MTO-Eastern Region

Report Number: GWP 4054-17-00

Highway 401 Colborne to Brighton

Drainage and Hydrology Study and Preliminary Design Report

July 20, 2023 Final

Assignment No. 4018-E-001, Work Item 11

wsp

Highway 401 Colborne to Brighton

Drainage and Hydrology Study and Preliminary Design Report

MTO-Eastern Region
Assignment #4018-E-001-11

Final

Project No.: 17M-01712-11
Client Ref: GWP 4054-17-00
Date: July 20, 2023

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July 20, 2023

Final

MTO-Eastern Region
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Attention: Darren Cizmar, Project Manager

Dear Mr. Cizmar

Subject: Highway 401 Colborne to Brighton Drainage and Hydrology Study and Preliminary Design Report
Client ref.: GWP 4054-17-00

We are pleased to submit one electronic copy of the Final Drainage and Hydrology Study and Preliminary Design report for Highway 401 Colborne to Brighton. This report documents the existing and proposed drainage conditions, the completed hydrologic and hydraulic analysis for the structural and non-structural culverts as well as the storm sewer design for the preferred alternative.

We trust the submission of this documents meets your requirements. Should you have any comments we look forward to your response.

Yours sincerely,

Sherif Iskandar, M.Sc., P.Eng., PMP
Senior Project Manager, Water Resources

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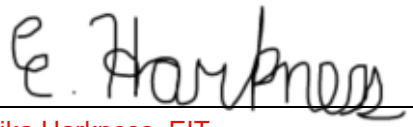

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1 INTRODUCTION

1.1 Authorization

WSP was retained by the Ministry of Transportation Ontario to complete the Preliminary Design and Class Environmental Assessment (EA) of Highway 401 from 0.8 km east of Percy Street to 0.4 km west of Christiani Road (GWP 4054-17-00) for the replacement / rehabilitation of three bridges (Herley Road, Lake Road, and County Road 26 underpasses) and four structural culverts. This study also includes establishing the future Highway 401 footprint for an interim six lanes and ultimate eight lanes to address current and future transportation needs, and commuter parking lot improvements at County Road 30.

This report includes the drainage analysis of each structural and non-structural culvert. This consists of a hydrologic and hydraulic assessment of the existing conditions and proposed conditions for the culverts. It also contains the existing and proposed preliminary analysis of the storm sewers within the project limits. A preliminary stormwater management plan is also included.

1.2 Highway Classification and Location

Highway 401 is classified as a rural freeway, undivided. The project area is along Highway 401 between Colborne and Brighton, Ontario. The approximate study area is shown in **Figure 1**.

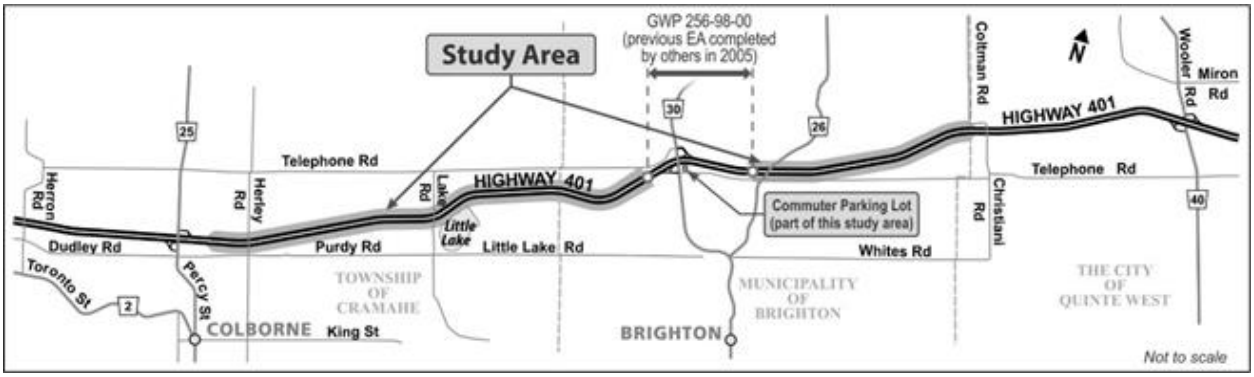

Figure 1: Approximate Study Area

1.3 Objectives

The objective of the drainage component of this assignment is to complete the Preliminary Design for replacement or rehabilitation of structures and for future widening of Highway 401, which includes the following:

- Verify the existing structural and non-structural culvert conditions and capacities for each culvert
- Analyze the existing storm sewer system
- Evaluate all culverts and storm sewers based on the proposed alternative
- Determine the preliminary stormwater management plan to achieve water quantity and quality control

2 BACKGROUND INFORMATION

2.1 Existing Background Information

WSP reviewed previous drawings and relevant drainage information and mapping. This included:

- Contract Drawings
  - Contract No. 1958-5500
  - Contract No. 1960-0217
  - Contract No. 1997-0057
  - Contract No. 1998-0008
  - Contract No. 2015-4021
  - Contract No. 2018-4004
  - Contract No. 2018-4022
  - Contract No. 2019-4001
- Survey road profiles and plans
  - B104012
  - B104013
  - C104012
  - C104013
- Base plans and road profiles in CAD format
- Digital base mapping including contour information
- Final Culvert Condition Report, Highway 401, Brighton Township, Ainley Group, February 2015
- Final Culvert Condition Report, Highway 401, Cramahe Township, Ainley Group, February 2015

2.2 Drainage Design Guidelines and Reference Documents

The MTO has prepared various directives and manuals that outline the approach and guidelines to access highway drainage systems. This assessment used the following guidelines:

- MTO Highway Drainage Design Standards (HDDS) (2008)
- MTO Drainage Management Manual (1997)
- MTO Drainage Directives and Policies
- MTO Guide for Preparing Hydrology Report for Water Crossings
- MTO Gravity Pipe Design Guidelines (April 2014)
- MTO PEM-DCSO #2016-14 Ministry's Climate Change Consideration in Design of Highway Drainage Infrastructure
- PLNG-B014, MTO Drainage Management Policy and Standards
- Ontario Ministry of the Environment (now MECP) Stormwater Management Planning and Design Manual (2003)

MTO's Highway Drainage Design Standards establish standards for designing Surface Drainage Systems (SD) and Water Crossings (WC). **Table 2-1** summarizes the standards that are relevant to this study area.

Table 2-1: Relevant Standards for HDDS

Standard	Description
SD-1: Design Flows for Surface Drainage Systems	10-year design flow
SD-3: Flow Spread on to Travel Lanes	Lateral Spread Distance < 0 (Desirable Standard) Lateral Spread Distance < 2.5 m of Lane Width Clear (Minimum Standard) Maximum Depth of Flooding < 25 mm
SD-4: Storm Sewer System	Velocity > 0.75 m/s (trunk sewer, smooth walled pipes) {Desirable Standard} Velocity > 1.5 m/s (lateral sewers) {Desirable Standard} Velocity > 0.5 m/s (pipe can be flushed) {Minimum Standard} Pipe Diameter > 300 mm Pipe Spacing > 150 m (diameter < 1200 mm) Slope of Later Sewers > 0.015 m/m
SD-5: Storm Sewer Inlets – Continuous Grade	Spacing Between Inlets < 150 m
SD-6: Storm Sewer Inlets – Highway Sags	Inlet Capacity Reduced by 50% Minimum twin inlets at bottom of sag
SD-9: Roadside Ditches	Maximum depth of flow – 1 m Maximum Permissible Velocity – 1.5 m/s Minimum freeboard – 0.3 m

Standard	Description
SD-13: Design Flows and Freeboards – Culverts not on a watercourse	Minimum freeboard - 0.3 m
WC-1: Design Flows – Bridges and Culverts	50-year Design Storm for a Freeway 100-year Check Storm
WC-7: Culvert Crossings - Watercourse	Freeboard design for freeways ≥ 1.0 m Culverts with diameter or rise < 3.0 m HW/D ≤ 1.5 Culverts with diameter or rise 3.0 to 4.5 m HW ≤ 4.5 m Culvert with diameter or rise > 4.5 m HW/D ≤ 1.0
WC-8: Minimum Culvert Size	Minimum Culvert Size for Freeway Culverts: 800 mm minimum diameter for circular culverts 800 mm minimum rise for elliptical or arch culverts 900 mm minimum rise for box culverts
WC-10: Culvert Extensions	The slope of the Culvert Extension is not less than the slope of the original structure Culvert Extensions be of the same material as the original structure alignment and shape of the original structure be maintained
WC-13: Relief Flow – Bridges and Culverts	The maximum depth of flow on the roadway shall not exceed 0.3 m The product of the velocity and depth on the roadway shall not exceed 0.8 m/s
SW-1: Stormwater Management – Level Control	Peak flow rates for storms with the following return periods: 2-, 5-, 10-, 25-, 50-, 100-year Enhanced protection or greater when sensitive aquatic habitat will be impacted – SWM facilities that provide equivalent of 80% long-term suspended solids removal Normal protection when conditions for enhanced protection is not required – SWM facilities that provide the equivalent of 70% long-term suspended solids removal
SW-3: Roadside Ditches – Water Quality	Water quality – Highway Embankments shall be a minimum of 3 m in length Water quality – Roadside Ditch shall have a minimum base width of 1.0 m Water quality – minimum desirable length of the Roadside Ditch shall be 40 m

SD-1 Design Flows for Surface Drainage Systems: This standard identifies the minimum design flows that should be used for the sizing of road surface drainage systems. The design flow for a freeway minor system is the 10-year storm.

SD-3: Flow Spread on to Travel Lanes: This identifies the maximum allowable spread distance onto the travel lanes of a highway. It also defines the maximum depth of flow at the edge of the travel lanes. For freeways, the desirable standard is the maximum lateral spread distance shall be zero. The minimum standard is the maximum lateral spread distance shall be that a minimum of 2.5 m of the lane width remain clear of any flooding. The maximum depth of flooding at the lowest edge of the travel lanes shall not exceed 25 mm. It is MTO's policy to meet the desirable standard wherever feasible.

SD-4: Storm Sewer System: This standard identifies the design of the storm sewer systems and identifies the minimum allowable velocity, the minimum pipe diameter, the maximum spacing of maintenance holes, and the minimum slope of the lateral sewers. The desirable standard is a minimum allowable velocity in a trunk sewer is 0.75 m/s for smooth walled pipes and 1.5 m/s for lateral sewers. The minimum standard in a trunk sewer is a minimum allowable velocity of 0.5 m/s where the pipe can be flushed. The minimum pipe diameter is 300 mm. The maximum MH spacing between pipes ≤1200 mm Φ is 150 m. The spacing shall be reduced to 100 m when the desirable minimum allowable velocity is not achieved. The minimum slope of the lateral sewers is 0.015 m/m.

SD-5: Storm Sewer Inlets on a Continuous Grade: This standard identifies the maximum spacing between adjacent inlets. The maximum spacing between inlets shall be 150 m.

SD-6: Storm Sewer Inlets at Highway Sags: This standard identifies the placement of storm sewer inlets and quantifies the blockage at highway sags. Inlets at highway sag assume the capacity has been reduced by 50% as a result of a blockage. Sufficient inlet capacity shall be provided to conform to SD-3 and a minimum of twin inlets shall be placed at the bottom of the sag.

SD-9 Roadside Ditches: This standard identifies the minimum design requirement of Roadside Ditches for the conveyance of flow. It does not address the design of roadside ditches for improvement of water quality.

Roadside Ditches shall be designed to convey both the Minor System Design Flow and the Major System Design Flow.

The maximum depth of flow in the Roadside Ditch associated with the Minor System Design Flow shall be 1.0 m.

For the Major System Design Flow, the design of the roadside ditch shall ensure that Design Flow will not spread onto either the shoulder or the travel lane.

As a Desirable Standard, for the Major System Design Flow, water shall not extend beyond the Right-of-Way, and as a Minimum Standard any flow spread beyond the Right-of-Way shall not increase the existing extent of flooding.

The Maximum Permissible Velocity is governed by the channel lining, which shall be designed to resist erosion for the Major System Design Flow. In no case shall the velocity in a grass-lined channel exceed 1.5 m/s unless bioengineering techniques (e.g. reinforcing grid or mat) are used.

SD-13 Design Flow and Freeboard for a Culvert not on Watercourse: This standard identifies the design flow and the required minimum freeboard for culverts associated with runoff from roadways and local external catchments. The culverts that are subject to this standard would cross adjacent roads, interchange ramps, private entrances, driveways and maintenance roads. For these culverts the minimum freeboard measured vertically to the top of the subgrade upstream of the culvert is 0.3 m for the minor system design flow (the 10-year storm flow). There is no minimum freeboard associated with the major system design flow.

Culverts under private entrances such as driveways and maintenance accesses shall be designed for the same Design Flow as the Roadside Ditch (SD-9) leading up to the entrance of the culvert. As a minimum they shall be designed to convey the Minor System Design Flow. Culverts under highways, highway ramps and adjacent roadways shall be designed to convey the Minor System Design Flow and the Major System Design Flow.

The conveyance capacity of the culvert shall be set to match the design characteristics of the Roadside Ditch located immediately upstream of the culvert.

WC-1: Design Flows for Bridges and Culverts: This standard identifies the minimum Design Flows for the sizing of bridges and culverts for flow conveyance on Regulated and non-Regulated Watercourses. It also identifies the requirement for accommodating the Regulatory Flow on Regulated Watercourses, and for determining the maximum allowable increase in flood elevations upstream of a bridge or culvert. This standard provides the hydrologic basis for all water crossing standards.

This standard addresses the Design Flow requirements for standard road classifications and low volume roads.

WC-7 Culvert Crossings on a Watercourse: This standard identifies the minimum Freeboard, the minimum Clearance, and the maximum Flood Depth at culvert crossings. The standard also identifies the Freeboard requirement for walkways, bikeways and maintenance roads that are constructed within a culvert.

The Desirable Freeboard is measured vertically from the Energy Grade Line elevation for the Design Flow to the edge of the travelled lane. The Minimum Freeboard is measured vertically from the High-Water Level for the Design Flow to edge of the travelled lane.

WC-8: Minimum Culvert Size: This standard identifies minimum culvert sizes for various road types based on maintenance considerations.

The standards for Minimum Culvert Sizes are dictated by maintenance considerations, which require a sufficient height to access the barrel for cleaning and repairs.

Culverts shall be designed to satisfy the following requirements:

- to convey the Design Flow
- to account for increased sedimentation inside the barrel and ice built up
- to allow for fish passage
- to account for fluvial geomorphology characteristics
- to account for other factors such as wildlife passage, navigation, and trail access
- to countersink the culvert and install substrate material to restore fisheries habitat

WC-10: Culvert Extensions: This standard identifies the desirable Slope, Material, and Alignment for designing culvert extensions.

Extensions to existing culverts shall be designed to prevent internal blockages caused by changes in direction, changes in the shape of the cross-section, or changes in the number of openings or cells.

It is desirable that; the slope of the Culvert Extension not be less than the slope of the original structure, Culvert Extensions be of the same material as the original structure, and the alignment and shape of the original structure be maintained.

WC-13: Relief Flow (Bridges and Culverts): This standard addresses the control of flood flows conveyed over the roadway as Relief Flow at water crossings. The standard identifies the maximum depth and the maximum velocity of flow over the roadway.

SW-1: Stormwater Management-Level of Control: This standard identifies the level of control requirements for the design of stormwater management facilities for highways.

Stormwater Management (SWM) Ponds that are designed to improve water quality or to provide a Level of Control shall be designed such that the pond remains stable during the full range of design storms, and that the receiving system capacity and flood potential are not increased.

SW-3: Roadside Ditches for Water Quality: This standard provides the minimum design requirement for Roadside Ditches to achieve water quality control.

3 FIELD INVESTIGATION

A field investigation of the existing structural culverts was conducted by WSP staff on May 3 - 4, 2021. The purpose of the field investigation was to review the existing drainage conditions, confirm the drainage patterns and physical conditions of the existing structural culverts 471, 472, 473 and 474, while for the non-structural culverts, field investigation was completed under separate assignment and the Final Culvert Condition Reports were provided to WSP. The following office and field tasks were completed:

- Reviewed existing background information.
- Conducted a physical inspection of all structural culverts within the study limits including upstream and downstream ends.
- Conducted a physical inspection of the upstream and downstream channel characteristics.
- Verified the location, type, size, condition, cover depth, flow direction and culvert material for all structural culverts.
- Inspected highway embankments and channel bank conditions to identify areas of erosion.
- Prepared a photographic inventory of the four structural culverts in the study limits on both the upstream and downstream sides including side ditches.
- Provided recommendations for each structural culvert within the study limits based on physical conditions.

During this field visit, WSP staff also analyzed the other drainage issues that have been noticed along the study area, such as ponding in ditches and buried ditch inlets. These other drainage issues are further discussed in the following section.

The structural culvert inspection photographs are included in **Appendix A-1**, while the field inspection sheets are in **Appendix A-2**.

3.1 Existing Drainage Issues

WSP staff contacted MTO maintenance to meet on site for their input on the following drainage issues summarized in **Table 3-1**, unfortunately due to a schedule conflict, an on-site meeting was unable to take place. The table directly below, includes the issue description, site photographs, observations, and recommendations. Field notes for

drainage issue A can be found in culvert 471 inspection sheet while the rest of the drainage issues listed below, the field notes can be found in **Appendix A-3**.

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Table 3-1: Summary of Additional Drainage Issues and Recommendations

Drainage Issue	Pictures	Observations & Recommendations
A - Crossing Culverts (0061 and 0010 in Cramahe Township) and the ditch are typically flooded which raises water level in Little Lake due to beaver dams on private property to the North of freeway. It impacts wells and septic systems.		Unstable marshy ground, unable to access and could not pass wildlife fence on the northside. It is recommended that the private owners be engaged to facilitate the relocation of the beaver activity with relevant agencies such as DFO. Under the Drainage Act, there is no precedent for beaver dam removal; however, DFO recommends that the local provincial wildlife management office be contacted for more information on beaver dam removal. In addition, DFO's "*Code of practice: Beaver dam breaching and removal*" must be followed.
B – Drainage issues between mile marker 506.4 - 507. Standing water within the ROW is a concern.		It was observed that blockages to the ditch catchbasins are the likely culprit to the standing water. Eastbound side, ditch drainage is poor, about 90% of ditch is standing water. Erosion was present and a silt fence is down. Westbound side, some ponding near fence line is present, however not as many drainage issues as the eastbound side. It is recommended that the catchbasins be replaced with ditch inlets that have higher visibility and more drainage capacity. A more frequent cleanout plan is recommended for future maintenance of the ditches within the study limits. Storm sewer CCTV and cleanout would also be recommended to ensure no sewer blockage is causing the standing water.

Drainage Issue	Pictures	Observations & Recommendations
C – Within cut area from mile marker 507.25 to Northumberland County Road 26, there are ineffective catchbasins due to erodible soil that covers them in significant rainfall. Alternate drainage system is required.		Erosion was present and covers the catch basins for both sides of the freeway. Found catch basins with metal detector. Still water was present on the eastbound side. It is recommended that the catchbasins be replaced with ditch inlets that have higher visibility and more drainage capacity. A more frequent cleanout plan is recommended for future maintenance of the ditches within the study limits. Storm sewer CCTV and cleanout would also be recommended as sediment from the scoured areas may caused sewer blockage.
D – Ditching between mile marker 509.5 – 511 has been challenging. Erodible soil fills ditches and causes water to flow on the shoulders.		Still water is present on the eastbound side. Erosion blankets are recommended for all cut slopes to improve slope stability and reduce erodible soil from filling the existing ditches. It is recommended that existing catchbasins in the ditches be replaced with ditch inlets to increase visibility for maintenance purposes and to increase capacity to take runoff when partially blocked. Storm sewer CCTV and cleanout is also recommended.
E – Drainage within County Road 30, Brighton interchange N/S-E ramp is a concern. Eroded soil regularly washes onto EB on ramp.		Erosion is present. Edge of shoulder is cracking and breaking. It is recommended that erosion blankets be implemented in the cut slopes to improve slope stability and reduce the amount of erodible soils. Special types of vegetation may also help to stabilize the slope.

Drainage Issue	Pictures	Observations & Recommendations
F – Drainage and saturated grade of the WB ramps for County Road 30 Brighton (mile marker 509) have been an ongoing issue creating hazardous conditions.		Erosion is present. Looked like there is a berm at the side near the guardrail. Pavement is cracking. It is recommended that the road shoulder be regraded to facilitate drainage away from the roadway.

Drainage Issue	Pictures	Observations & Recommendations
G – Ongoing washout concerns from County Road 26, easterly to the end of the fill area EB.		There was no ditch found due to erosion / washout. It is recommended that erosion blankets be implemented in the cut slopes to improve slope stability and reduce the presence of erodible soils. Ditching is recommended to be cleaned out and regraded.
H – From mile marker 515 - 520 there are significant areas with no drainage. Standing water in ditches which causes cattails and phragmites to flourish and are unmaintainable. There is no drainage from the ROW so ditch cleanout is unable to be performed.		Standing water is present as well as phragmites. Under proposed conditions, the ditching is recommended to be regraded to ensure adequate drainage. Slope protection is also recommended to reduce erodible soils in the ditches.

Drainage Issue	Pictures	Observations & Recommendations
I – Culvert at the north fence line (near GPS coordinate 44.082447 N, 77.728133 W) conveys water to the ROW ditch inlet. Culvert is buried and plugged with silt due to eroded material from the north. This cause erosion of the ROW.		Field staff were unable to locate the buried culvert at the GPS coordinate with the metal detector. Could not find any evidence of erosion near the indicated coordinate. The culvert is recommended to be cleaned out and it is recommended to be flagged for more frequent maintenance checks. An alternative recommendation would be to remove the culvert and replace it with a rock lined ditch to convey flows.

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4 EXISTING DRAINAGE CONDITIONS

4.1 Existing Culvert Locations and Characteristics

There are 42 culverts in this study area, four of them are structural culverts. **Table 4-1** summarizes the existing structural culvert characteristics while **Table 4-2** summarizes the existing non-structural culvert characteristics.

Table 4-1: Summary of Existing Structural Culvert Characteristics

Culvert ID	Highway Lanes	Township	Station ID	Dimension (mm) and Type	Flow Direction
471	EB / WB	Cramahe	18+386	4200 x 2400 RFB	S-N
472	EB / WB	Cramahe	18+914	4200 x 2400 RFB	S-N
473	EB / WB	Cramahe	19+710	4200 x 2400 RFB	N-S
474	EB / WB	Brighton	10+215	4200 x 2400 RFB	S-N

Table 4-2: Summary of Existing Non-Structural Culvert Characteristics

Culvert ID	Highway Lanes	Station ID	Dimension (mm) and Type	Flow Direction
Cramahe Township				
0020	WB	13+057	900 CSP	N-S
0051	EB	13+060	900 CSP	N-S
0019	WB	13+277	700 CSP	N-S
0052	EB	13+277	700 CSP	N-S
0018	WB	13+520	900 CSP	N-S
0053	EB	13+527	700 CSP	N-S
0017	WB	14+112	700 CSP	N-S
0054	EB	14+112	900 CSP	N-S
0016	WB	14+328	900 CSP	N-S
0055	EB	14+328	900 CSP	N-S
0015	WB	14+542	900 CSP	N-S
0056	EB	14+548	900 CSP	N-S
0014	WB	14+959	1500 x 1500 NFRB	N-S
0057	EB	14+968	1500 x 1500 NFRB	N-S

Culvert ID	Highway Lanes	Station ID	Dimension (mm) and Type	Flow Direction
0013	WB	15+547	900 CSP	N-S
0058	EB	15+547	900 CSP	N-S
0011A	EB	16+492	900 CSP	S-N
0011B	WB	16+492	900 CSP	S-N
0061	WB	16+888	1800 x 1200 RFB	N-S
0010	EB	16+965	1800 x 1200 RFB	N-S
Brighton Township				
0045	WB	12+090	1200 x 1200 NFRB	N-S
0051	EB	12+110	1200 x 1200 NFRB	N-S
0044	WB	12+460	1200 x 1200 NFRB	N-S
0052	EB	12+460	1200 x 1200 NFRB	N-S
0022B	WB	16+060	1200 x 1200 NFRB	N-S
0022A	EB	16+060	1200 x 1200 NFRB	N-S
0021	WB	17+040	1200 x 1200 NFRB	N-S
0009	EB	17+040	1200 x 1200 NFRB	N-S
0020	WB	17+405	1200 x 900 NFRB	N-S
0010	EB	17+405	1200 x 1200 NFRB	N-S
0019	WB	17+630	1200 x 1200 NFRB	N-S
0012	EB	17+630	1200 x 1200 NFRB	N-S
0006	WB	18+695	1200 x 1200 NFRB	N-S
00016	EB	18+710	1200 x 1200 NFRB	N-S
0002	WB	20+375	1800 x 1200 NRFO	N-S
0003	EB	20+375	1800 x 1200 RFB	N-S
0001	WB	20+600	900 CSP	N-S
0004	EB	20+600	900 CSP	N-S

4.2 Drainage Mosaics

Catchment areas were delineated for each culvert under existing conditions using contour maps covering the study area. Existing drainage mosaics, **4-1** to **4-11** are attached at the end of this report in the exhibits section. It shows the location of the existing structural and non-structural culverts and their catchment delineation.

