     0.00

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


--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0038):    15.51   0.000     0.00     0.00
     + ID2= 2 (  0221):     4.96   0.000     0.00     0.00
       ==================================================
       ID = 3 (  0038):    20.47   0.000     0.00     0.00

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| RESERVOIR(  2099)|     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   |  0.0508      0.7415
                          0.0049     0.0845   |  0.1103      0.8448
                          0.0085     0.1713   |  0.1869      0.9504
                          0.0110     0.2604   |  0.2773      1.0584
                          0.0130     0.3519   |  0.3797      1.1687
                          0.0147     0.4458   |  0.5592      1.2814
                          0.0163     0.5420   |  0.8940      1.3964
                          0.0177     0.6406   |  1.4269      1.5138

                               AREA     QPEAK     TPEAK      R.V.
                               (ha)     (cms)     (hrs)      (mm)
   INFLOW : ID= 2 (  0038)    20.470     0.000     0.00       0.00
   OUTFLOW: ID= 1 (  2099)    20.470     0.000     0.00       0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   NaN
                  TIME SHIFT OF PEAK FLOW         (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0000
                  MAXIMUM  STORAGE   USED       (cu.m.)=  0.000000

    **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                   CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
-------------------------------------------------------------------------------

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

```
| ADD HYD  (  0049)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  2099):    20.47   0.000     0.00     0.00
     + ID2= 2 (  0210):     0.62   0.000     0.00     0.00
       ==================================================
       ID = 3 (  0049):    21.09   0.000     0.00     0.00

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0222)|   Area    (ha)=   1.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.90         0.48
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      95.92        10.00
     Mannings n           =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

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

  --------------------------
  | Junction Command(0051) |
  --------------------------

                           AREA     QPEAK   TPEAK     R.V.
                           (ha)     (cms)    (hrs)    (mm)
  INFLOW : ID= 2(  0222)    1.38     0.00    0.00     0.00
  OUTFLOW: ID= 2(  0051)    1.38     0.00    0.00     0.00

  -----------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.10         1.67
```

```
     Dep. Storage     (mm)=       7.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     178.33        10.00
     Mannings n           =      0.013        0.250

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


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

******* ERROR: RAINFALL INCREMENT = 0, COMMAND ABORTED.

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

  --------------------------
  | Junction Command(0052) |
  --------------------------

                           AREA     QPEAK   TPEAK     R.V.
                           (ha)     (cms)    (hrs)    (mm)
  INFLOW : ID= 2(  0212)    4.77     0.00    0.00     0.00
  OUTFLOW: ID= 2(  0052)    4.77     0.00    0.00     0.00

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

APPENDIX G
Utility Correspondence

From: Yang Xiao
To: Kapolnas, Stephen; Jim Sorley; Anthony Lastella
Cc: Mammel, Suzanne; Zach Lindley
Subject: RE: 161414394_Smithville Stage 3A Hydro Coordiantion
Date: Thursday, December 21, 2023 11:29:56 AM
Attachments: New Subdvision Development Information Fillable.pdf

---

Hi Steve,

There is no capacity issue. NPEI have 3 phase overhead 27.6kv & 8.3kv circuits in the vicinity.

For new subdivision development, please submit the attached form.

Otherwise, submit Service Request Application Form
https://www.npei.ca/forms/forms-and-information

Regards,
Yang

From: Kapolnas, Stephen <Steve.Kapolnas@stantec.com>
Sent: Thursday, December 21, 2023 9:56 AM
To: Yang Xiao <yang.xiao@npei.ca>; Jim Sorley <jim.sorley@npei.ca>; Anthony Lastella <Anthony.Lastella@npei.ca>
Cc: Mammel, Suzanne <Suzanne.Mammel@stantec.com>
Subject: 161414394_Smithville Stage 3A Hydro Coordiantion