4.3 Existing Conditions Hydrologic Modelling

Hydrologic modelling was completed for existing conditions to simulate the hydrologic responses of the drainage areas during the design storm. It calculated runoff

characteristics during different return periods for the catchment area contributing to each culvert.

Hydrologic results for drainage areas with a directly connected impervious land use greater that 20 percent, the design storms are calculated using the STANDHYD instantaneous unit hydrograph.

Hydrologic results for drainage areas with a directly connected impervious land use less than 20 percent, the design storms are calculated using the NASH instantaneous unit hydrograph (NASHYD).

4.3.1 Flow Rate Calculations Under Existing Conditions

Hydrologic parameters were estimated for each drainage area based on the Curve Number (CN), the Time to Peak (T_P), initial pervious abstraction and percentage of imperviousness. The initial pervious abstraction refers to the portion of precipitation that gets stored in the watershed and does not contribute to the runoff process. The abstraction losses include interception, infiltration to soil moisture storage and depression storage. The initial pervious abstraction values are dependant on the topography of the drainage area, soil cover and initial moisture conditions. The hydrologic parameters are summarized in **Table 4-3.**

Table 4-3: Summary of Catchment Area Parameters Under Existing Conditions

Catchment ID	Hyd. Routine	Area (ha)	SCS Curve Number (CN)	Initial Pervious Abstraction (mm)	T_p (hrs)	Impervious (%)
100	Standard	0.91	67	5.0	n/a	61.0
101	Nash	7.90	62	16.8	0.46	10.0
110	Standard	1.01	55	5.0	n/a	30.0
111	Nash	5.33	54	22.8	0.38	7.0
120	Standard	0.82	55	5.0	n/a	32.0
121	Nash	2.33	53	23.8	0.68	7.0
130	Standard	1.57	55	5.0	n/a	34.0
131	Nash	10.63	54	22.8	0.69	7.0
140	Standard	0.76	55	5.0	n/a	26.0
141	Nash	7.22	64	15.2	0.55	7.0
150	Standard	1.35	55	5.0	n/a	26.0
151	Nash	14.07	66	14.2	0.18	10.0
160	Standard	3.05	55	5.0	n/a	28.0
161	Nash	131.28	74	9.0	0.97	5.0
170	Standard	3.33	55	5.0	n/a	29.0

Catchment ID	Hyd. Routine	Area (ha)	SCS Curve Number (CN)	Initial Pervious Abstraction (mm)	T_p (hrs)	Impervious (%)
171	Nash	32.39	59	19.1	0.89	9.0
180	Nash	2.46	55	22.6	0.99	8.0
181	Standard	1.21	55	5.0	n/a	28.0
190	Standard	2.29	57	5.0	n/a	46.0
191	Nash	147.11	67	13.4	1.83	11.6
192	Nash	276.67	67	9.4	4.85	29.4
193	Nash	48.63	64	16.4	1.31	16.0
194	Nash	160.45	74	9.1	1.95	3.4
195	Nash	496.69	74	9.2	4.78	2.2
196	Nash	65.48	73	9.6	0.56	3.4
200	Standard	5.18	72	5.0	n/a	33.0
201	Nash	30.53	71	10.7	0.78	7.2
210	Standard	0.57	69	5.0	n/a	30.0
211	Nash	2.02	72	10.5	0.16	9.4
220	Standard	0.88	98	5.0	n/a	99.0
221	Nash	14.91	59	18.9	0.41	6.0
230	Standard	3.07	62	5.0	n/a	42.0
231	Nash	33.58	58	18.6	0.31	3.0
240	Standard	0.88	55	5.0	n/a	37.0
241	Nash	11.24	56	22.2	0.41	10.0
250	Standard	0.93	64	5.0	n/a	26.0
251	Nash	16.61	51	24.7	0.51	3.0
260	Standard	3.40	76	5.0	n/a	27.0
261	Nash	35.85	59	18.5	1.24	4.0
270	Standard	3.95	57	5.0	n/a	31.0
271	Nash	26.76	59	18.9	0.23	10.0
280	Standard	0.90	72	5.0	n/a	51.0
281	Nash	6.71	67	12.9	0.43	7.0

A Visual OTTHYMO 6.2 hydrologic model was created using the above parameters. The 12-hour SCS storm distribution, catchment parameters and the future rainfall data for the projected year 2097, taken from MTO IDF Curve Lookup Tool was used to calculate the flow rates for the 2, 5, 10, 25, 50 and 100-year storm events with Climate Change consideration. The peak flows for the structural culverts are summarized in **Table 4-4** while **Table 4-5** summarizes the peak flows for the non-structural culverts.

Table 4-4: Peak Flow Rates for Structural Culverts Under Existing Conditions

Culvert ID	Station	Drainage Area (ha)	Peak Flow Rates (m^3/s)					
			2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
471	18+386	426.07	1.358	2.261	2.948	3.887	4.694	5.436
472	18+914	809.56	3.215	5.131	6.549	8.450	10.054	11.509
473	19+710	760.93	3.049	4.837	6.154	7.913	9.392	10.731
474	10+215	600.48	2.221	3.502	4.444	5.699	6.753	7.707

Table 4-5: Peak Flow Rates for Non-Structural Culverts Under Existing Conditions

Culvert ID	Station	Drainage Area (ha)	Peak Flow Rates (m^3/s)					
			2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Cramahe Township								
0020	13+057	7.90	0.069	0.133	0.184	0.258	0.322	0.382
0051	13+060	8.81	0.103	0.166	0.224	0.305	0.375	0.441
0019	13+277	5.33	0.024	0.054	0.081	0.122	0.159	0.194
0052	13+277	6.34	0.052	0.087	0.119	0.167	0.214	0.257
0018	13+520	2.33	0.008	0.018	0.026	0.039	0.050	0.061
0053	13+527	3.15	0.039	0.056	0.070	0.088	0.104	0.119
0017	14+112	10.63	0.035	0.079	0.117	0.173	0.225	0.274
0054	14+112	12.20	0.080	0.119	0.154	0.218	0.276	0.332
0016	14+328	7.22	0.074	0.136	0.184	0.252	0.31	0.364
0055	14+328	7.98	0.086	0.154	0.207	0.280	0.343	0.401
0015	14+542	14.07	0.283	0.509	0.683	0.930	1.144	1.341
0056	14+548	15.42	0.322	0.577	0.771	1.043	1.275	1.488
0014	14+959	131.28	1.870	2.997	3.825	4.930	5.863	6.707
0057	14+968	134.33	1.900	3.037	3.874	4.990	5.931	6.782
0013	15+547	36.06	0.163	0.325	0.458	0.648	0.817	0.975
0058	15+547	39.39	0.208	0.369	0.511	0.711	0.890	1.058
0011A	16+492	2.46	0.007	0.015	0.022	0.033	0.042	0.051
0011B	16+492	3.67	0.051	0.071	0.089	0.110	0.129	0.146
0061	16+888	147.11	0.777	1.353	1.797	2.407	2.934	3.419
0010	16+965	149.20	0.788	1.367	1.814	2.428	2.958	3.445
Brighton Township								
0045	12+090	30.53	0.388	0.65	0.847	1.116	1.344	1.552
0051	12+110	35.71	0.471	0.767	0.991	1.292	1.548	1.766
0044	12+460	2.02	0.066	0.110	0.142	0.186	0.223	0.256
0052	12+460	2.59	0.095	0.151	0.193	0.251	0.298	0.341

Culvert ID	Station	Drainage Area (ha)	Peak Flow Rates (m^3/s)					
			2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
0022B	16+060	14.91	0.106	0.216	0.308	0.442	0.561	0.673
0022A	16+060	15.79	0.154	0.253	0.349	0.490	0.614	0.730
0021	17+040	33.58	0.265	0.558	0.796	1.148	1.461	1.754
0009	17+040	36.65	0.341	0.669	0.943	1.331	1.674	1.994
0020	17+405	11.24	0.055	0.123	0.182	0.268	0.348	0.424
0010	17+405	12.12	0.071	0.147	0.212	0.307	0.393	0.475
0019	17+630	16.61	0.048	0.119	0.181	0.274	0.359	0.441
0012	17+630	17.54	0.061	0.140	0.210	0.312	0.405	0.491
0006	18+695	35.85	0.137	0.269	0.377	0.531	0.668	0.796
00016	18+710	39.25	0.183	0.306	0.421	0.584	0.725	0.859
0002	20+375	26.76	0.254	0.537	0.776	1.117	1.417	1.699
0003	20+375	30.71	0.372	0.705	0.973	1.371	1.713	2.033
0001	20+600	6.71	0.093	0.165	0.221	0.298	0.364	0.425
0004	20+600	7.61	0.119	0.201	0.264	0.348	0.422	0.491

Six culverts have contributing catchment areas that have waterbodies and/or wetlands that provide storage throughout the catchment. Based on Design Chart 1.06 in the MTO Drainage Management Manual, dated 1997, and the percentage of waterbodies and wetland in the catchment, an appropriate reduction factor was applied to the discharge flows for the design and check storm. **Table 4-6** summarizes the design and check flows with the reduction factor applied.

Table 4-6: Peak Discharge Flow Reduction to Allow for Storage Under Existing Conditions

Culvert ID	AW/A %	Type of Curve	KS	Peak Flow Rates (m^3/s)	
				50-yr	100-yr
471	16.58	B	0.570	2.676	3.099
472	4.45	B	0.690	6.937	7.941
473	4.74	B	0.685	6.434	7.351
474	5.73	B	0.645	4.356	4.971
Cramahe Township					
0061	2.99	C	0.690	2.024	2.359
0010	2.95	C	0.690	2.041	2.377

4.4 Existing Conditions Hydraulic Assessment

The design standards for the hydraulic assessment of culverts are based on the MTO HDDS (2008), discussed in **Section 2.1**. To estimate the headwater depth and assess the hydraulic capacity of existing culverts within the study area, a CulvertMaster and HEC-RAS hydraulic modelling tool was used.

A HEC-RAS model was used to analyze the structural culverts while a CulvertMaster model was used for the non-structural culverts.

4.4.1 Hydraulic Results Under Existing Conditions

The 50-year storm was used as the design storm and the 100-year storm was used as the check storm for all culverts with a span less than 6 m. The hydraulic analysis involved the comparison of the headwater elevation and the elevation at which water would spill onto the highway. This comparison will determine if the existing culvert meets the freeboard and flood depth design criteria.

There is a total of five existing non-structural culverts that do not meet the design criteria.

Hydraulic analysis for each of the four existing structural culverts are summarized in **Table 4-7**, **Table 4-8**, **Table 4-9** and **Table 4-10**.

4-11 summarizes the hydraulic analysis of the existing non-structural culverts. Highlighted cells include numbers that are relevant to the design criteria as follows:

- The desired freeboard criteria is such that the design storm energy grade line elevation is > 1.0 m for culverts that cross under roadways.
- The minimum freeboard criteria is such that the design storm water surface elevation is > 1.0 m for culverts that cross under roadways.
- The required HW/D for culverts with diameter or rise > 4.5 m under the design storm is < 1.0 m

The HEC-RAS results are included in **Appendix D-1** and the CulvertMaster output files are included in **Appendix D-2**.

Table 4-7: Existing Hydraulic Performance Summary for Culvert 471

Description	2-year	5-year	10-year	25-year	50-year	100-year
Water Surface Elevation	171.54	171.74	171.88	172.05	172.18	172.30
Energy Grade line Elevation	171.54	171.75	171.88	172.05	172.18	172.30
Top of Road (low Point)	174.54	174.54	174.54	174.54	174.54	174.54
(2+4) Top of Road Freeboard (min.)	3.00	2.80	2.66	2.49	2.36	2.24
(3) Top of Road Freeboard (desired)	3.00	2.79	2.66	2.49	2.36	2.24
Soffit Elevation (upstream)	173.09	173.09	173.09	173.09	173.09	173.09
(6) Soffit Clearance	1.55	1.35	1.21	1.04	0.91	0.79
(7) HW/D	0.35	0.44	0.49	0.57	0.62	0.67

Under existing conditions, culvert 471 meets all relevant design criteria including:

— HW/D Ratio < 1.0 m for culverts with spans > 4.5 m for a design storm of 50-years

— Freeboard > 1.0 m for culverts that cross under roadways for the design storm of 50-years

The culvert is propositioned to be replaced under proposed conditions as a result of the highway widening. The structural culvert is also reaching the end of it's designed life span.

Table 4-8: Existing Hydraulic Performance Summary for Culvert 472

Description	2-year	5-year	10-year	25-year	50-year	100-year
Water Surface Elevation	170.88	171.16	171.35	171.59	171.77	171.99
Energy Grade line Elevation	170.96	171.25	171.43	171.67	171.85	172.01
Top of Road (low Point)	178.53	178.53	178.53	178.53	178.53	178.53
(2+4) Top of Road Freeboard (min.)	7.65	7.37	7.18	6.94	6.76	6.54
(3) Top of Road Freeboard (desired)	7.57	7.28	7.10	6.86	6.68	6.52

Description	2-year	5-year	10-year	25-year	50-year	100-year
Soffit Elevation (upstream)	172.30	172.30	172.30	172.30	172.30	172.30
(6) Soffit Clearance	1.42	1.14	0.95	0.71	0.53	0.31
(7) HW/D	0.41	0.52	0.60	0.70	0.78	0.87

Under existing conditions, culvert 472 meets all relevant design criteria including:

— HW/D Ratio < 1.0 m for culverts with spans > 4.5 m for a design storm of 50-years

— Freeboard > 1.0 m for culverts that cross under roadways for the design storm of 50-years

The culvert is propositioned to be replaced under proposed conditions as a result of the highway widening.

Table 4-9: Existing Hydraulic Performance Summary for Culvert 473

Description	2-year	5-year	10-year	25-year	50-year	100-year
Water Surface Elevation	180.17	180.47	180.67	180.91	181.10	181.26
Energy Grade line Elevation	180.18	180.48	180.68	180.92	181.11	181.27
Top of Road (low Point)	184.95	184.95	184.95	184.95	184.95	184.95
(2+4) Top of Road Freeboard (min.)	4.78	4.48	4.28	4.04	3.85	3.69
(3) Top of Road Freeboard (desired)	4.77	4.47	4.27	4.03	3.84	3.68
Soffit Elevation (upstream)	181.48	181.48	181.48	181.48	181.48	181.48
(6) Soffit Clearance	1.31	1.01	0.81	0.57	0.38	0.22
(7) HW/D	0.45	0.58	0.66	0.76	0.84	0.91

Under existing conditions, culvert 473 meets all relevant design criteria including:

— HW/D Ratio < 1.0 m for culverts with spans > 4.5 m for a design storm of 50-years

— Freeboard > 1.0 m for culverts that cross under roadways for the design storm of 50-years

The culvert is propositioned to be replaced under proposed conditions as a result of the highway widening. The structural culvert is also reaching the end of it's designed life span.

Table 4-10: Existing Hydraulic Performance Summary for Culvert 474

Description	2-year	5-year	10-year	25-year	50-year	100-year
Water Surface Elevation	184.86	184.96	185.03	185.13	185.22	185.31
Energy Grade line Elevation	184.91	185.05	185.15	185.27	185.38	185.47
Top of Road (low Point)	186.90	186.90	186.90	186.90	186.90	186.90
(2+4) Top of Road Freeboard (min.)	2.04	1.94	1.87	1.77	1.68	1.59
(3) Top of Road Freeboard (desired)	1.99	1.85	1.75	1.63	1.52	1.43
Soffit Elevation (upstream)	186.02	186.02	186.02	186.02	186.02	186.02
(6) Soffit Clearance	1.16	1.06	0.99	0.89	0.80	0.71
(7) HW/D	0.52	0.56	0.59	0.63	0.67	0.71

Under existing conditions, culvert 474 meets all relevant design criteria including:

- HW/D Ratio < 1.0 m for culverts with spans > 4.5 m for a design storm of 50-years
- Freeboard > 1.0 m for culverts that cross under roadways for the design storm of 50-years

The culvert is propositioned to be replaced under proposed conditions as a result of the highway widening. The structural culvert is also reaching the end of it's designed life span.

Table 4-11: Summary of Existing Hydraulic Analysis for Non-Structural Culverts

Culvert ID	Culvert Station	Existing Culvert Size (mm)	Edge of Pavement Elevation (m)	50 Year Storm		100 Year Storm		HW/D Ratio
				Headwater Elevation (m)	Freeboard (m)	Headwater Elevation (m)	Freeboard (m)	
Cramahe Township								
0020	13+057	900	171.00	169.31	1.69	169.37	1.63	0.60
0051	13+060	900	170.85	168.95	1.90	169.00	1.85	0.67
0019	13+277	700	171.75	170.91	0.84	170.95	0.80	0.60
0052	13+277	700	172.00	170.06	1.94	170.13	1.87	0.69
0018	13+520	900	174.20	171.91	2.29	171.93	2.27	0.22
0053	13+527	700	173.34	171.15	2.19	171.19	2.15	0.45
0017	14+112	700	171.65	170.11	1.54	170.16	1.49	0.73
0054	14+112	900	171.63	169.72	1.91	169.75	1.88	0.70
0016	14+328	900	171.13	169.41	1.72	169.46	1.67	0.63
0055	14+328	900	171.10	169.30	1.80	169.35	1.75	0.67
0015	14+542	900	170.68	170.12	0.56	170.65	0.03	2.14
0056	14+548	900	170.64	169.52	1.12	169.82	0.82	1.62
0014	14+959	1500 x 1500	170.54	169.58	0.96	169.58	0.96	1.50
0057	14+968	1500 x 1500	168.98	168.37	0.61	168.58	0.40	1.52
0013	15+547	900	174.51	173.24	1.27	173.45	1.06	1.07
0058	15+547	900	173.97	172.90	1.07	173.03	0.94	1.06
0011A	16+492	900	183.12	179.14	3.98	179.16	3.96	0.20
0011B	16+492	900	183.46	178.89	4.57	178.91	4.55	0.37
0061	16+888	1800 x 1200	182.89	178.30	4.59	178.41	4.48	0.83
0010	16+965	1800 x 1200	182.42	178.10	4.32	178.19	4.23	0.80
Brighton Township								
0045	12+090	1200 x 1200	201.93	199.58	2.35	199.68	2.25	0.79
0051	12+110	1200 x 1200	201.76	199.34	2.42	199.44	2.32	0.87
0044	12+460	1200 x 1200	204.02	200.45	3.57	200.49	3.53	0.24
0052	12+460	1200 x 1200	202.42	200.18	2.24	200.21	2.21	0.37
0022B	16+060	1200 x 1200	196.31	190.50	5.81	190.57	5.74	0.46
0022A	16+060	1200 x 1200	196.17	189.60	6.57	189.67	6.50	0.48
0021	17+040	1200 x 1200	179.37	178.25	1.12	178.38	0.99	0.87
0009	17+040	1200 x 1200	178.74	177.65	1.09	177.79	0.95	0.95
0020	17+405	1200 x 900	180.12	178.47	1.65	178.52	1.60	0.44
0010	17+405	1200 x 1200	179.41	177.10	2.31	177.16	2.25	0.36
0019	17+630	1200 x 1200	180.58	178.79	1.79	178.85	1.73	0.34

Culvert ID	Culvert Station	Existing Culvert Size (mm)	Edge of Pavement Elevation (m)	50 Year Storm		100 Year Storm		HW/D Ratio
				Headwater Elevation (m)	Freeboard (m)	Headwater Elevation (m)	Freeboard (m)	
0012	17+630	1200 x 1200	179.88	178.39	1.49	178.44	1.44	0.37
0006	18+695	1200 x 1200	179.57	177.93	1.64	178.01	1.56	0.52
00016	18+710	1200 x 1200	179.06	177.28	1.78	177.36	1.70	0.54
0002	20+375	1800 x 1200	183.40	181.74	1.66	181.84	1.56	0.65
0003	20+375	1800 x 1200	181.85	179.69	2.16	179.8	2.05	0.73
0001	20+600	900	183.48	180.87	2.61	180.94	2.54	0.62
0004	20+600	900	182.20	180.69	1.51	180.75	1.45	0.71

Culverts 0019, 0015, 0056, 0014 and 0057 in Cramahe Township do not meet design criteria under existing conditions.

4.5 Existing Storm Sewer Assessment

Existing runoff from Highway 401 within the study area flows towards the grassed median and side ditches. When a concrete median is present instead of a grassed median, runoff flowing towards the median will be collected through existing catch basins and conveyed to an outlet through existing storm sewers. The outlets discharge to the outer ditches of the highway.

4.5.1 Rainfall

As previously stated, the MTO Lookup tool was used to find the 2097 rainfall climate projection for this study area. The general equation that fits to an IDF Curve for a specific location and return period is provided below:

$$I = AT_C{}^B$$

Where,

I = rainfall intensity (mm/hr)

T_C = Time of concentration (min)

$A\ and\ B$ = coefficients (differs per design storm and dependent on geographic location)

By graphing the rainfall intensity values from the MTO IDF Lookup tool and finding the trend line equations, the A and B values were found for all storm events. **Table 4-12** summarizes the calculated coefficients for all storm events.

Table 4-12: 2097 A & B Coefficients for the 2-year to 100-year Based on MTO Lookup Tool

Coefficients	2-year	5-year	10-year	25-year	50-year	100-year
A	24.048	30.986	35.591	41.362	45.628	49.849
B	-0.678	-0.681	-0.683	-0.686	-0.686	-0.689

4.5.2 Analysis

An existing storm sewer assessment was completed using rainfall intensities for the 10-year design storm and the catchment areas of each catch basin. **Table 4-13** summarizes the existing storm sewer characteristics such as spacing (distance between one catch basin to the next), pipe size and slope.

Exhibits 4-12 to **4-27** show the existing storm sewer catchment areas. Each drainage area includes the eastbound and westbound lane contribution to the catch basins. Catchments 530, 535 and 540 drains towards an outlet that is outside the project limits.

The analysis for the existing storm sewers concluded that all existing pipes have at least the minimum velocity of 0.5 m/s. The detailed analysis is located in **Appendix E**.

Table 4-13: Existing Storm Sewer Characteristics

Reach		Spacing (m)	Pipe Size (mm)	Slope (%)
From Station	To Station			
Cramahe Township				
12+520	12+630	110	300	0.60
12+630	12+730	100	375	0.91
12+730	12+830	100	375	1.10
12+830	Outlet	23	525	0.50
12+895	12+945	50	300	0.69
13+070	13+010	60	300	0.25
13+010	12+945	65	375	0.25
12+945	Outlet	25	525	0.50
17+300	17+365	65	375	0.50
17+365	17+400	35	375	0.62
17+400	17+443	43	375	0.85
17+443	17+508	65	450	0.50

Reach		Spacing (m)	Pipe Size (mm)	Slope (%)
From Station	To Station			
17+508	17+573	65	450	0.55
17+573	17+611	38	450	0.65
17+611	17+720	109	450	0.80
17+720	17+812	92	525	0.80
17+812	17+915	103	525	0.80
17+915	18+015	100	600	0.50
18+015	18+115	100	600	0.50
18+115	18+215	100	600	0.50
18+215	18+300	85	750	0.40
18+300	Outlet	33	825	0.48
18+373	18+400	27	375	0.55
18+400	18+422	22	375	0.55
18+422	18+475	53	375	0.55
19+298	19+192	106	450	1.00
19+192	19+092	100	450	1.80
19+092	18+991	101	525	2.20
18+991	18+898	93	525	2.20
18+898	18+798	100	600	1.80
18+798	18+697	101	750	1.00
18+697	18+600	97	750	1.00
18+600	18+518	82	750	1.00
18+518	18+475	43	750	1.00
18+475	Outlet	36	825	2.30
19+570	19+652	82	375	0.50
19+652	19+695	43	450	0.40
19+695	19+722	27	450	0.70
19+722	19+750	28	450	0.70
19+750	19+800	50	450	0.70
10+075	20+210	106	375	0.58
20+210	20+100	110	450	0.40
20+100	20+003	97	450	0.60
20+003	19+892	111	525	0.40
19+892	19+800	92	525	0.72
19+800	Outlet	30	825	0.50
Brighton Township				
15+330	15+250	80	375	2.50
15+250	15+205	45	375	2.80
15+205	15+195	10	375	2.80

Reach		Spacing (m)	Pipe Size (mm)	Slope (%)
From Station	To Station			
15+730	15+619	111	375	1.20
15+619	15+595	24	375	1.20
15+595	15+510	85	375	1.40
15+510	15+470	40	450	1.90
15+470	15+425	45	450	1.90
15+425	15+410	15	450	2.00
15+410	Outlet	19	760	0.50
16+000	16+100	100	375	1.00
16+100	16+200	100	375	1.10
16+200	16+300	100	450	1.50
16+300	16+390	90	450	2.10
16+390	16+486	96	450	3.50
16+486	16+598	112	450	2.50
16+598	Outlet	27	825	2.00

Table 4-14: Existing Drainage Area Summary

Catchment ID	Drainage Area (ha)	Outlet ID
300	0.021	1
305	0.174	1
310	0.180	1
315	0.165	1
320	0.123	2
325	0.064	2
330	0.072	2
335	0.056	2
340	0.082	3
345	0.222	3
350	0.098	3
355	0.042	3
360	0.149	3
365	0.121	3
370	0.071	3
375	0.193	3
380	0.183	3
385	0.179	3
390	0.167	3
395	0.168	3
400	0.178	3
405	0.136	3
410	0.144	4
415	0.078	4
420	0.080	4
425	0.075	4
430	0.141	4
435	0.179	4
440	0.178	4
445	0.181	4
450	0.174	4
455	0.176	4
460	0.174	4
465	0.182	4
470	0.212	4
475	0.276	5
480	0.149	5
485	0.071	5

Catchment ID	Drainage Area (ha)	Outlet ID
490	0.093	5
495	0.091	5
500	0.164	5
505	0.188	5
510	0.168	5
515	0.293	5
520	0.094	5
525	0.040	5
530*	0.070	-
535*	0.128	-
540*	0.144	-
545	0.008	6
550	0.071	6
555	0.074	6
560	0.149	6
565	0.022	6
570	0.174	6
575	0.197	6
580	0.239	7
585	0.156	7
590	0.160	7
595	0.161	7
600	0.133	7
605	0.173	7
610	0.100	7

*Catchments 530, 535 and 540 drain into an outlet that is not within the study limits.

5 PROPOSED DRAINAGE CONDITIONS

This section discusses the drainage requirements to accommodate the proposed Highway 401 widening.

5.1 Proposed Conditions Crossing Culverts

For the preliminary design, headwalls are proposed for 26 culvert ends that are located within the proposed grass median. Further ditching and median design and analysis will be carried out in the detail design phase, which includes the possibility of wingwalls being required for the culvert ends located in the side ditching.

5.1.1 Flow Rate Calculations Under Proposed Conditions

As in **Section 4.3.1** hydrologic parameters were estimated for each catchment under proposed conditions. These parameters are summarized in **Table 5-1**.The proposed peak flow values for the structural and non-structural culverts are summarized in **Table** 5-2 and **Table 5-3**. The catchments under proposed conditions are shown in **Exhibits 5-1** to **5-11**.

Table 5-1: Summary of Catchment Parameters Under Proposed Conditions

Catchment ID	Hyd. Routine	Area (ha)	SCS Curve Number (CN)	Initial Pervious Abstraction (mm)	T_p (hrs)	Impervious (%)
100	Standard	0.91	67	5.0	n/a	62.0
101	Nash	7.90	62	16.6	0.34	11.0
110	Standard	1.01	55	5.0	n/a	39.0
111	Nash	5.27	55	22.6	0.39	8.0
120	Standard	0.82	55	5.0	n/a	40.0
121	Nash	2.40	54	23.5	0.50	8.0
130	Standard	1.57	55	5.0	n/a	42.0
131	Nash	10.63	55	22.6	0.65	8.0
140	Standard	0.76	55	5.0	n/a	38.0
141	Nash	7.22	64	15.2	0.44	7.0
150	Standard	1.35	55	5.0	n/a	39.0
151	Nash	14.07	66	14.2	0.17	10.0
160	Standard	3.05	55	5.0	n/a	39.0
161	Nash	131.28	75	8.6	0.94	5.0
170	Standard	3.33	55	5.0	n/a	42.0

Catchment ID	Hyd. Routine	Area (ha)	SCS Curve Number (CN)	Initial Pervious Abstraction (mm)	T_p (hrs)	Impervious (%)
171	Nash	32.39	60	18.2	0.91	10.0
180	Nash	2.46	56	22.2	1.36	10.0
181	Standard	1.21	55	5.0	n/a	40.0
190	Standard	1.71	61	5.0	n/a	72.0
191	Nash	146.82	67	13.4	2.20	11.6
192	Nash	277.13	66	9.7	2.41	30.2
193	Nash	48.62	66	15.1	1.78	20.0
194	Nash	160.45	74	9.1	2.14	3.4
195	Nash	496.70	74	9.2	3.71	2.2
196	Nash	65.48	72	10.2	0.68	2.4
200	Standard	5.18	72	5.0	n/a	39.0
201	Nash	30.53	71	10.7	0.57	7.2
210	Standard	0.57	69	5.0	n/a	39.0
211	Nash	2.03	72	10.4	0.15	5.0
220	Standard	0.88	98	5.0	n/a	100.0
221	Nash	14.91	58	19.1	0.40	5.0
230	Standard	3.07	62	5.0	n/a	58.0
231	Nash	33.58	59	18.5	0.29	4.0
240	Standard	0.88	55	5.0	n/a	44.0
241	Nash	11.24	56	22.2	0.40	10.0
250	Standard	0.93	64	5.0	n/a	41.0
251	Nash	16.61	51	24.9	0.50	2.0
260	Standard	3.40	76	5.0	n/a	40.0
261	Nash	35.85	59	18.5	1.23	4.0
270	Standard	3.95	57	5.0	n/a	55.0
271	Nash	26.76	60	18.7	0.22	11.0
280	Standard	0.90	98	5.0	n/a	100.0
281	Nash	6.71	68	12.7	0.40	8.0

Table 5-2: Peak Flow Rates for Structural Culverts Under Proposed Conditions

Culvert ID	Station	Drainage Area (ha)	Peak Flow Rates (m^3/s)					
			2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
471	18+386	425.66	2.083	3.484	4.552	6.012	7.266	8.417
472	18+914	809.56	3.934	6.287	8.028	10.358	12.324	14.107
473	19+710	760.94	3.732	5.932	7.554	9.720	11.543	13.192
474	10+215	600.49	2.702	4.272	5.425	6.961	8.256	9.430

Table 5-3: Peak Flow Rates for Non-Structural Culverts Under Proposed Conditions

Culvert ID	Station	Drainage Area (ha)	Peak Flow Rates (m^3/s)					
			2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Cramahe Township								
0020	13+057	7.90	0.081	0.159	0.222	0.310	0.387	0.459
0051	13+060	8.81	0.125	0.209	0.277	0.371	0.457	0.534
0019	13+277	5.27	0.024	0.056	0.083	0.124	0.161	0.196
0052	13+277	6.28	0.063	0.100	0.133	0.179	0.221	0.261
0018	13+520	2.40	0.009	0.021	0.031	0.046	0.060	0.073
0053	13+527	3.22	0.047	0.068	0.085	0.108	0.128	0.147
0017	14+112	10.63	0.038	0.086	0.127	0.187	0.242	0.295
0054	14+112	12.20	0.096	0.140	0.175	0.238	0.302	0.362
0016	14+328	7.22	0.077	0.143	0.196	0.270	0.335	0.395
0055	14+328	7.98	0.092	0.165	0.223	0.304	0.374	0.439
0015	14+542	14.07	0.288	0.522	0.706	0.960	1.179	1.380
0056	14+548	15.42	0.356	0.621	0.823	1.104	1.343	1.562
0014	14+959	131.28	1.884	3.019	3.852	4.969	5.909	6.759
0057	14+968	134.33	1.916	3.061	3.905	5.031	5.979	6.836
0013	15+547	36.06	0.174	0.340	0.475	0.667	0.837	0.995
0058	15+547	39.39	0.279	0.401	0.531	0.732	0.910	1.077
0011A	16+492	2.46	0.006	0.013	0.019	0.028	0.035	0.043
0011B	16+492	3.67	0.068	0.092	0.111	0.133	0.153	0.170
0061	16+888	146.82	0.683	1.182	1.567	2.095	2.551	2.970
0010	16+965	148.53	0.693	1.195	1.581	2.112	2.570	2.990
Brighton Township								
0045	12+090	30.53	0.474	0.795	1.036	1.365	1.645	1.900
0051	12+110	35.71	0.604	0.977	1.257	1.631	1.951	2.223
0044	12+460	2.03	0.069	0.114	0.147	0.192	0.229	0.263
0052	12+460	2.60	0.103	0.162	0.205	0.264	0.312	0.356
0022B	16+060	14.91	0.101	0.209	0.299	0.431	0.548	0.658
0022A	16+060	15.79	0.153	0.251	0.341	0.479	0.601	0.715
0021	17+040	33.58	0.289	0.603	0.867	1.243	1.575	1.885
0009	17+040	36.65	0.423	0.759	1.040	1.437	1.788	2.122
0020	17+405	11.24	0.055	0.124	0.184	0.272	0.354	0.431
0010	17+405	12.12	0.073	0.150	0.215	0.312	0.400	0.482
0019	17+630	16.61	0.048	0.118	0.181	0.275	0.36	0.444
0012	17+630	17.54	0.063	0.143	0.213	0.315	0.409	0.496
0006	18+695	35.85	0.138	0.271	0.379	0.534	0.672	0.801

Culvert ID	Station	Drainage Area (ha)	Peak Flow Rates (m^3/s)					
			2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
00016	18+710	39.25	0.229	0.338	0.424	0.587	0.730	0.865
0002	20+375	26.76	0.274	0.581	0.834	1.192	1.506	1.800
0003	20+375	30.71	0.511	0.890	1.190	1.623	1.995	2.341
0001	20+600	6.71	0.102	0.180	0.239	0.322	0.394	0.459
0004	20+600	7.61	0.175	0.263	0.328	0.417	0.493	0.562

As stated in **Section 4.3.1,** six culverts have contributing catchment areas that have waterbodies and or wetlands that provide storage throughout the catchment. **Table 5-4** summarizes the peak flows with the applied reduction factor from Design Chart 1.06 in the MTO Drainage Management Manual.

Table 5-4: Peak Discharge Flow Reduction to Allow for Storage Under Proposed Conditions

Culvert ID	AW/A %	Type of Curve	KS	Peak Flow Rates (m^3/s)	
				50-yr	100-yr
471	16.5	B	0.570	4.142	4.798
472	4.48	B	0.690	8.504	9.734
473	4.76	B	0.685	7.907	9.037
474	5.77	B	0.645	5.325	6.082
Cramahe Township					
0061	3.00	C	0.690	1.760	2.049
0010	2.97	C	0.690	1.773	2.063

5.2 Proposed Conditions Hydraulic Assessment

The hydraulic assessment under proposed conditions was completed in the same way as the existing conditions by using CulverMaster and HEC-RAS modelling tools with the MTO HDDS design standards. The culvert lengths were lengthened to accommodate the road widening and the invert elevations were updated to match the new proposed lengths. Scour review is recommended to be completed during the detailed design.

5.2.1 Hydraulic Results Under Proposed Conditions

Hydraulic analysis for each structural culverts under proposed conditions are summarized in **Table 5-5**, **Table 5-6**, **Table 5-7** and **Table 5-8**.

Table 5-9 summarizes the hydraulic analysis for the non-structural culverts under proposed conditions.

The HEC-RAS results are included in **Appendix D-1** and the CulvertMaster output files are included in **Appendix D-2**.

Table 5-5: Proposed Hydraulic Performance Summary for Culvert 471

Description	2-year	5-year	10-year	25-year	50-year	100-year
Water Surface Elevation	171.45	171.61	171.77	171.95	172.09	172.20
Energy Grade line Elevation	171.55	171.68	171.81	171.97	172.10	172.21
Top of Road (low Point)	174.54	174.54	174.54	174.54	174.54	174.54
(2+4) Top of Road Freeboard (min.)	3.09	2.93	2.77	2.59	2.45	2.34
(3) Top of Road Freeboard (desired)	2.99	2.86	2.73	2.57	2.44	2.33
Soffit Elevation (upstream)	173.00	173.00	173.00	173.00	173.00	173.00
(6) Soffit Clearance	1.55	1.39	1.23	1.05	0.91	0.80
(7) HW/D	0.32	0.38	0.45	0.52	0.58	0.63

Table 5-6: Proposed Hydraulic Performance Summary for Culvert 472

Description	2-year	5-year	10-year	25-year	50-year	100-year
Water Surface Elevation	170.60	170.86	170.98	171.10	171.19	171.26
Energy Grade line Elevation	170.89	171.13	171.26	171.42	171.53	171.63
Top of Road (low Point)	178.53	178.53	178.53	178.53	178.53	178.53
(2+4) Top of Road Freeboard (min.)	7.93	7.67	7.55	7.43	7.34	7.27
(3) Top of Road Freeboard (desired)	7.64	7.40	7.27	7.11	7.00	6.90
Soffit Elevation (upstream)	172.30	172.30	172.30	172.30	172.30	172.30
(6) Soffit Clearance	1.70	1.44	1.32	1.20	1.11	1.04
(7) HW/D	0.29	0.40	0.45	0.50	0.54	0.57

Table 5-7: Proposed Hydraulic Performance Summary for Culvert 473

Description	2-year	5-year	10-year	25-year	50-year	100-year
Water Surface Elevation	180.06	180.16	180.23	180.50	180.68	180.83
Energy Grade line Elevation	180.20	180.34	180.43	180.61	180.78	180.92
Top of Road (low Point)	184.95	184.95	184.95	184.95	184.95	184.95
(2+4) Top of Road Freeboard (min.)	4.89	4.79	4.72	4.45	4.27	4.12
(3) Top of Road Freeboard (desired)	4.75	4.61	4.52	4.34	4.17	4.03
Soffit Elevation (upstream)	181.48	181.48	181.48	181.48	181.48	181.48
(6) Soffit Clearance	1.42	1.32	1.25	0.98	0.80	0.65
(7) HW/D	0.41	0.45	0.48	0.59	0.67	0.73

Table 5-8: Proposed Hydraulic Performance Summary for Culvert 474

Description	2-year	5-year	10-year	25-year	50-year	100-year
Water Surface Elevation	184.88	185.00	185.07	185.17	185.26	185.34
Energy Grade line Elevation	184.88	185.00	185.08	185.18	185.26	185.34
Top of Road (low Point)	186.90	186.90	186.90	186.90	186.90	186.90
(2+4) Top of Road Freeboard (min.)	2.02	1.90	1.83	1.73	1.64	1.56
(3) Top of Road Freeboard (desired)	2.02	1.90	1.82	1.72	1.64	1.56
Soffit Elevation (upstream)	186.02	186.02	186.02	186.02	186.02	186.02
(6) Soffit Clearance	1.14	1.02	0.95	0.85	0.76	0.68
(7) HW/D	0.53	0.58	0.61	0.65	0.68	0.72

Table 5-9: Summary of Proposed Hydraulic Analysis for Non-Structural Culverts

Culvert ID	Culvert Station	Proposed Culvert Size (mm)	Edge of Pavement Elevation (m)	50 Year Storm		100 Year Storm		HW/D Ratio
				Headwater Elevation (m)	Freeboard (m)	Headwater Elevation (m)	Freeboard (m)	
Cramahe Township								
0020	13+057	900	171.01	169.87	1.14	169.93	1.08	0.68
0051	13+060	900	170.73	169.01	1.72	169.07	1.66	0.74
0019	13+277	1000	172.62	170.97	1.65	171.01	1.61	0.36
0052	13+277	1000	171.94	169.98	1.96	170.02	1.92	0.39
0018	13+520	900	174.05	172.00	2.04	172.03	2.01	0.24
0053	13+527	1000	173.29	171.11	2.18	171.13	2.16	0.30
0017	14+112	700	171.54	170.21	1.33	170.27	1.27	0.71
0054	14+112	900	171.49	169.75	1.74	169.8	1.69	0.67
0016	14+328	900	171.02	169.48	1.54	169.54	1.48	0.62
0055	14+328	900	170.96	169.32	1.64	169.37	1.59	0.70
0015	14+542	1200	170.57	169.35	1.22	169.48	1.09	0.90
0056	14+548	1200	170.50	169.11	1.39	169.21	1.29	0.87
0014	14+959	2400 x 1500	170.39	169.1	1.29	169.26	1.13	1.09
0057	14+968	2400 x 1500	168.84	167.6	1.24	167.74	1.10	0.99
0013	15+547	1000	174.25	173.17	1.08	173.26	0.99	0.87
0058	15+547	1390 x 970 (CSPA)	173.80	172.59	1.20	172.67	1.13	0.66
0011A	16+492	900	183.30	179.23	4.07	179.24	4.06	0.18
0011B	16+492	900	183.34	178.87	4.47	178.89	4.45	0.40
0061	16+888	1800 x 1200	182.87	178.27	4.60	178.36	4.51	0.73
0010	16+965	1800 x 1200	183.01	178.02	4.99	178.11	4.90	0.71
Brighton Township								
0045	12+090	1200 x 1200	201.79	199.79	2.00	199.88	1.91	0.91
0051	12+110	1200 x 1200	201.57	199.4	2.17	199.5	2.07	0.92
0044	12+460	1200 x 1200	203.87	200.6	3.27	200.63	3.24	0.25
0052	12+460	1200 x 1200	202.34	200.14	2.20	200.18	2.16	0.34
0022B	16+060	1200 x 1200	196.11	191.15	4.96	191.22	4.89	0.45
0022A	16+060	1200 x 1200	195.82	189.53	6.29	189.61	6.21	0.48
0021	17+040	1800 x 1200	179.21	178.17	1.04	178.28	0.93	0.69
0009	17+040	1800 x 1200	178.50	177.34	1.16	177.44	1.06	0.68
0020	17+405	1200 x 900	179.96	178.54	1.42	178.60	1.36	0.45
0010	17+405	1200 x 1200	179.27	177.13	2.13	177.19	2.07	0.32

Culvert ID	Culvert Station	Proposed Culvert Size (mm)	Edge of Pavement Elevation (m)	50 Year Storm		100 Year Storm		HW/D Ratio
				Headwater Elevation (m)	Freeboard (m)	Headwater Elevation (m)	Freeboard (m)	
0019	17+630	1200 x 1200	180.42	178.88	1.54	178.94	1.48	0.34
0012	17+630	1200 x 1200	179.73	178.3	1.43	178.35	1.38	0.33
0006	18+695	1200 x 1200	179.33	178.02	1.31	178.10	1.23	0.52
00016	18+710	1200 x 1200	178.84	177.43	1.41	177.5	1.34	0.49
0002	20+375	1800 x 1200	183.63	182.00	1.63	182.10	1.53	0.68
0003	20+375	1800 x 1200	182.05	179.85	2.20	179.96	2.09	0.81
0001	20+600	900	183.66	180.98	2.68	181.04	2.62	0.65
0004	20+600	900	182.41	180.76	1.65	180.81	1.60	0.78

From the results above 11 non-structural culverts are proposed for replacement. Two were recommended to be replaced from the Ainley Group Final Culvert Condition Reports (2015). Five are being replaced due to not meeting the design criteria under existing conditions and the last four are getting replaced because the existing size does not meet the design criteria under proposed conditions.

All proposed structural culverts meet relevant design criteria and have a lower observed water level compared to existing conditions due to the flattening of the proposed culvert to better follow the watercourse slope and increased width of culvert.

Under the detailed design phase, detailed area survey should be obtained to refine the watercourse tie-in design as the surveyed cross-sections during the preliminary design was intended for use in the HEC-RAS modelling and elevations outside of the surveyed cross-sections are estimated.

Table 5-10 summarizes all the culvert recommendations for the structural and non-structural culverts.