Hi,

We are working on a proposed subdivision in Smithville, Ontario, West Lincoln. As you may be aware Smithville is expanding their urban boundaries and our projected site is within Stage 3A (see attachment 1). Attached shows an outlined area of the initial stage within Stage 3A, block plan 9.

We would like to confirm if NPEI has the appropriate infrastructure /capacity in place to service the initial stage (highlighted in blue).

Do you have any servicing concerns for the proposed development from a capacity/infrastructure standpoint and let us know if the initial stage can be accommodated?

If you have any questions, don't hesitate to ask.

Regards

Steve Kapolnas, P.Eng.
Project Engineer

Direct: 519 585-7365

Stephen.Kapolnas@stantec.com

Stantec
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

Yang Xiao
Engineering Technician
(905) 356-2681 ext 6239
yang.xiao@npei.ca



Register for our updated MyAccount before March 31, 2024 to be enrolled in eBiling and we'll donate $10 a local charitable organization! To sign up Click Here

For more information about NPEI and the Programs and Services that we offer, please click on our New Customer Info Guide Click Here

For Niagara Peninsula Energy Customers please Click Here to participate in our online customer service survey! (powered by SurveyMonkey)

My working hours may differ from yours. Please do not feel obligated to respond to this email outside of your normal working hours. Thank you.

From: Sarah Smith
To: Kapolnas, Stephen
Cc: Mammel, Suzanne
Subject: FW: 161414394_Smithville Stage 3A Gas Coordiantion
Date: Monday, January 8, 2024 1:04:37 PM
Attachments: 144262DP-Stage 1.pdf

Hi Stephen,

Adam forwarded me your email. I will be your contact for anything in West Lincoln.

We have existing main on the north side of Townline Rd in front of the outlined area in blue. If you applied today for the outlined area only, we would likely be able to accommodate your gas requirements.

However,

1. We do not reserve gas. So just because today gas may be available doesn't mean it will be when you apply in the future.
2. Larger customers (including developers) who apply in the West Lincoln area often need some kind of reinforcement for their projects. I just wanted to make you aware for the remainder of your larger development could require some kind of reinforcement, but we won't know until you apply and provide further details.
3. I think it is worth mentioning that the Ontario Energy Board have made a decision as of Dec 21, 2023 regarding our proposed rate case. We are anticipating some changes as of January 2025 which will likely affect the costing feasibility parameters. We are encouraging developers to read the OEB decision if you haven't already.

If you have any further questions, please don't hesitate to reach out.

Thank you,

Sarah Smith
Sr Analyst New Business Projects
Southeast Region/Niagara Operations

ENBRIDGE
TEL 905-641-6716 | FAX: 905-984-4976 | sarah.smith@enbridge.com
3401 Schmon Parkway, Thorold, ON L2V 4Y6

enbridge.com
Safety. Integrity. Respect. Inclusion.

From: Adam Chitussi <Adam.Chitussi@enbridge.com>
Sent: Tuesday, January 2, 2024 9:37 AM
To: Sarah Smith <Sarah.Smith@enbridge.com>
Subject: FW: 161414394_Smithville Stage 3A Gas Coordiantion

From: Kapolnas, Stephen <Steve.Kapolnas@stantec.com>
Sent: Thursday, December 21, 2023 4:17 PM
To: Adam Chitussi <Adam.Chitussi@enbridge.com>
Cc: Mammel, Suzanne <Suzanne.Mammel@stantec.com>
Subject: [External] 161414394_Smithville Stage 3A Gas Coordiantion

Hi,

We are working on a proposed subdivision in Smithville, Ontario, West Lincoln. As you may be aware Smithville is expanding their urban boundaries and our projected site is within Stage 3A (see attachment 1). Attached shows an outlined area of the initial stage within Stage 3A, block plan 9.

We would like to confirm if Enbridge has the appropriate infrastructure /capacity in place to service the initial stage (highlighted in blue).

Do you have any servicing concerns for the proposed development from a capacity/infrastructure standpoint and let us know if the initial stage can be accommodated?

If you have any questions, don't hesitate to ask.

Regards

Steve Kapolnas, P.Eng.
Project Engineer

Direct: 519 585-7365
Stephen.Kapolnas@stantec.com

Stantec
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

From: Stratychuk, Craig
To: Telfer, Christine
Cc: Kapolnas, Stephen; Thompson, Susan; Rioux, Karen