Table 5-10: Culvert Recommendations

Culvert ID	Township	Station	Proposed Recommendations
Structural			
471	Cramahe	18+386	Replace with 4800 x 2400 mm box culvert embedded 300 mm
472	Cramahe	18+914	Replace with 4800 x 2400 mm box culvert embedded 300 mm
473	Cramahe	19+710	Replace with 4800 x 2400 mm box culvert embedded 300 mm
474	Brighton	10+215	Replace with 4800 x 2400 mm box culvert embedded 300 mm
Non- Structural			
0020	Cramahe	13+057	Extend culvert with a 900 mm pipe (like for like), a catch basin may be required in the median
0051	Cramahe	13+060	Extend culvert with a 900 mm pipe (like for like), a catch basin may be required in the median
0019	Cramahe	13+277	Replace with a 1000 mm CSP, headwall proposed in the median
0052	Cramahe	13+277	Replace with a 1000 mm CSP, headwall proposed in the median
0018	Cramahe	13+520	Extend culvert with a 900 mm pipe (like for like), headwall proposed in median
0053	Cramahe	13+527	Replace with a 1000 mm CSP, headwall proposed in the median
0017	Cramahe	14+112	Extend culvert with a 700 mm pipe (like for like), headwall proposed in median
0054	Cramahe	14+112	Extend culvert with a 900 mm pipe (like for like), headwall proposed in median
0016	Cramahe	14+328	Extend culvert with a 900 mm pipe (like for like), headwall proposed in median
0055	Cramahe	14+328	Extend culvert with a 900 mm pipe (like for like), headwall proposed in median
0015	Cramahe	14+542	Replace with a 1200 mm CSP, headwall proposed in the median
0056	Cramahe	14+548	Replace with a 1200 mm CSP, headwall proposed in the median
0014	Cramahe	14+959	Replace with a 2400 x 1500 mm NRFB, headwall proposed in the median
0057	Cramahe	14+968	Replace with a 2400 x 1500 mm NRFB, headwall proposed in the median

Culvert ID	Township	Station	Proposed Recommendations
0013	Cramahe	15+547	Replace with a 1000 mm CSP, headwall proposed in the median
0058	Cramahe	15+547	Replace with a 1390 x 970 mm CSPA, headwall proposed in the median
0011A	Cramahe	16+492	Extend culvert on ditch side with 900 mm CSP (like for like), directly connected to 0011B
0011B	Cramahe	16+492	Extend culvert on ditch side with 900 mm CSP (like for like), directly connected to 0011A
0061	Cramahe	16+888	Extend culvert on ditch side with 1800 x 1200 mm RFB (like for like), directly connected to 0010
0010	Cramahe	16+965	Extend culvert on ditch side with 1800 x 1200 mm RFB (like for like), directly connected to 0061
0045	Brighton	12+090	Extend culvert with 1200 x 1200 mm NRFB (like for like), headwall proposed in median
0051	Brighton	12+110	Extend culvert with 1200 x 1200 mm NRFB (like for like), headwall proposed in median
0044	Brighton	12+460	Extend culvert with 1200 x 1200 mm NRFB (like for like), headwall proposed in median
0052	Brighton	12+460	Extend culvert with 1200 x 1200 mm NRFB (like for like), headwall proposed in median
0022B	Brighton	16+060	Extend culvert on ditch side with 1200 x 1200 mm NRFB (like for like), directly connected to 0022A
0022A	Brighton	16+060	Extend culvert on ditch side with 1200 x 1200 mm NRFB (like for like), directly connected to 0022B
0021	Brighton	17+040	Replace with a 2800 x 1200 mm NRFB, headwall proposed in the median
0009	Brighton	17+040	Replace with a 2800 x 1200 mm NRFB, headwall proposed in the median
0020	Brighton	17+405	Extend culvert with 1200 x 900 mm NRFB (like for like), headwall proposed in median
0010	Brighton	17+405	Extend culvert with 1200 x 1200 mm NRFB (like for like), headwall proposed in median
0019	Brighton	17+630	Extend culvert with 1200 x 1200 mm NRFB (like for like), headwall proposed in median
0012	Brighton	17+630	Extend culvert with 1200 x 1200 mm NRFB (like for like), headwall proposed in median
0006	Brighton	18+695	Extend culvert with 1200 x 1200 mm NRFB (like for like), headwall proposed in median
00016	Brighton	18+710	Extend culvert with 1200 x 1200 mm NRFB (like for like), headwall proposed in median

Culvert ID	Township	Station	Proposed Recommendations
0002	Brighton	20+375	Extend culvert with 1800 x 1200 mm NRFO (like for like) on the ditch side, storm sewer system will connect 0002 and 0003 in the proposed concrete median
0003	Brighton	20+375	Extend culvert with 1800 x 1200 mm NRFO (like for like) on the ditch side, storm sewer system will connect 0003 and 0002 in the proposed concrete median
0001	Brighton	20+600	Extend culvert with 900 mm CSP (like for like) on the ditch side, storm sewer system will connect 0001 and 0004 in the proposed concrete median
0004	Brighton	20+600	Extend culvert with 900 mm CSP (like for like) on the ditch side, storm sewer system will connect 004 and 0001 in the proposed concrete median

5.3 Proposed Drainage Patterns

Under proposed drainage conditions, two additional lanes will be constructed either within the outer grassed ditch or one lane will be added on the inside shoulder while the other will be added on the outside shoulder. The proposed cross-section of the highway will include four lanes and shoulders on each of the eastbound and westbound lanes.

In most areas of the proposed design, runoff from the two inner lanes and median shoulders will be captured by catch basins. In some other areas of the proposed design, runoff from all four lanes and median shoulders or just the median shoulders will be collected by catch basins. Runoff that is not being captured by the catch basins will sheet flow to the highway outer ditches and ultimately flow to either municipal drains or a watercourse.

Proposed storm sewer networks will be discharging to the highway outer ditches through storm sewer outlets. The existing drainage pattern will be maintained and the existing storm sewer outlets will be utilized whenever possible in the areas of the study limits that are not being realigned. In the one small section that is proposed to be realigned, a new storm sewer network will need to be installed. Another small section will also need to add a new storm sewer network, as the grassed median is being proposed to change into a concrete median.

5.4 Proposed Storm Sewer Design

This section documents the hydraulic assessment of the existing storm sewers under proposed conditions and the proposed storm sewers in the section of road that has a new alignment or for the small section that is proposed to be changed from a grassed median to a concrete median. The catchment drainage areas are illustrated in **Exhibits 5-12** to **5-30**.

As previously stated, existing storm sewers and outlets are utilized where applicable. In some sections, the existing storm sewer size will need to be increased due to the increase in catchment size. The slope and spacing are proposed to stay the same as the existing. The storm sewer sections that will be needed to be upgraded are summarized in **Table 5-11**

In the areas where Highway 401 is proposed to be realigned and the small section that is proposed to change from grassed median to concrete median, the storm sewer slope was selected to match the highway grade and will follow the design standards summarized in **Table 2-1**. Where cover is deficient, pipe insulation will be proposed. **Table 5-12** summarizes the new storm sewer characteristics for the new storm sewer segments.

A flow spread calculation was completed under proposed conditions. For preliminary design, it analyzed three locations that are designed to capture the most runoff, has the furthest spacing and with the lowest slope to confirm that travel lanes would stay free of flooding and that flow spread will be limited to the shoulder width under heavy storm events. The three locations have a proposed shoulder width of 6 m, 4 m and 5.3 m. The spread calculated for the three locations will stay within the proposed shoulder width for both the minor and major storm. Since the analysis met the flow spread design requirements the other locations that have greater slope, smaller catchments and smaller spacing, should also meet the design criteria. The calculated spread analysis is included in **Appendix E**. A more detailed analysis will be completed for the detailed design.

Due to the realignment, two outlets will need to be abandoned, while the others can remain in their existing locations. Whether the outlets can be plugged and abandoned or will need to be removed shall be determined during the detailed design stage.

For the section that is being changed from grassed median to concrete median, three outlets are needed but the outlets are going to be connected to two existing culverts and a ditch outlet**.** Table 5-13 summarizes the outlets to be abandoned or kept and the newly proposed outlets are presented in **Table 5-14**. The detailed analysis is located in **Appendix E**.

Table 5-11: Summary of Storm Sewer Pipe Upgrades

Reach		Spacing (m)	Existing Size (mm)	Proposed Size (mm)	Slope (%)
From Station	To Station				
Cramahe Township					
19+570	19+652	82	375	450	0.50
19+652	19+695	43	450	525	0.40
19+695	19+722	27	450	525	0.70
19+722	19+750	28	450	525	0.70
19+750	19+800	50	450	525	0.70
Brighton Township					
16+486	16+598	112	450	525	2.50

Table 5-12: Proposed Storm Sewer Characteristics for New Sections

Reach		Spacing (m)	Pipe Size (mm)	Slope (%)
From Station	To Station			
Cramahe Township				
17+320	17+470	150	300	0.50
17+470	17+590	120	450	0.50
17+645	17+590	55	375	0.50
17+590	Outlet	30	450	0.50
17+880	18+030	150	375	0.62
18+030	18+180	150	525	0.62
18+180	18+330	150	525	0.62
18+330	Outlet	30	600	0.50
18+365	18+440	75	300	0.62
18+697*	18+550	147	750	1.00
18+550	18+440	110	750	0.66
18+440	Outlet	30	750	0.50
Brighton Township				
20+610	Outlet (Culvert C0004)	45	900	0.50
20+460	20+360	100	450	0.50
20+360	Outlet (Culvert C0003)	45	1800 x 1200	2.06
20+840	20+950	110	375	0.53
20+950	Outlet (Existing ditch outlet)	42	900	0.50

**This station is in a section that is not being realigned.*

Table 5-13: Summary of Existing Outlets Under Proposed Conditions

Outlet ID	Outlet Chainage	Existing Outlet Diameter (mm)	Remarks
Cramahe Township			
1	12+830	525	Leave as is (new outlet labelled 1)
2	12+945	525	Leave as is (new outlet labelled 2)
3	18+300	825	Abandon. New outlet proposed for new alignment
4	18+475	825	Abandon. New outlet proposed for new alignment
5	19+800	825	Leave as is (new outlet labelled 6)
Brighton Township			
6	15+410	760	Leave as is (new outlet labelled 7)
7	16+598	825	Leave as is (new outlet labelled 8)

Table 5-14: Summary of Proposed Outlets

Proposed Outlet ID	Outlet Chainage	Proposed Outlet Diameter (mm)
Cramahe Township		
1	12+830	525
2	12+945	525
3	17+590	450
4	18+330	600
5	18+440	750
6	19+800	825
Brighton Township		
7	15+410	760
8	16+598	825
9	20+360	900
10	20+610	1800 x 1200
11	20+950	900

There is an increase in impervious area, because of the increase in the highway pavement footprint and the proposed widening. Due to the new alignment with the storm sewers spaced 150 m apart there is less catchment areas in that section of road than there was under existing conditions. Additional storm sewer catchments were added (615 to 635) to design the storm sewer sizes for the section of road that is proposed to change from a grassed median to a concrete median. **Table 5-15** summarizes the proposed drainage area for the catchments under proposed conditions.

Table 5-15: Proposed Drainage Area Summary

Catchment ID	Drainage Area (ha)	Outlet ID
300	0.030	1
305	0.257	1
310	0.261	1
315	0.239	1
320	0.208	2
325	0.086	2
330	0.076	2
335	0.024	2
340	0.117	3
345	0.438	3
350	0.460	3
355	0.141	3
360	0.332	4
365	0.335	4
370	0.372	4
375	0.374	4
380	0.073	5
385	0.456	5
390	0.327	5
440	0.252	5
445	0.251	5
450	0.250	5
455	0.249	5
460	0.251	5
465	0.257	5
470	0.299	5
475	0.401	6
480	0.212	6
485	0.100	6
490	0.129	6
495	0.126	6
500	0.227	6
505	0.269	6
510	0.240	6
515	0.306	6
520	0.024	6
525	0.274	6
530*	0.095	-

Catchment ID	Drainage Area (ha)	Outlet ID
535*	0.178	-
540*	0.205	-
545	0.012	7
550	0.103	7
555	0.108	7
560	0.219	7
565	0.031	7
570	0.254	7
575	0.222	7
580	0.432	8
585	0.236	8
590	0.235	8
595	0.236	8
600	0.195	8
605	0.252	8
610	0.201	8
615	0.325	9
620	0.409	9
625	0.290	10
630	0.300	11
635	0.341	11

*Catchments 530, 535 and 540 drain into an outlet that is not within the study limits.

6 STORMWATER MANAGEMENT PLAN PERFORMANCE

6.1 Stormwater Management Criteria

Stormwater management criteria, based on the Ministry of the Environment, Conservation and Parks (MECP) and MTO standards, are summarized as follows:

- Minimize increases in flows up to the 100-year storm
- Maintain or enhance the quality of runoff discharge from the highway right of way (ROW)

The MCEP Stormwater Management Planning and Design Manual (2003), the MTO Drainage Management Manual (1997) and MTO HDDS (2008) provided policies and guidelines for the selection and design of the stormwater management measures required to enhance the quality of runoff and provide water quantity control. The following guidelines from the MTO HDDS were used in the assessment:

SW-1: Stormwater Management – Level of Control: This standard conforms to the provincial approach of water quality as outlined in the MECP SWM Manual (2003) and is based upon the level of removal of suspended solids for water quality control, directed to fisheries protection.

Enhanced protection or greater shall be used when sensitive aquatic habitat will be impacted by discharge from the highway drainage system. As such 80% TSS removal is recommended for this site.

SW-3: Roadside Ditches for Water Quality: This standard includes the following:

- Removal efficiency will conform to the quality control criteria specified in SW-1.
- Highway embankments shall be a minimum of 3 m in length measured transversely from the outside of the shoulder to the invert of the roadside ditch. Dense vegetation cover shall be used to improve water quality and prevent erosion of the embankment.
- Minimum ditch base width shall be 1.0 m. To improve water quality the roadside ditch shall be planted with dense vegetation cover.
- Minimum ditch length shall be 40 m measured from the furthest downstream storm sewer outfall to the receiving watercourse.

Table 6-1 presents a list of SWM features along with the design criteria associated to their design. These are typical SWM features used in MTO ROW.

Table 6-1: Summary of Possible SWM Features

SWM Feature	Criteria
Traditional SWM Pond	Provide an enhanced (Level 1) level of protection (80% long term suspended solids removal) per MECP requirements
	Provide extended detention of the 25 mm rainfall events for erosion control plus 40 m^3/ha for water quality enhancement
	Include a sediment forebay for settling suspended solids
	Include a 3.0 m deep permanent pool with bottom draw outlet
	Include consideration for re-aeration downstream of the ponds
	Include an access road to facilitate maintenance of the forebay
Linear Wet Ponds	Provide and enhanced (Level 1) level of protection (80% long term suspended solids removal) per MECP requirements
	Provide extended detention of the 25 mm rainfall events for erosion control plus 40 m^3/ha for water quality enhancement
	Include a 3.0 m deep permanent pool with bottom draw outlet
	Include 4:1 side slopes against the highway and 3:1 side slopes outside
	Include consideration for re-aeration downstream of the linear ponds
Linear Dry Ponds	Provide extended detention of the 25 mm rainfall events for erosion control plus 40 m^3/ha for water quality enhancement
Enhanced Grassed Swales	Bottom width shall be a minimum of 1.0 m
	Minimum longitudinal slope of 0.5% up to a maximum of 4%
Oil / Grit Separators	Provide at least 80% TSS removal

6.2 Discussion of SWM Alternatives

Under existing conditions, drainage is provided by storm sewers, roadside ditching and municipal drains. Open ditches are recognized as water quality control measures that provide sediment filtration.

Under proposed conditions, most existing storm sewers are being proposed to remain in a similar location, while some other sections are newly proposed or being moved due to the new alignment in a section.

Downstream control points were created to compare pre- to post-development flows within the right of way (ROW). The catchments were created from highpoint to highpoint

along the road profile. There is very little difference of the road profile between existing conditions and proposed conditions, therefore the same catchments are used for pre-development and post-development flow analysis. **Table 6-2** compares existing and proposed flow rates for the created catchments.

Table 6-2: Pre to Post-Development Conditions Comparison

Catchment ID	Chainage		Existing 100-year Flow (L/s)	Proposed 100-year Flow (L/s)	Difference (L/s)	Difference (%)
	From	To				
Cramahe Township						
1	12+500	13+500	2772	3382	610	22
2	13+500	16+580	8522	11713	3191	37
3	16+580	17+720	3746	4523	777	21
4	17+720	19+400	4730	5196	466	10
5	19+400	20+200	2420	2642	223	9
Brighton Township						
6	20+200	10+930	2483	3244	761	31
7	10+930	11+770	2144	3018	874	41
8	11+770	12+600	2063	2927	864	42
9	15+200	15+815	1870	2035	165	9
10	15+815	17+870	5633	7133	1500	27
11	17+870	19+662	4623	6494	1871	40
12	19+662	20+720	2672	3615	942	35
13	20+720	20+971	564	724	160	28

6.3 Preliminary Stormwater Management Strategy

6.3.1 Quantity Control

MTO is committed to minimizing increases in stormwater peak flows up to the pre-development 100-year storm at all outlets from the MTO ROW to minimize the risk to downstream riparian landowners due to the added impervious land use from the proposed highway widening.

Based on the pre-post comparison from **Table 6-2** there is a total increased flow of 25% due to an increase in impervious area of 62% of 32 ha from existing conditions across the full study limit. This is based on the ultimate conditions of full highway twinning within the study limits.

The 13 outlet control points within the study limits have been assessed on their required storage based on the pre- to post- flow comparison for the 100-year storm as presented in **Table 6-3**.

Table 6-3: Storage Required at Outlet Control Points

Catchment ID	Chainage		Existing 100-year Flow (m^3/s)	Area (ha)	Runoff Coefficient (C)	Required Storage (m^3)
	From	To				
Cramahe Township						
1	12+500	13+500	2.77	10.09	0.56	**379**
2	13+500	16+580	8.52	35.93	0.55	**1941**
3	16+580	17+720	3.75	14.50	0.52	**482**
4	17+720	19+400	4.73	15.88	0.55	**382**
5	19+400	20+200	2.42	8.58	0.52	**188**
Brighton Township						
6	20+200	10+930	2.48	9.40	0.58	**457**
7	10+930	11+770	2.14	8.63	0.59	**526**
8	11+770	12+600	2.06	8.16	0.60	**519**
9	15+200	15+815	1.87	6.28	0.54	**142**
10	15+815	17+870	5.63	21.38	0.56	**914**
11	17+870	19+662	4.62	18.71	0.58	**1121**
12	19+662	20+720	2.67	10.67	0.57	**565**
13	20+720	20+971	0.56	2.04	0.60	**98**

Storage will be provided in the roadside ditches in the form of grassed swales with rock check dams depending on the available space and previously identified drainage issues. Grassed swales with a bottom width of 1 m, a 6:1 foreslope, and a 3:1 backslope was assessed and the required ditch length to provide adequate quantity control throughout the project area is 8816 m, split between the 13 outlet control points. The full storage and ditch calculations can be found in **Appendix F**.

6.3.2 Water Balance and Quality Control

For water balance, the first 5 mm of stormwater runoff volume shall be retained on site and managed by ways of infiltration, evapotranspiration, or re-use. For this project, the method of water balance will be infiltration.

The site is recommended to provide enhanced level protection of 80% TSS removal. Grassed swales should be sized to convey the peak flows from a 4-hour 25 mm Chicago storm with a velocity of 0.5 m/s.

Based on the imperviousness, Table 3.2 of the MOECC (now MECP) Stormwater Management Planning and Design Manual details the storage volume required for different stormwater management plans such as infiltration, wetlands, hybrid wet pond / wetland, and wet ponds.

For this project, quality control will be provided in the form of enhanced grassed swales with rock check dams. A summary of the required treatment volume and required total swale volume can be found in **Table 6-4**. This table also shows that the required treatment volume for each catchment is less than the 5 mm runoff volume, which meets the quality control requirements.

Table 6-4: Quality Control - Water Quality Storage Sizing

Catchment ID	Area (ha)	Impervious (%)	25 mm Runoff Volume (m^3)	Required Treatment Volume (m^3)	<	5 mm Runoff Volume (m^3)
Cramahe Township						
1	10.09	38	2523	285	<	505
2	35.93	32	8983	995	<	1797
3	14.50	32	3625	388	<	725
4	15.88	40	3970	441	<	794
5	8.58	35	2145	228	<	429
Brighton Township						
6	9.40	38	2350	272	<	470
7	8.63	36	2158	252	<	432
8	8.16	38	2040	243	<	408
9	6.28	39	1570	173	<	314
10	21.38	37	5345	603	<	1069
11	18.71	36	4678	544	<	936
12	10.67	37	2668	304	<	534
13	2.04	46	510	60	<	102

7 EROSION AND SEDIMENT CONTROL MEASURES

Erosion and sediment control measures will be implemented during all phases of construction, clean-up and restoration to prevent sediment-laden runoff from entering any of the watercourses directly from the construction zone. The measures will include management of any residual flow or the potential for flow in the watercourses where fish habitat was confirmed.

During construction, uncontrolled sedimentation and erosion can result in a disruption of nearby watercourses, a degradation of downstream water quality and a loss of topsoil. Erosion and sedimentation control measures should be implemented during construction to prevent the migration of soils from the site. The recommended erosion and sedimentation control measures that should be considered are the following:

Vegetative:

1. All areas not subject to active construction 30 days after area grading should be top soiled and seeded immediately after completion of such grading.
2. Immediately following seed application, a straw erosion blanket should be installed on any exposed slopes adjacent to sensitive features.

Structural:

1. As construction proceeds, diversion swales should be graded where needed along the ROW boundaries to intercept drainage from external areas and direct it away from exposed surfaces.
2. Temporary sedimentation traps and silt fencing should be placed around outlets and inlets from existing culverts in the drainage system.
3. All culvert work should be conducted “in the dry”.
4. Temporary silt fencing should be installed around sensitive vegetative features.
5. Flow checks should be provided in roadside ditches.
6. Additional erosion control works may be required during the course of construction. These may consist of swales, silt fences, and/or diversion berms. The location and need for these works will be established in the field.

The integration of these measures will minimize the impacts of erosion and sedimentation during construction.

8 CONCLUSIONS

MTO retained WSP to prepare a Preliminary Design and EA for replacement or rehabilitation of structures and a Preliminary Design for the future widening of Highway 401.

This report contains existing hydrologic and hydraulic assessments of the structural and non-structural culverts as well as analysis of the existing storm sewer network. Assessments of all culverts and storm sewer networks under proposed conditions were completed. A preliminary stormwater management plan is also included. The following conclusions can be made from the assessments:

1 The existing drainage systems consist of open ditches, swales, ditch inlets, outlets, culverts and storm sewers.

2 Under existing conditions:

- a Runoff from highway lanes is discharged either to the median ditch or the side ditches. The median ditch sections discharge through culverts to the outer ditches.
- b In sections where median ditches are not present, runoff is conveyed towards the concrete median is captured by catch basins and conveyed through storm sewers and outlets to the outer ditches.
- c All culverts except five non-structural culverts meet all relevant design criteria.

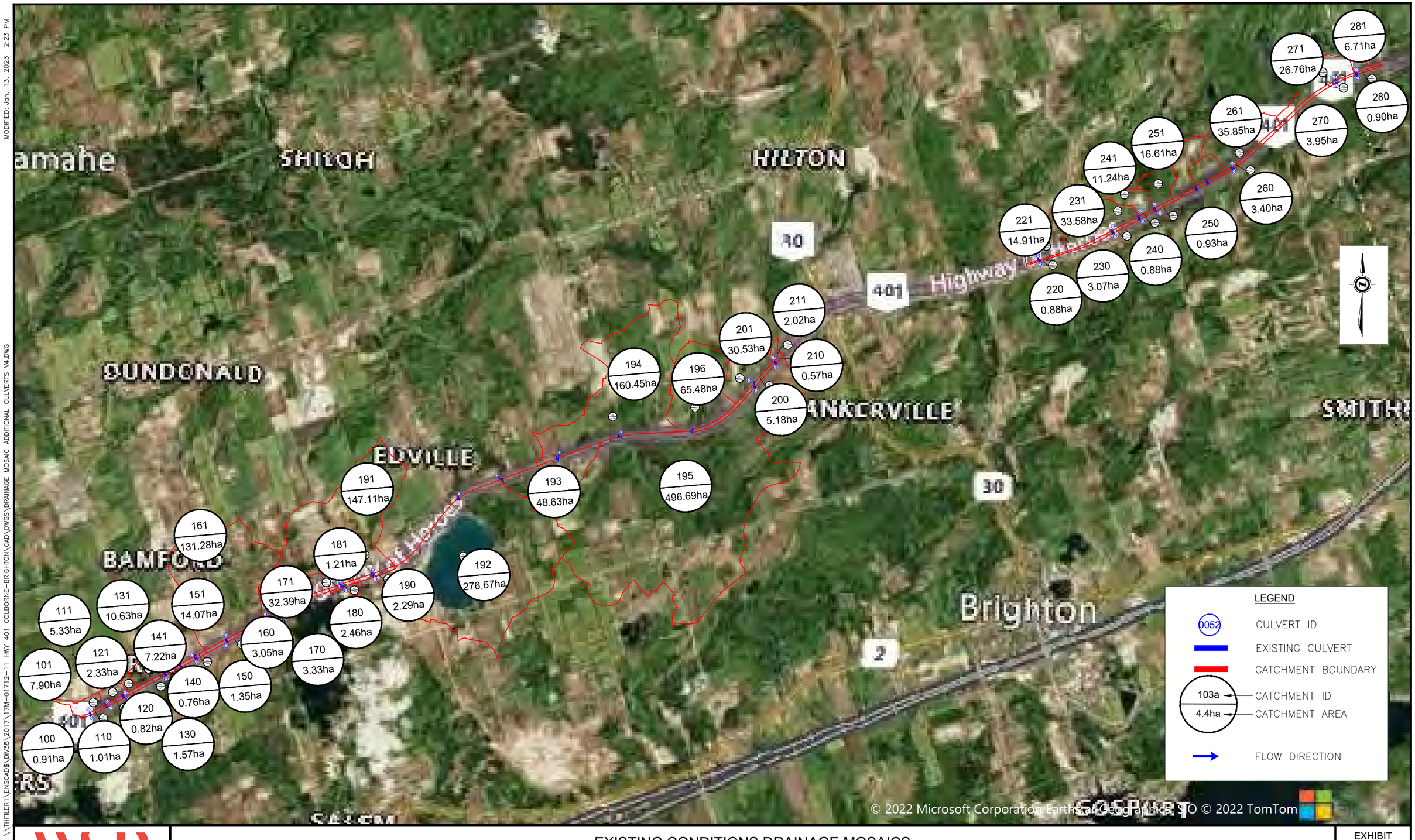
3 Under proposed conditions:

- a For the sections with the new alignment and where it is proposed to change from a grassed median to a concrete median, new storm sewer segments are proposed.
- b Six sewer pipe sections need to be upgraded to a larger sized pipe.
- c Under proposed conditions, five culverts were recommended to be increased in size to meet design criteria.
- d The four structural culverts are recommended to be replaced with 4800 x 2400 mm concrete box culverts.
- e Stormwater management will be provided in the form of enhanced grassed swales with check dams with potential of linear dry ponds.
- f Existing drainage patterns will be maintained where feasible.

4 Sediment and erosion control measures will be implemented during all phases of construction, clean-up and restoration to prevent sediment-laden runoff from entering any of the watercourses directly from the construction zone.

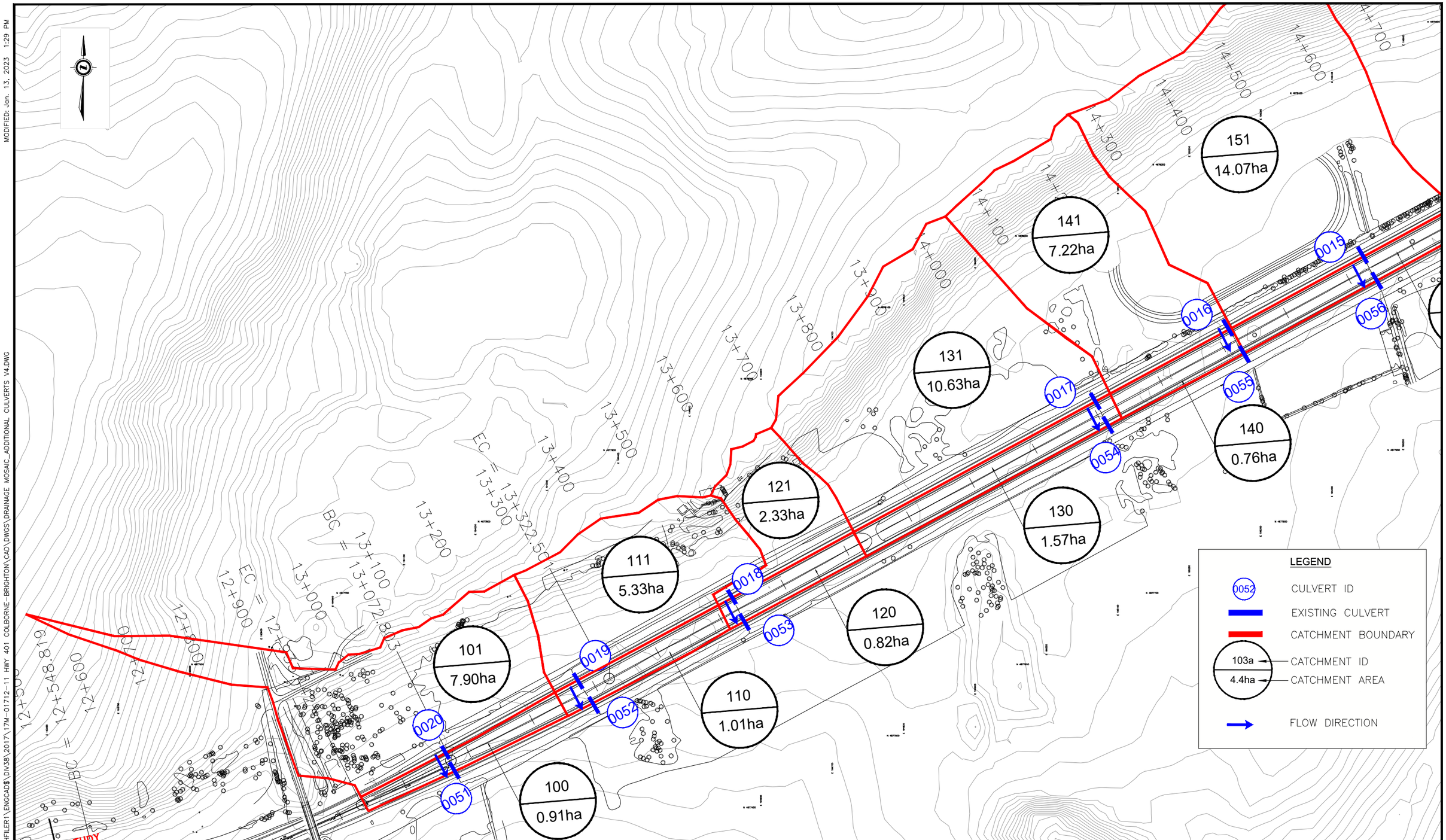
Exhibits

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\DRAINAGE MOSAIC_ADDITIONAL CULVERTS V4.DWG
MODIFIED: Jan. 13, 2023 2:23 PM



wsp	EXISTING CONDITIONS DRAINAGE MOSAICS HIGHWAY 401 COLBORNE TO BRIGHTON	EXHIBIT 4-1

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\DRAINAGE MOSAIC_ADDITIONAL CULVERTS V4.DWG
MODIFIED: Jan. 13, 2023 1:29 PM



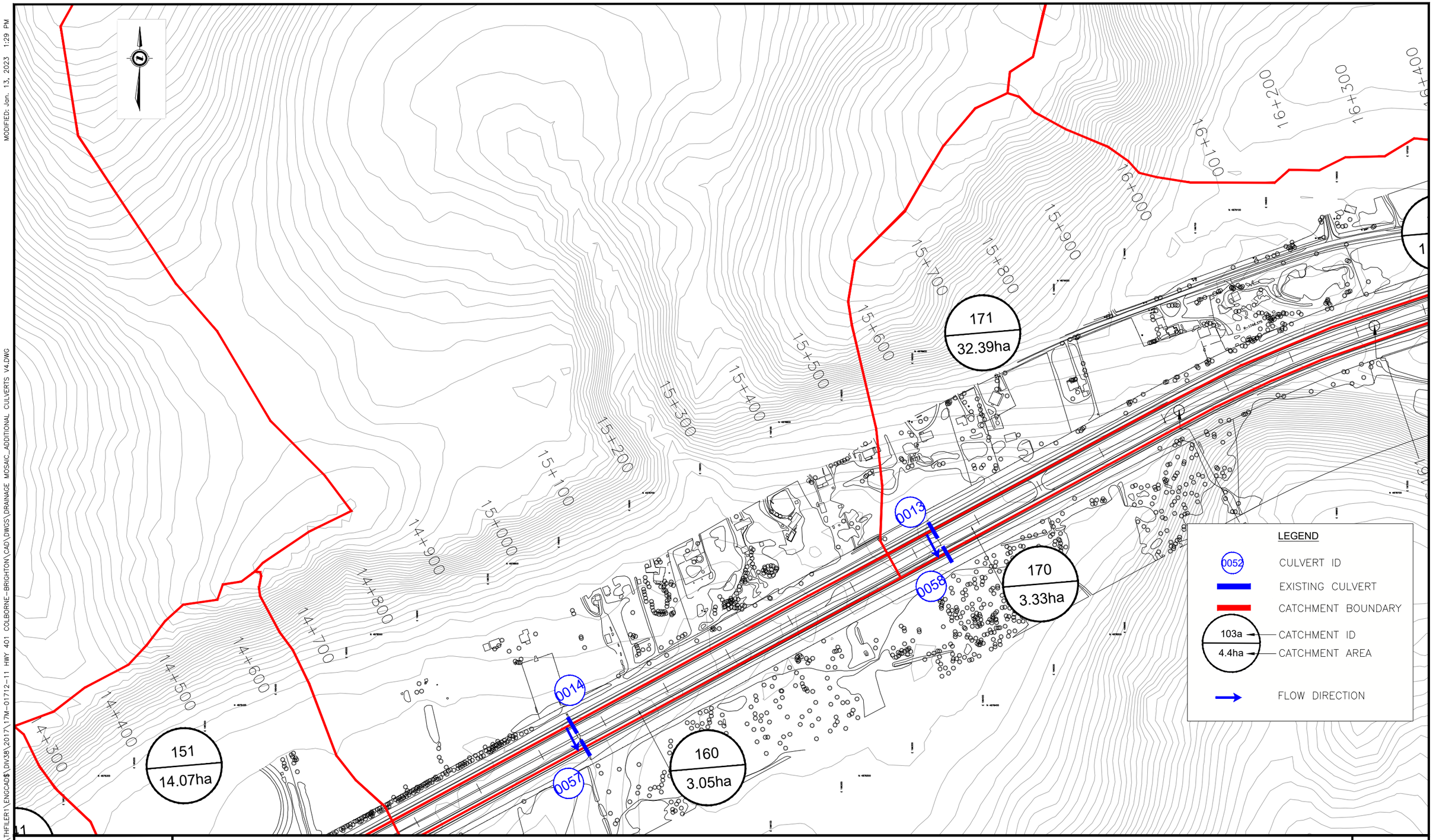
EXISTING CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-2

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\DRAINAGE MOSAIC_ADDITIONAL CULVERTS V4.DWG
MODIFIED: Jan. 13, 2023 1:29 PM



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EXISTING CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-3

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\DRAINAGE MOSAIC_ADDITIONAL CULVERTS V4.DWG
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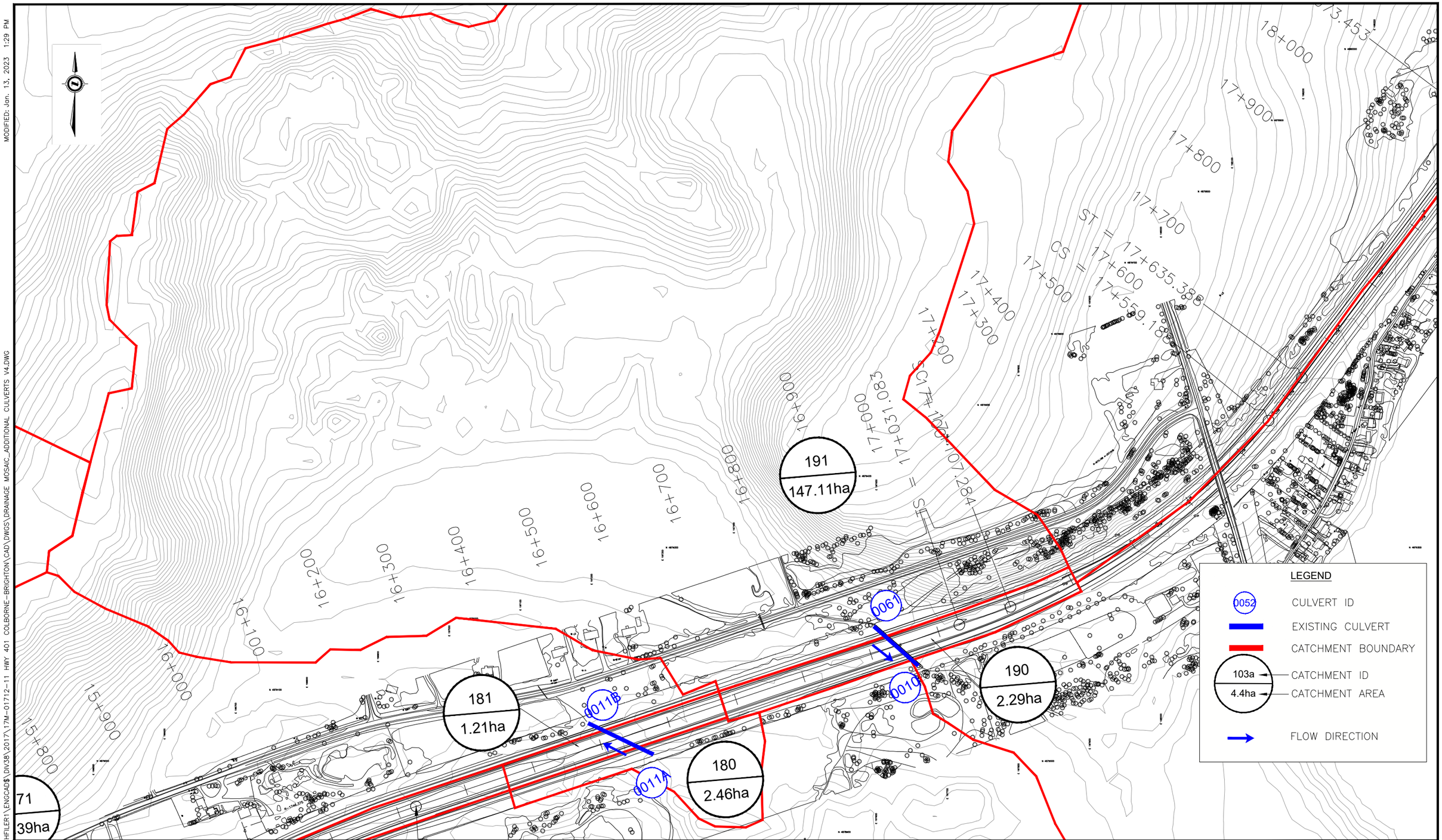

EXISTING CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-4

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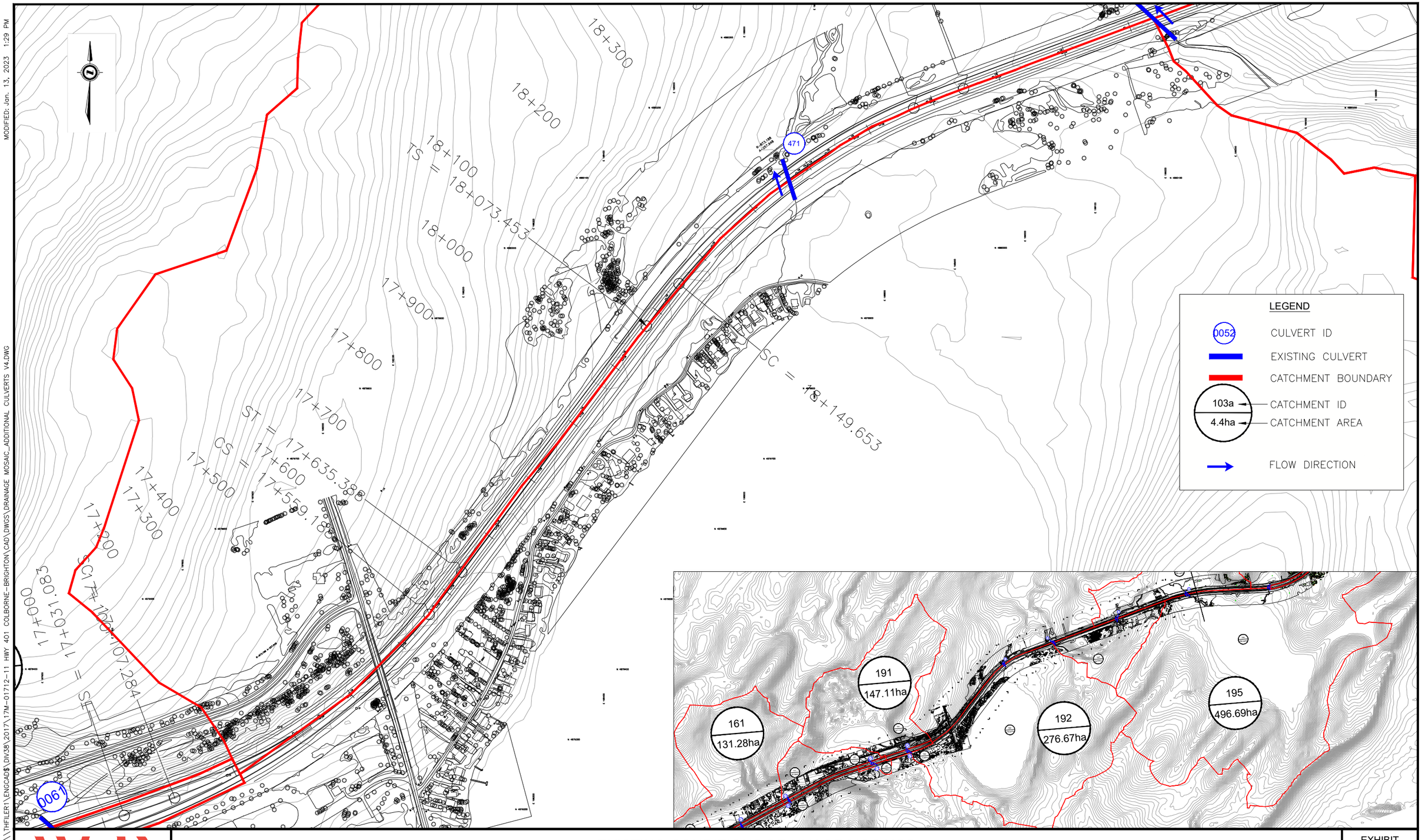

EXISTING CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-5

DRAWING NAME: \\THFILER1.ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\DRAINAGE MOSAIC_ADDITIONAL CULVERTS V4.DWG
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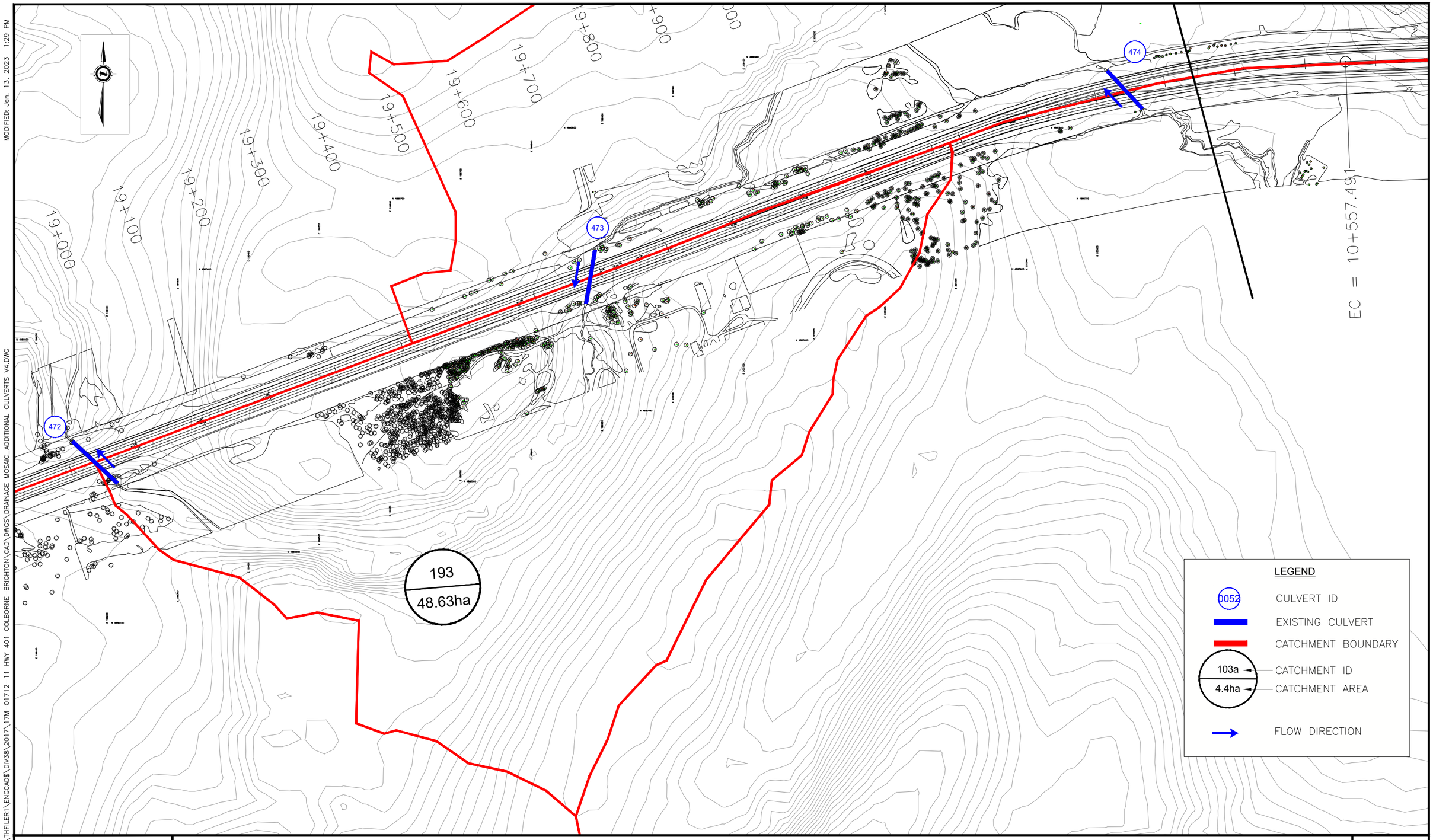

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EXISTING CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-6

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\DRAINAGE MOSAIC_ADDITIONAL CULVERTS V4.DWG
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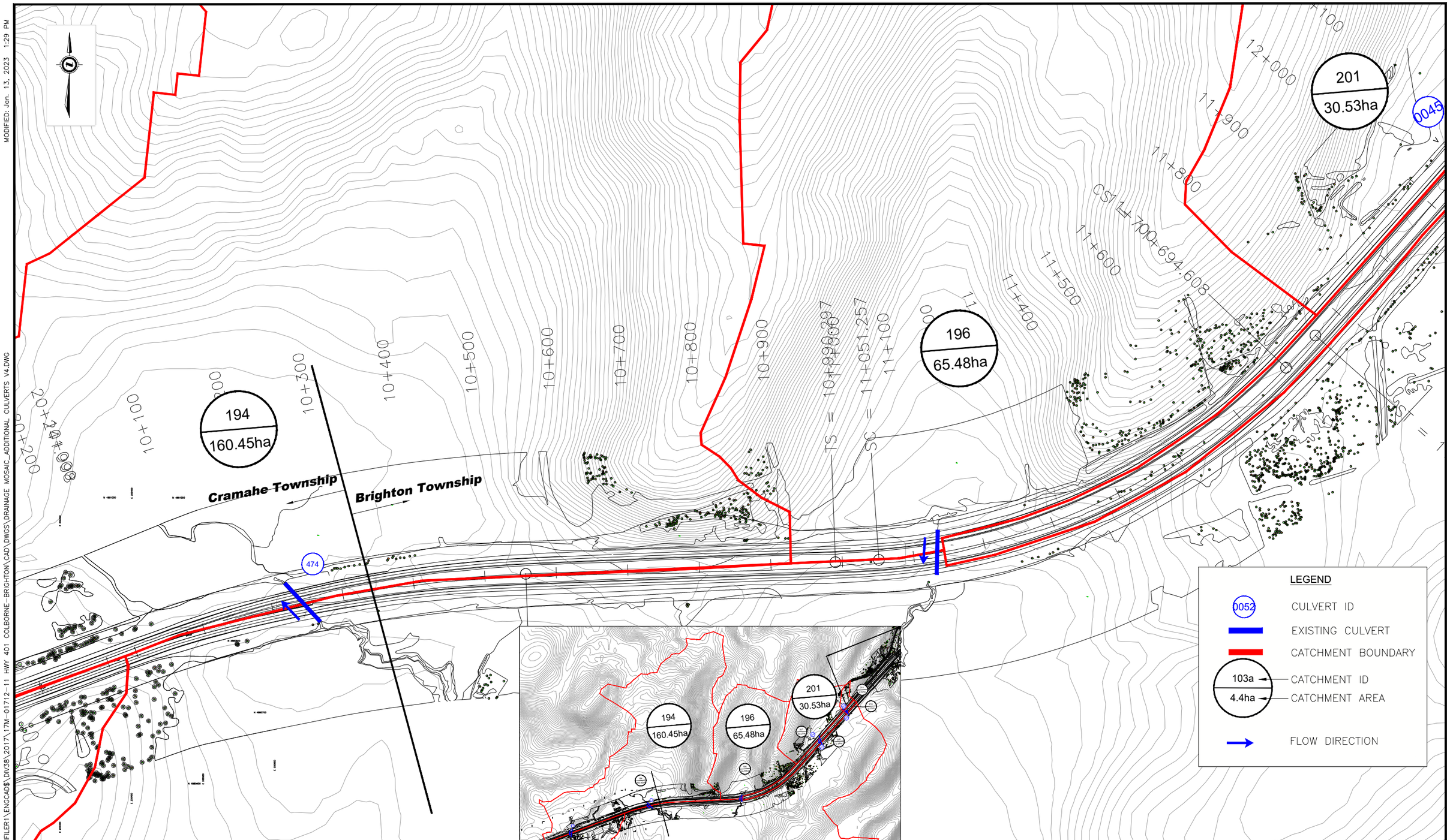