Subject: RE: 161414394_Smithville Stage 3A Bell Coordination
Date: Wednesday, August 9, 2023 8:36:37 AM
Attachments: image001.png

Hey Christine.. long time no chat.
Yes, Smithville (West Lincoln) is handled by our office… and we will be more than happy to help
The regular IM for the area is away on vacation for a couple weeks, but I had a look on his behalf.

Good Morning Steve
We certainly have infrastructure in place in the area to service this location, but as any new build, we would have to go through our internal governance process for approvals before commitment to build.
Aside from what you have already provided, any information is greatly appreciated. (potential lots, timing etc)

Craig Stratychuk **Specialist, Network Provisioning 63 King St, Floor 3 St. Catharines**
Mobile# (289)219-3326 Office# (905)988-1239

From: Telfer, Christine <christine.telfer@bell.ca>
Sent: August-09-23 7:26 AM
To: Stratychuk, Craig <craig.stratychuk@bell.ca>
Cc: Steve.kapolnas@stantec.com; Thompson, Susan <s.thompson@bell.ca>; Rioux, Karen <karen.rioux@bell.ca>
Subject: FW: 161414394_Smithville Stage 3A Bell Coordination

Morning Craig,

Hope all is well with you.

Not sure if Smithville is part of your territory, but I think it is out of the St. Catherine's cell. Could you pass the below email on to whomever the IM is for Smithville?

Have a good day.

Chris

Christine Telfer
Bell Canada, Implementation Manager

86 Market St.,P.O. Box 938
Brantford, ON N3T 2Z8
(519)751-3055
christine.telfer@bell.ca
"Good judgement comes from experience; and
experience, well, that comes from bad judgment.
Anonymous

From: Kapolnas, Stephen <Steve.Kapolnas@stantec.com>
Sent: August-08-23 4:30 PM
To: Rioux, Karen <karen.rioux@bell.ca>; Thompson, Susan <s.thompson@bell.ca>; Telfer, Christine <christine.telfer@bell.ca>
Cc: Mammel, Suzanne <Suzanne.Mammel@stantec.com>
Subject: [EXT]FW: 161414394_Smithville Stage 3A Bell Coordination

Hi,

We are working on a proposed subdivision in Smithville, Ontario, West Lincoln. As you may be aware Smithville is expanding their urban boundaries and our projected site is within Stage 3A (see attachment 1). Attached shows an outlined area of stage 3A along with a redline highlight of the projected site. Within the month, we hope to have a block plan to circulate.

We would like to confirm if Bell has the appropriate infrastructure /capacity in place to service the projected site within stage 3A and Stage 3A entirely (highlighted in blue). Stage 3A is approximately 63.5ha and the project site (highlighted in red) is approximately 11ha.

Do you have any servicing concerns for the proposed development from a capacity/infrastructure standpoint?

If you have any questions, don't hesitate to ask.

Regards

Steve Kapolnas, P.Eng.
Project Engineer

Direct: 519 585-7365
Stephen.Kapolnas@stantec.com

Stantec
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

From: Rick Kabel
To: Kapolnas, Stephen; Ronald Gibson
Cc: Craig.Krueger@cogeco.com
Subject: Re: 161414473_Smithville Stage 3A Utility Coordination
Date: Tuesday, July 2, 2024 8:37:48 AM

Hi Stephen

Cogeco has infrastructure in the area and are able to service this proposed new subdivision.

Ron Gibson is our Network Delivery Coordinator for Smithville and will be able to answer any other
questions or concerns for this new build. He is presently on vacation but will be back on July 8th.

Thanks

On Fri, 28 Jun 2024 at 16:26, Kapolnas, Stephen <Steve.Kapolnas@stantec.com> wrote:

> Hi,
>
> We are working on a proposed subdivision in Smithville, Ontario, West Lincoln. As you may be aware Smithville is expanding their urban boundaries and our projected site is within Stage 3A (see attachment 1). Attached shows an outlined area of the initial stage within Stage 3A, block plan 9.
>
> We would like to confirm if Cogeco has the appropriate infrastructure /capacity in place to service the initial stage (highlighted in blue) and the entire Block Plan.
>
> Do you have any servicing concerns for the proposed development from a capacity/infrastructure standpoint and let us know if the initial stage can be accommodated?
>
> If you have any questions, don't hesitate to ask.
>
> Regards
>
> **Steve Kapolnas**, P.Eng.
>
> Project Engineer

Direct: 519 585-7365
Stephen.Kapolnas@stantec.com

Stantec
100-300 Hagey Boulevard
Waterloo ON N2L 0A4

--

RICK KABEL
Network Delivery Coordinator
Niagara

289 241-0223

7170 McLeod Road
Niagara Falls, Ontario L2G 3H2 Canada
cogeco.ca