EXISTING CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-7

MODIFIED: Jan. 13, 2023 1:29 PM
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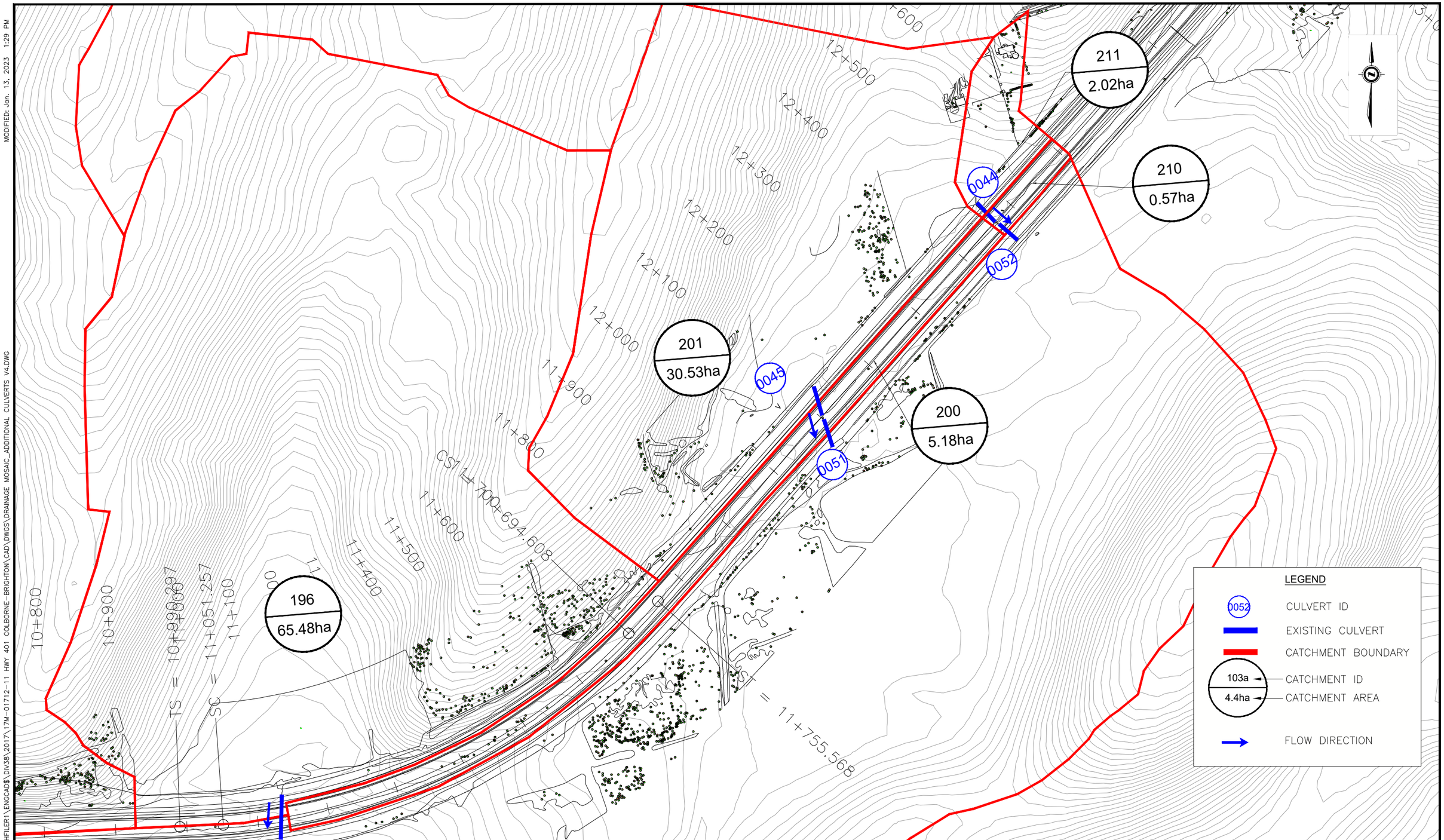

EXISTING CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-8

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\DRAINAGE MOSAIC_ADDITIONAL CULVERTS V4.DWG
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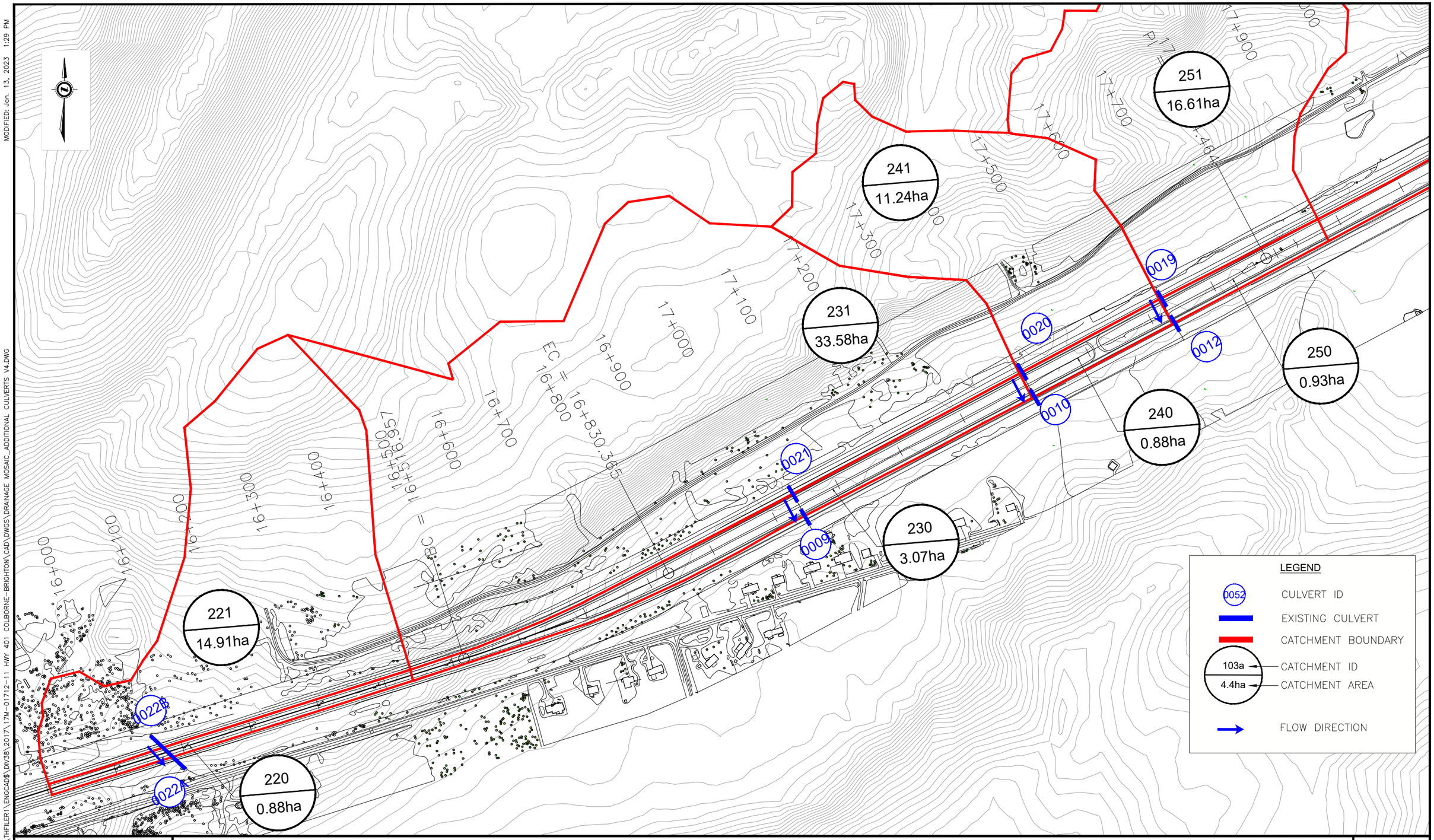

EXISTING CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-9

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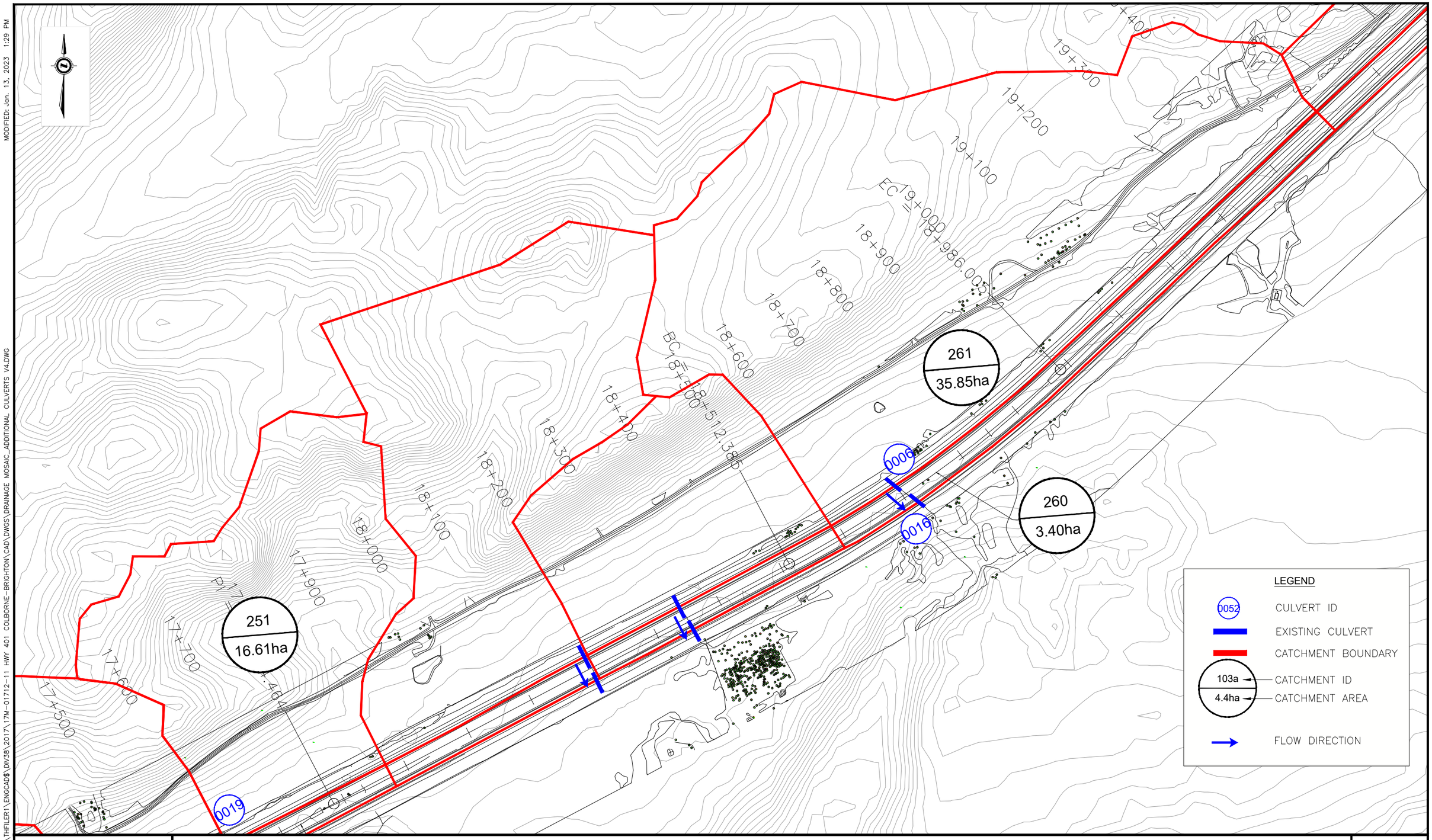

wsp	EXISTING CONDITIONS DRAINAGE MOSAICS HIGHWAY 401 COLBORNE TO BRIGHTON	EXHIBIT 4-10

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\DRAINAGE MOSAIC_ADDITIONAL CULVERTS V4.DWG
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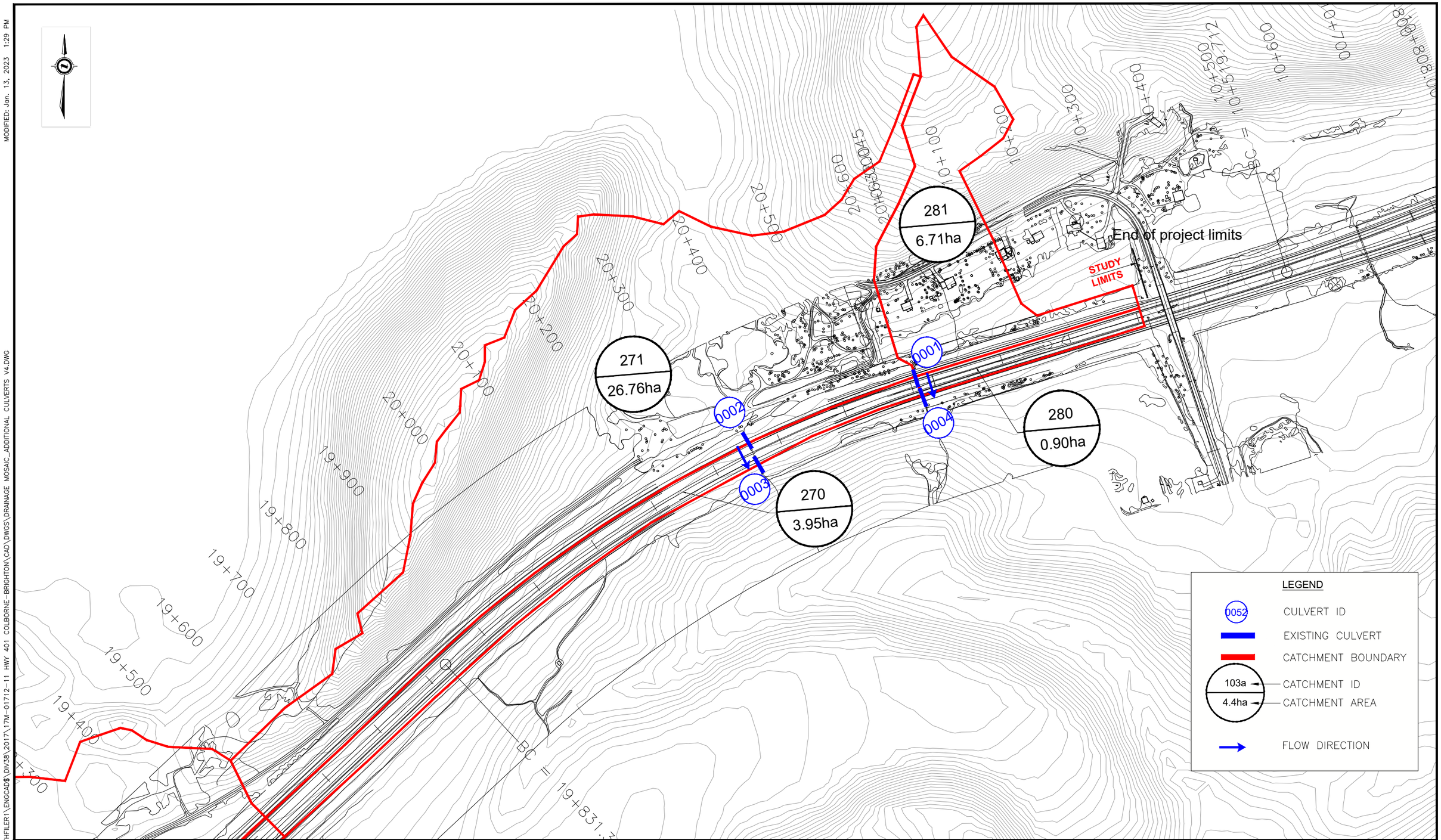

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EXISTING CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-11

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS EXISTING.DWG
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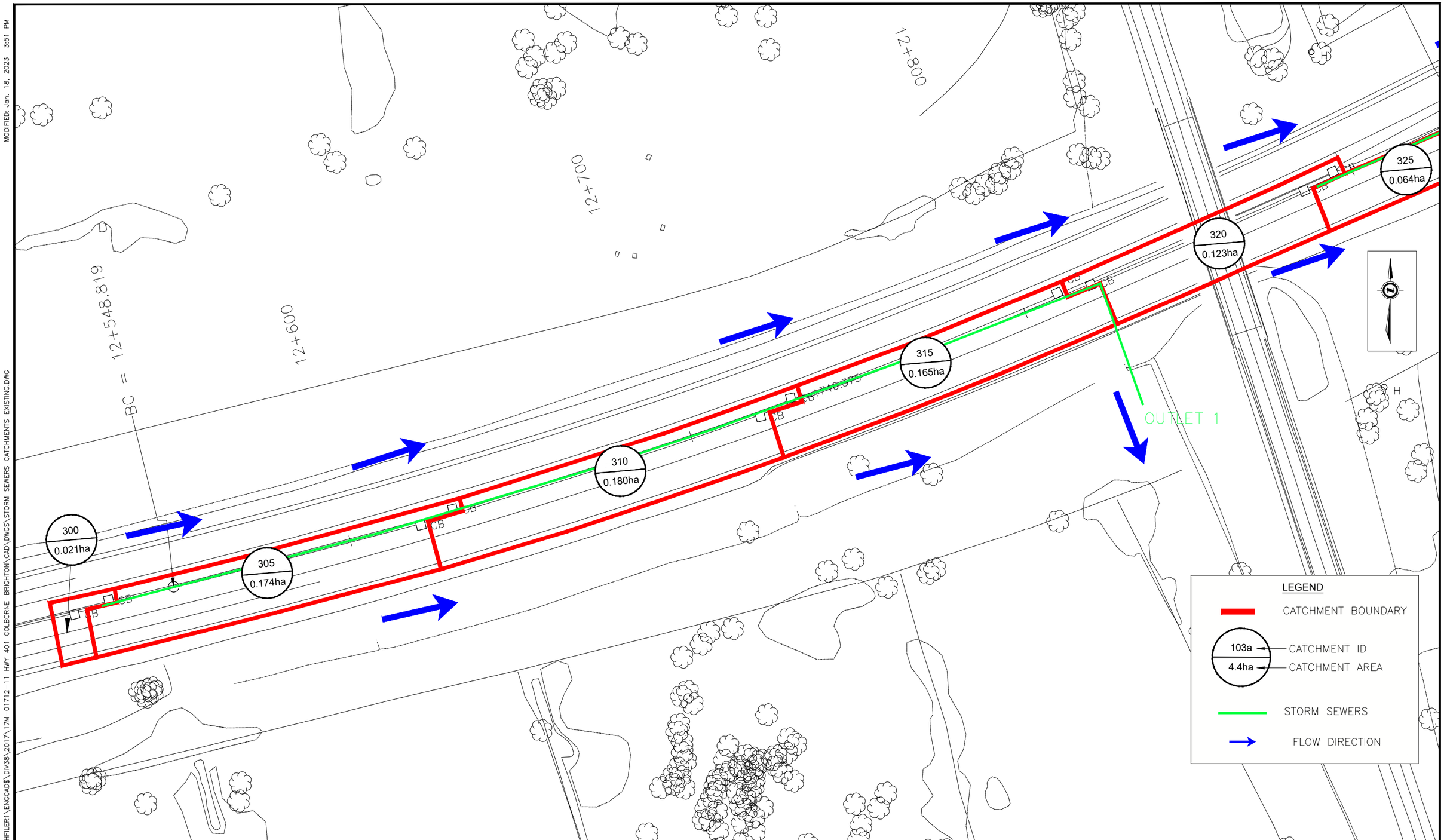

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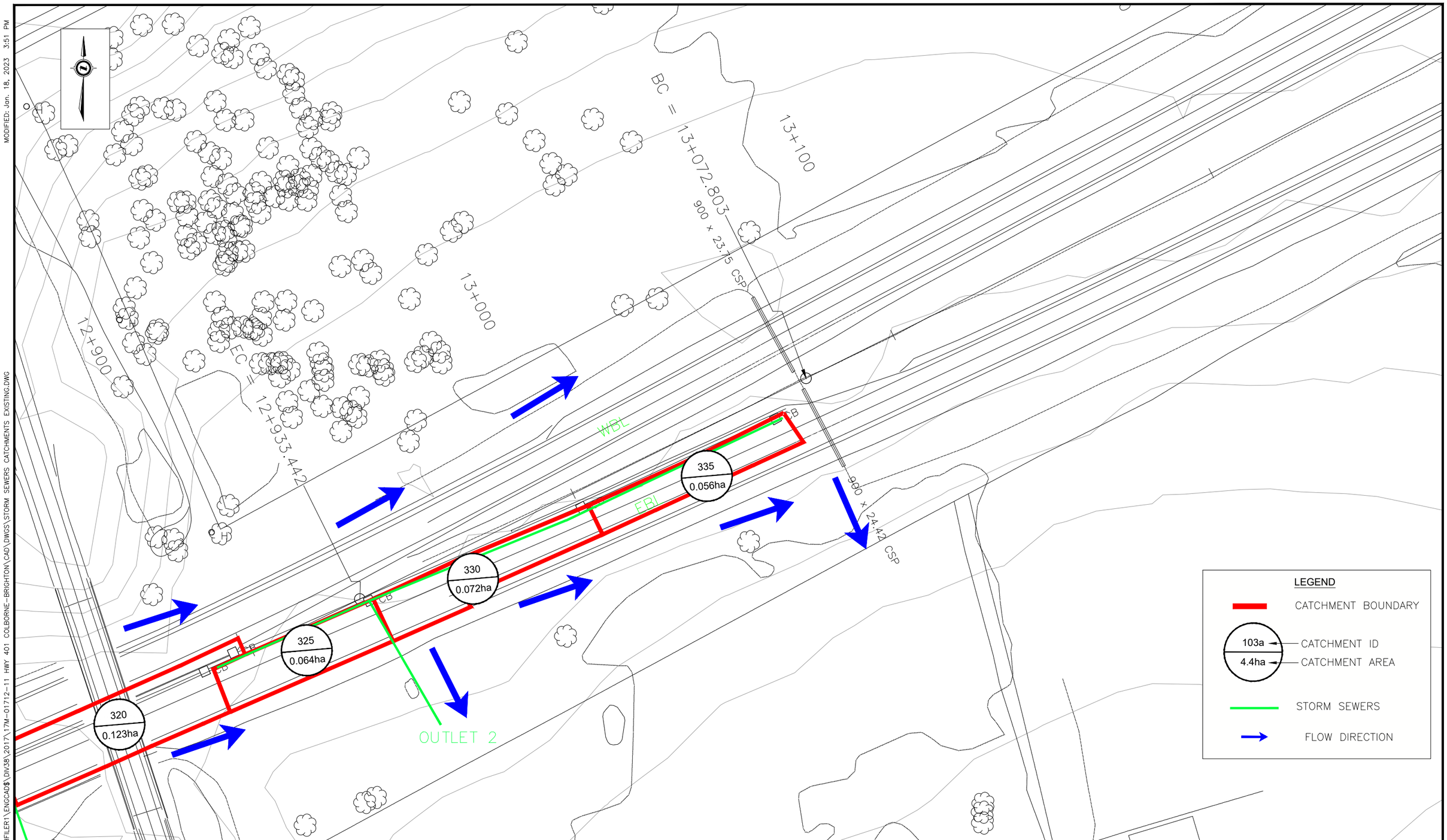
MODIFIED: Jon. 18, 2023 3:51 PM



EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-13

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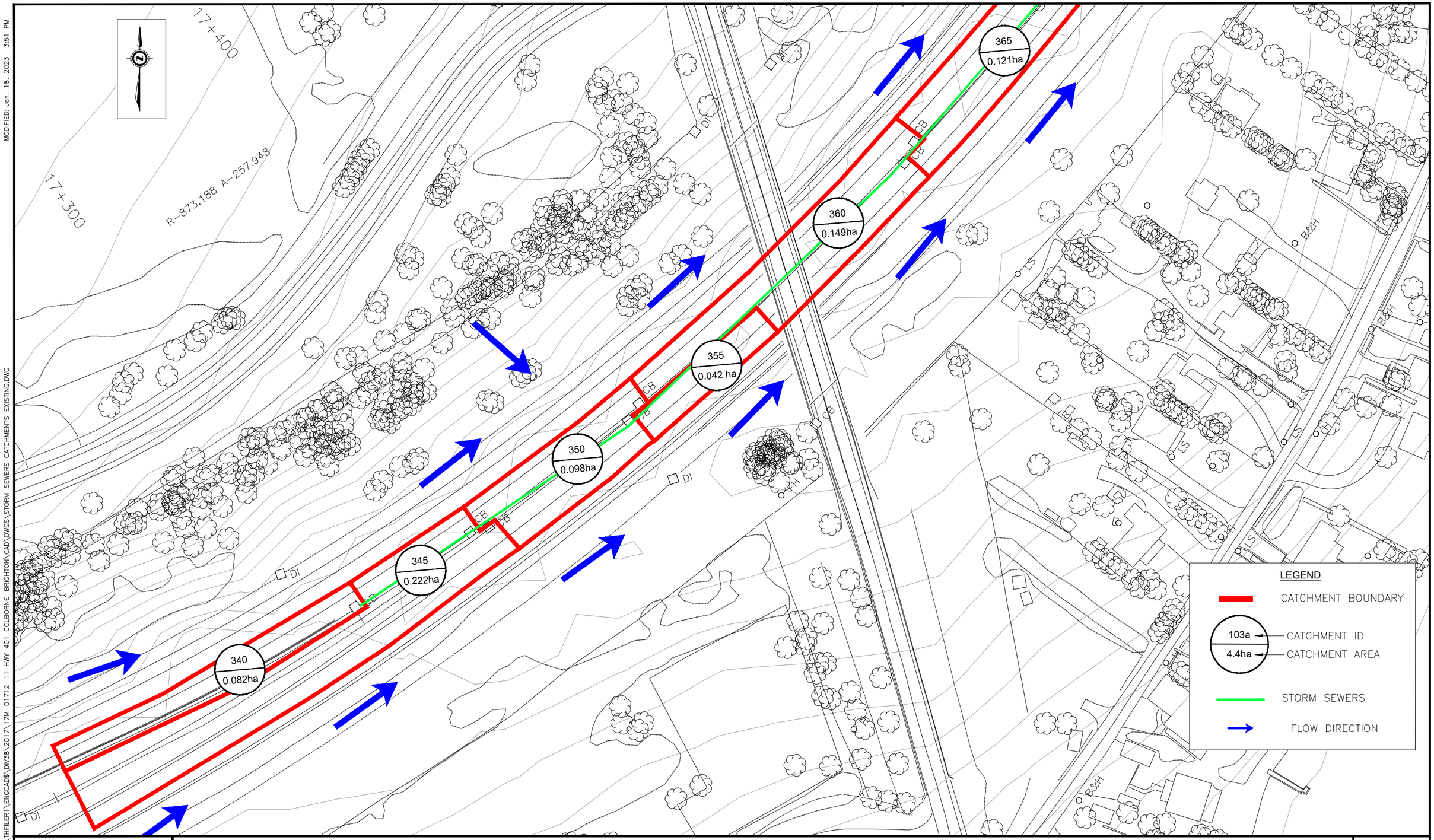

wsp

EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-14

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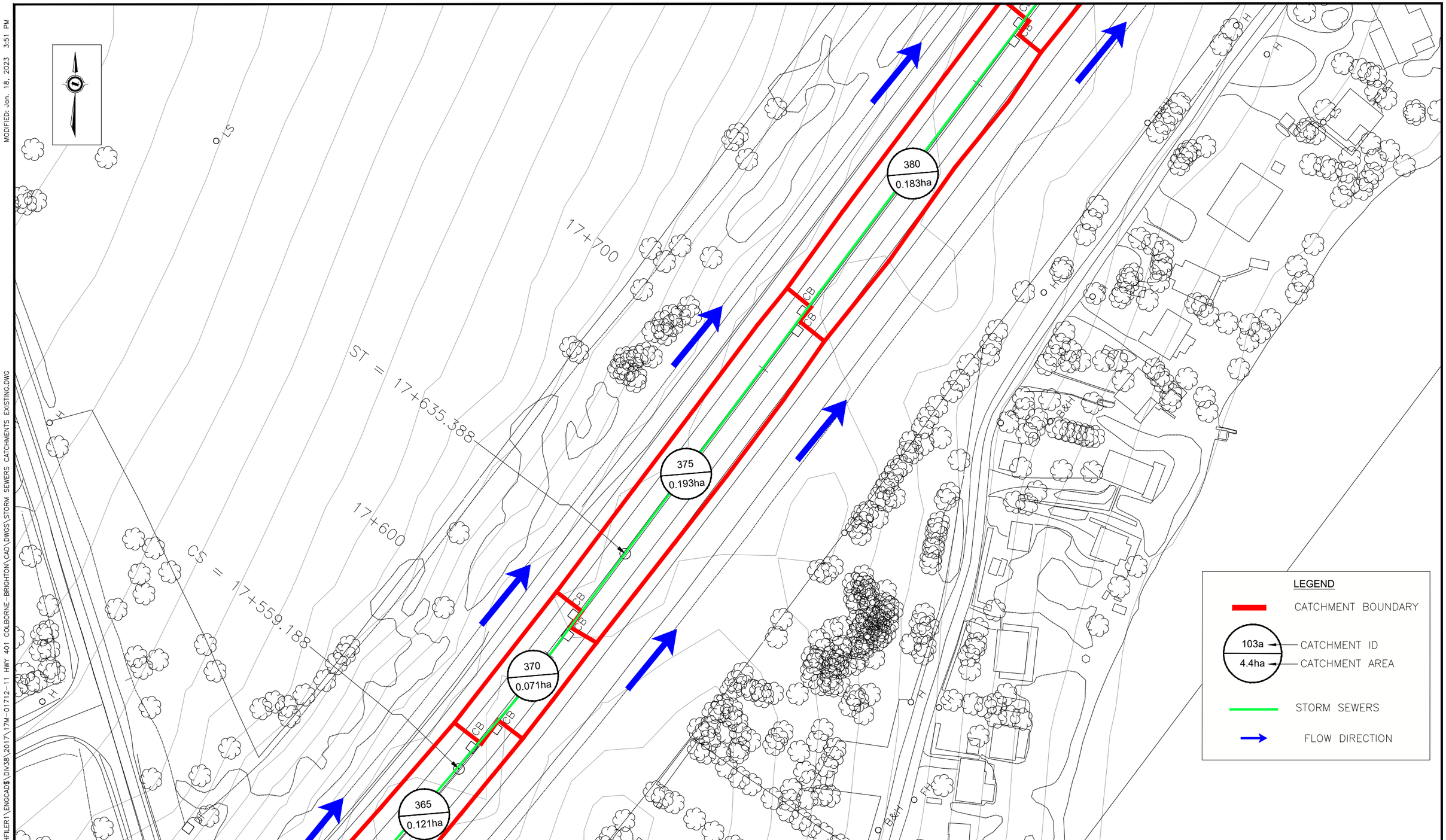

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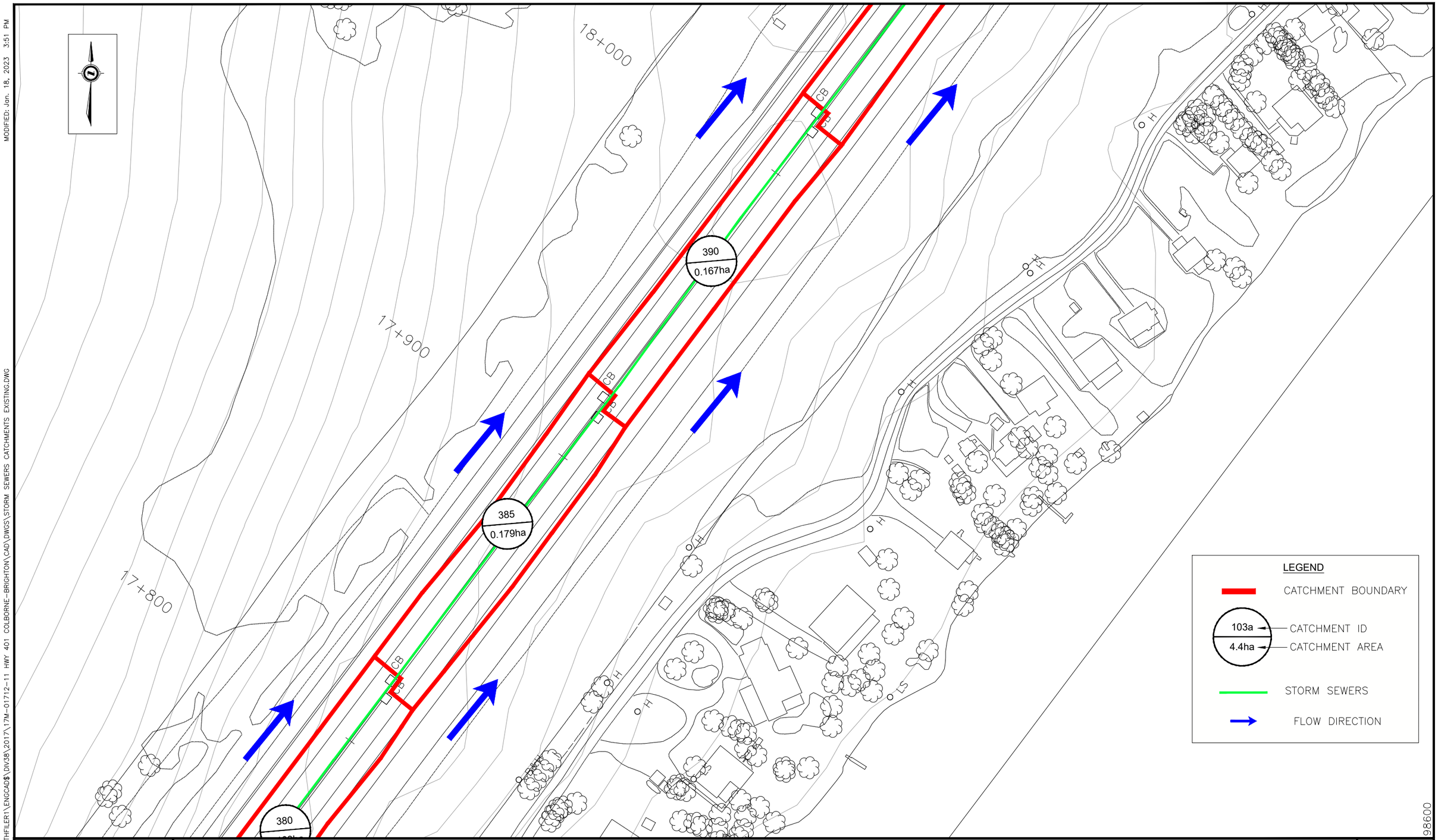
EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-15



98600

EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-16

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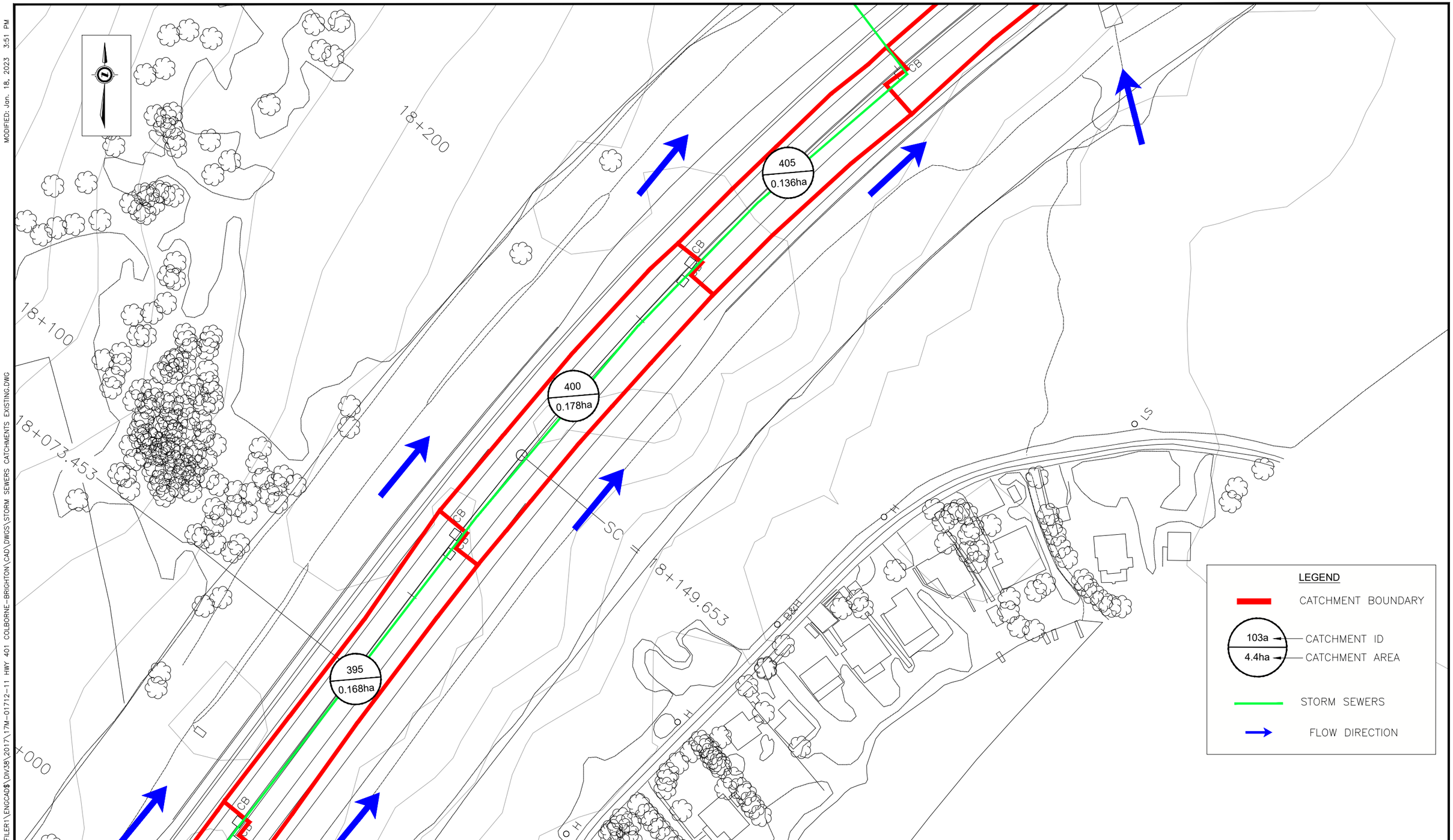

EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-17

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MODIFIED: Jan. 18, 2023 3:51 PM

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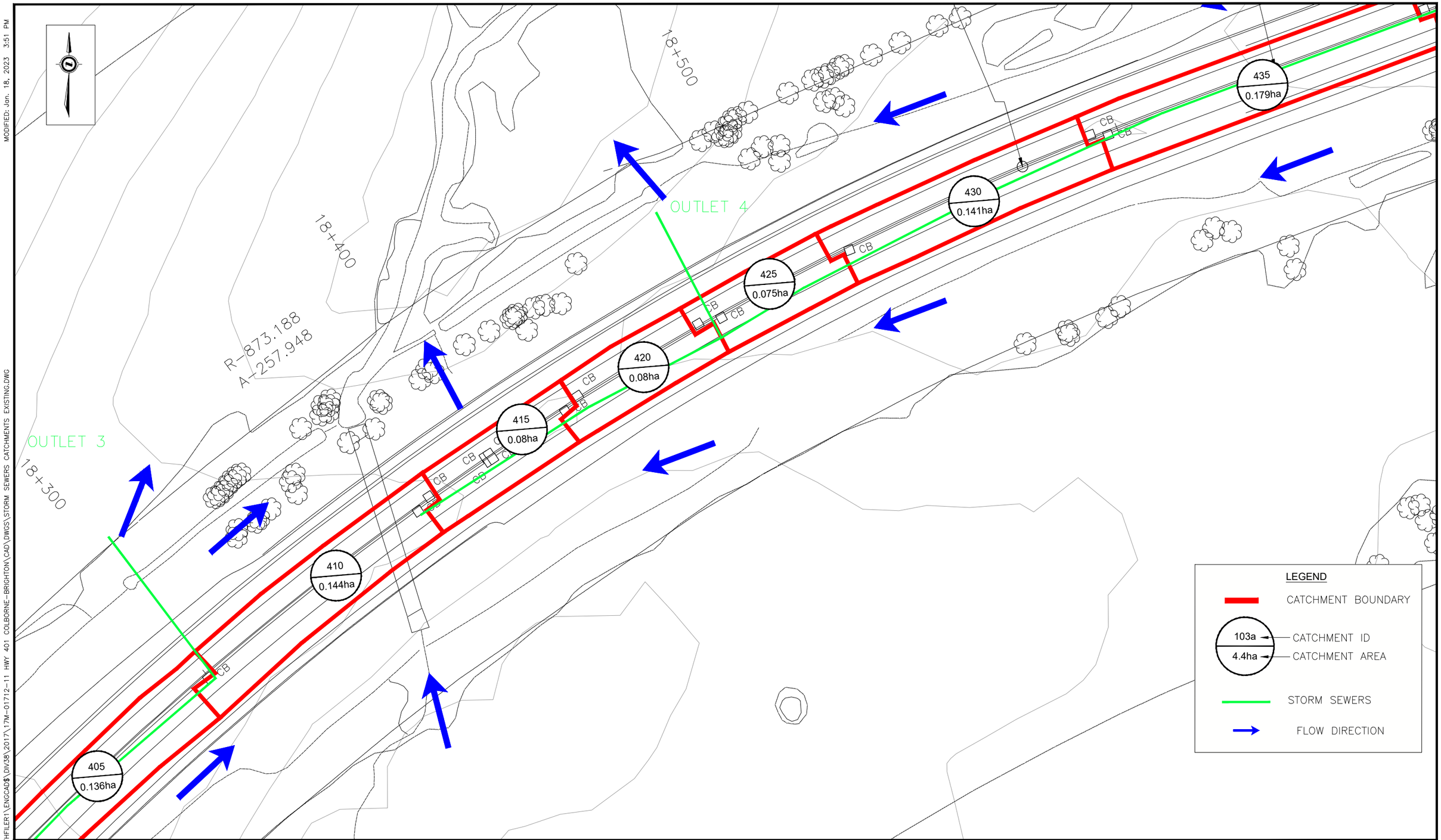

EXISTING STORM SEWER CATHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-18

DRAWING NAME: \\THFILER1.ENGCAD$\DIV36\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS EXISTING.DWG
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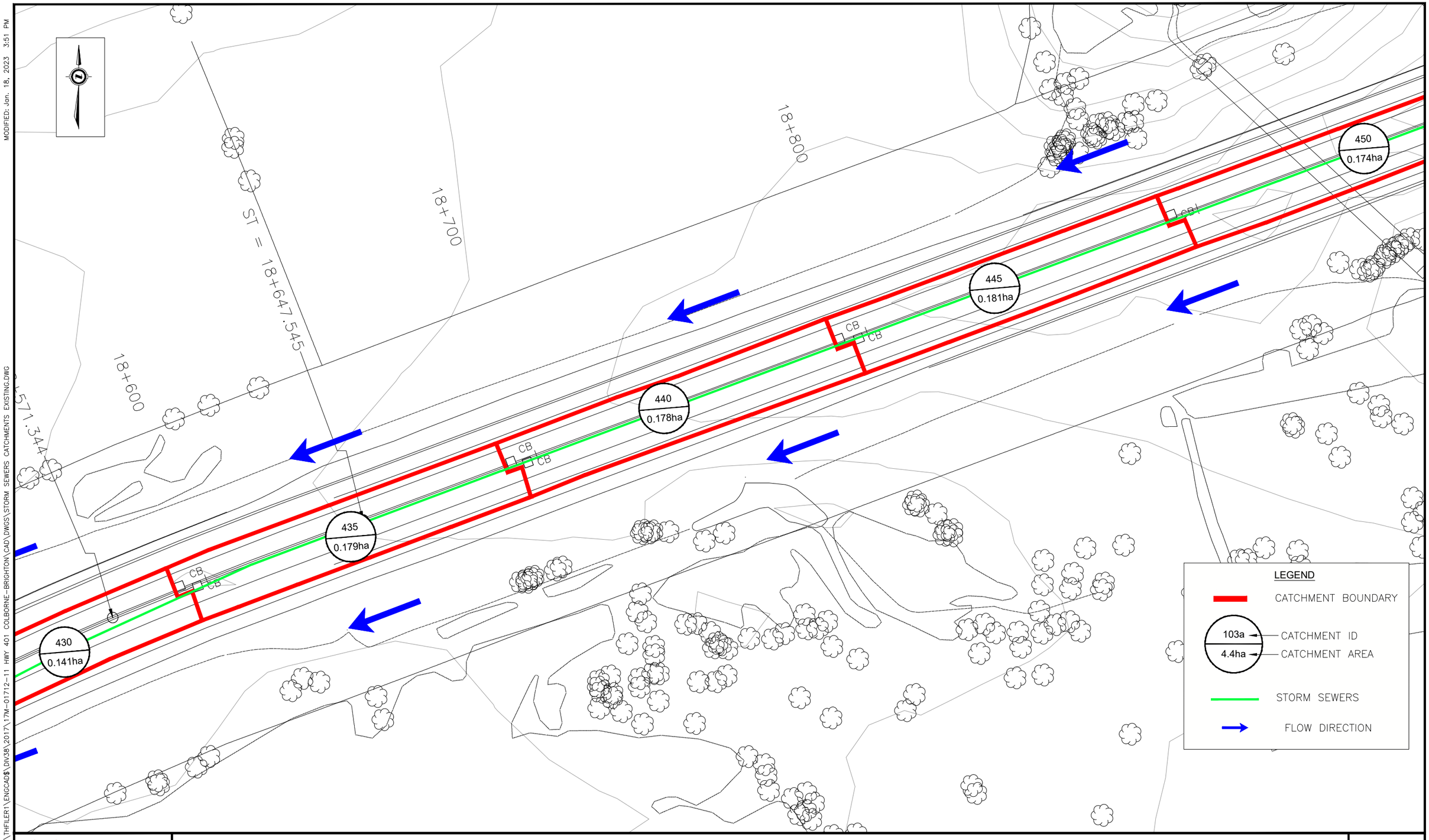


wsp

EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-19

DRAWING NAME: \\THFILER1\ENGCAD$\DIV3B\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS EXISTING.DWG
MODIFIED: Jan. 18, 2023 3:51 PM

19+300

19+200

19+100

470
0.212ha

465
0.182ha

460
0.174ha

455
0.176ha

CB

CB

LEGEND

CATCHMENT BOUNDARY

103a — CATCHMENT ID
4.4ha — CATCHMENT AREA

STORM SEWERS

FLOW DIRECTION

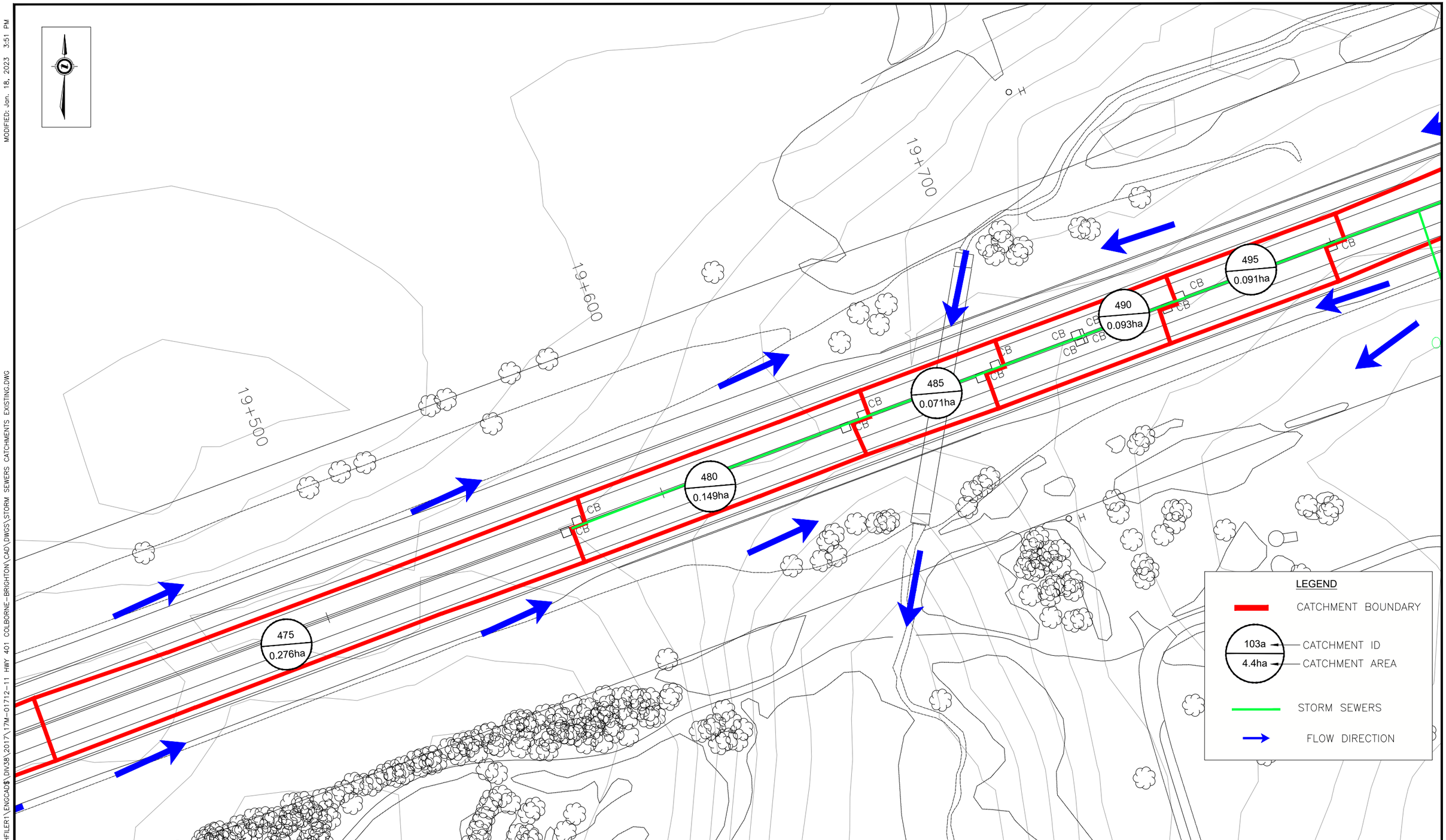
wsp

EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-20



wsp	EXISTING STORM SEWER CATCHMENTS HIGHWAY 401 COLBORNE TO BRIGHTON	EXHIBIT 4-21

DRAWING NAME: \\THFILER1\ENGCAD$\DIV3B\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS EXISTING.DWG
MODIFIED: Jan. 18, 2023 3:51 PM

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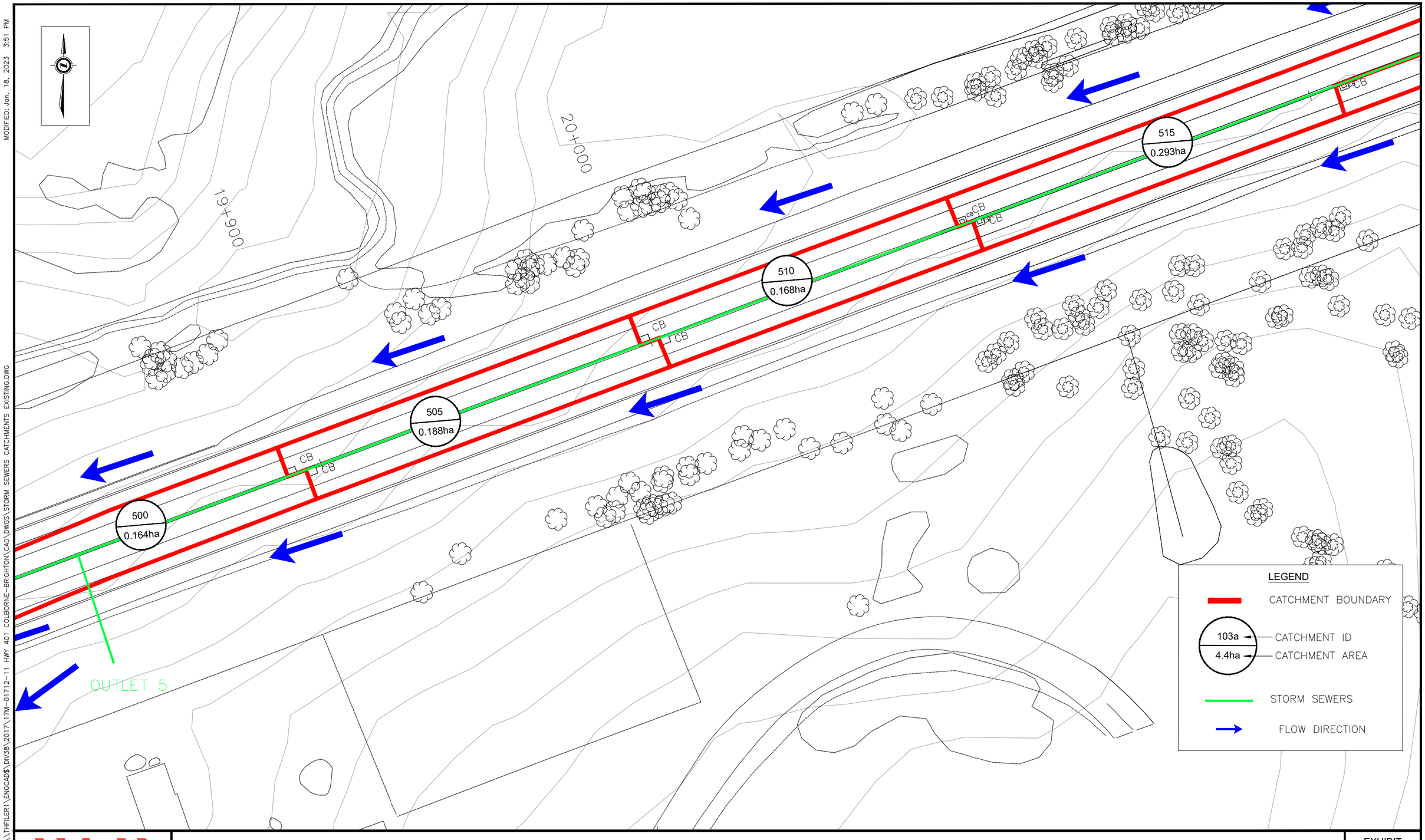
MODIFIED: Jon. 18, 2023 3:51 PM



wsp

EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-22

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MODIFIED: Jon. 18, 2023 3:51 PM

20+241.998

20+200

10+000

00+100

10+200

525
0.040ha

520
0.094ha

515
0.293ha

CB

N 4880800

N 4880700

LEGEND

CATCHMENT BOUNDARY

103a — CATCHMENT ID
4.4ha — CATCHMENT AREA

STORM SEWERS

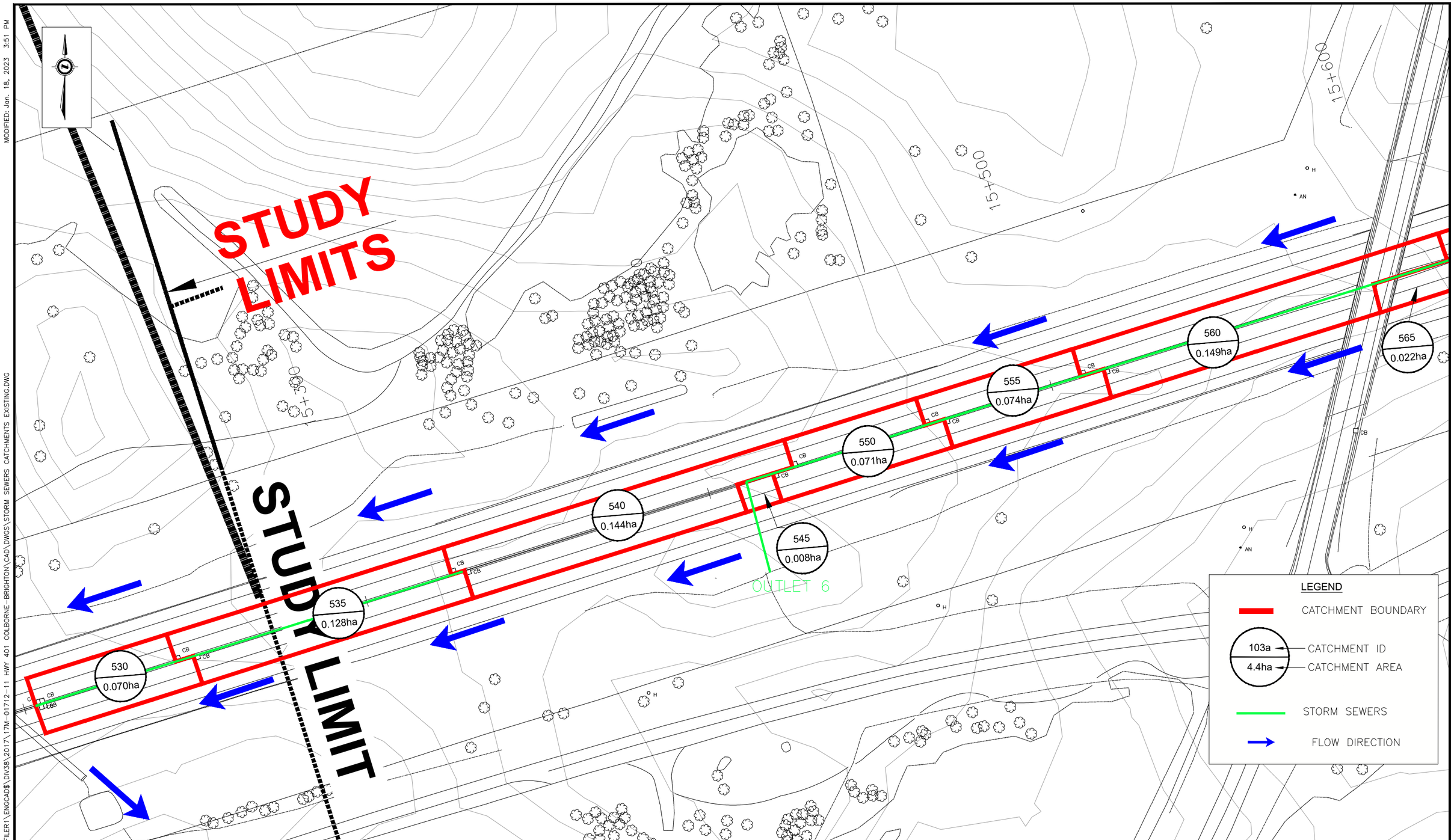
FLOW DIRECTION

wsp

EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT
4-23



EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-24

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS EXISTING.DWG

MODIFIED: Jan. 18, 2023 3:51 PM

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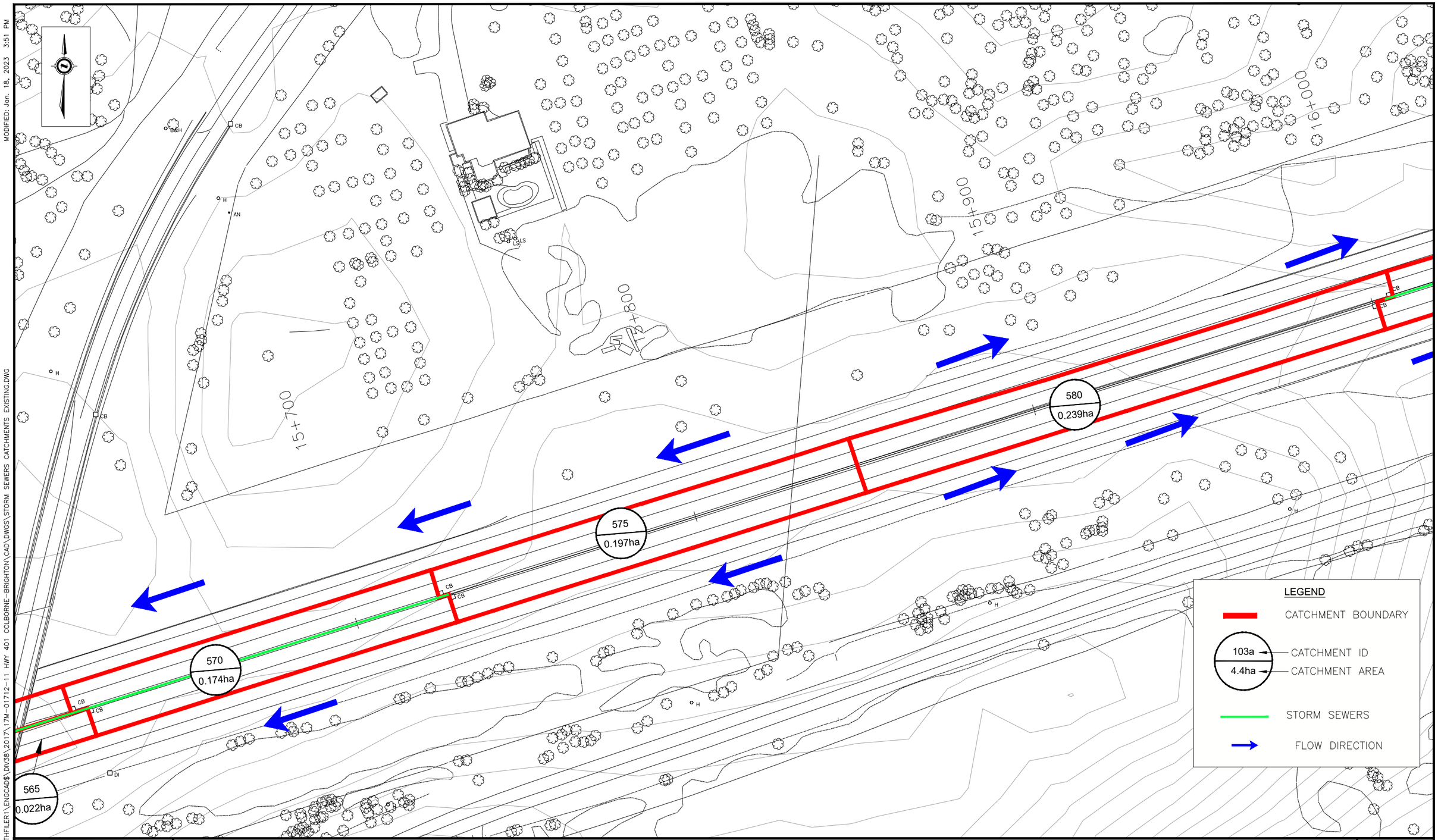
MODIFIED: Jon. 18, 2023 3:51 PM



wsp

EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-25

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS EXISTING.DWG
MODIFIED: Jon. 18, 2023 3:51 PM

595
0.161ha

600
0.133ha

590
0.160ha

585
0.156ha

CB

H

LEGEND

CATCHMENT BOUNDARY

103a — CATCHMENT ID
4.4ha — CATCHMENT AREA

STORM SEWERS

FLOW DIRECTION

wsp

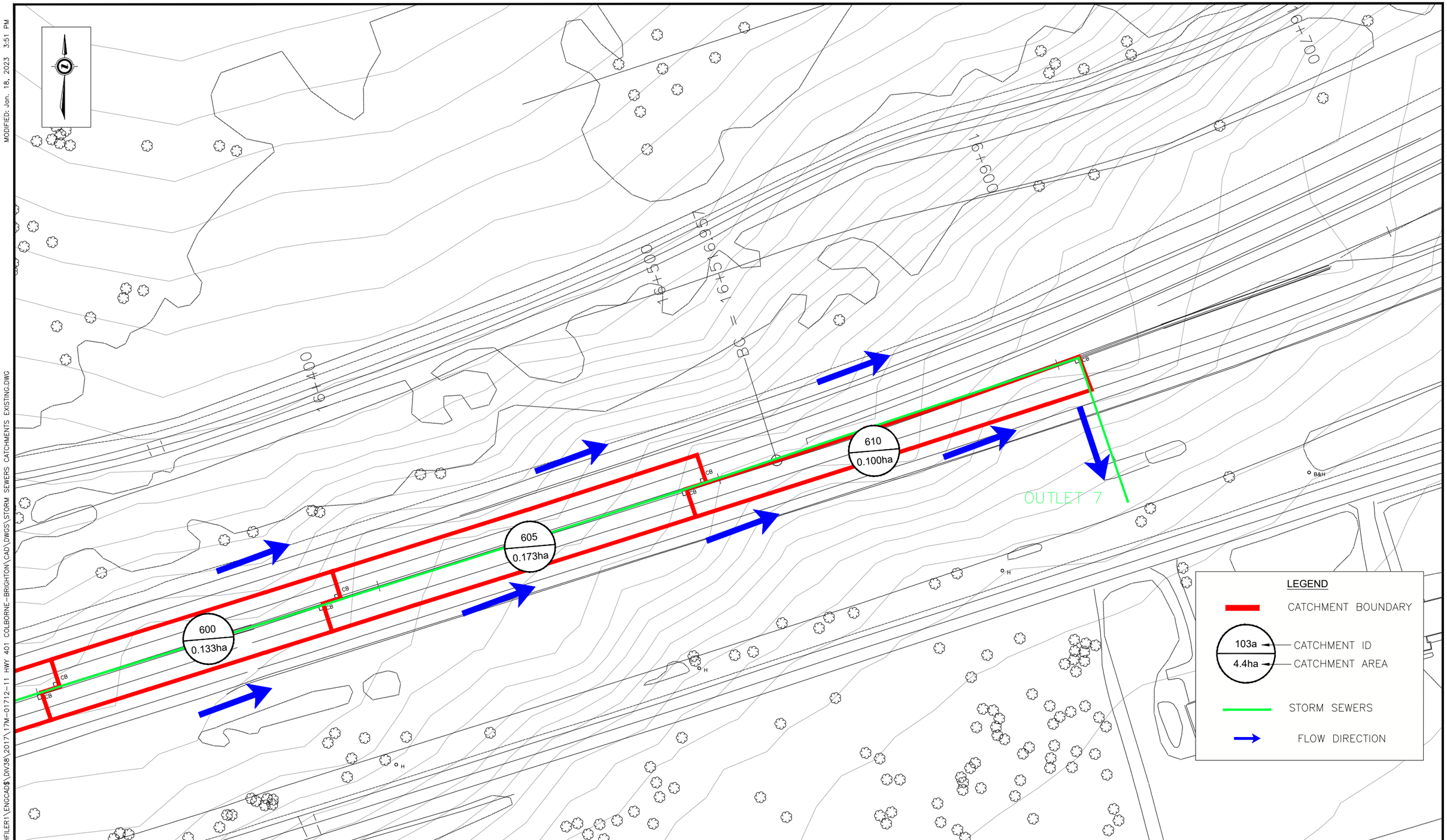
EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

4-26

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS EXISTING.DWG
MODIFIED: Jon. 18, 2023 3:51 PM



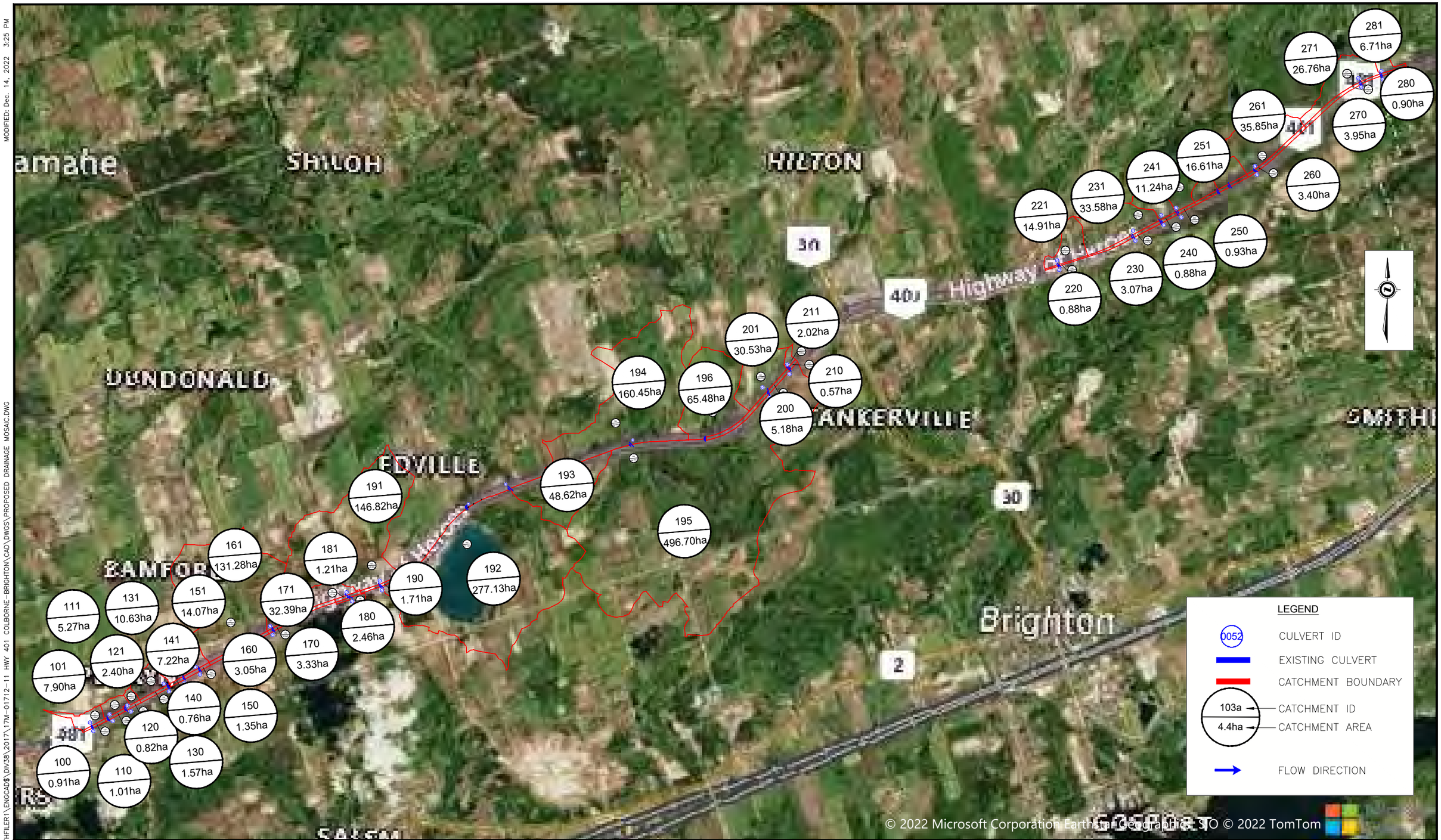
wsp

EXISTING STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

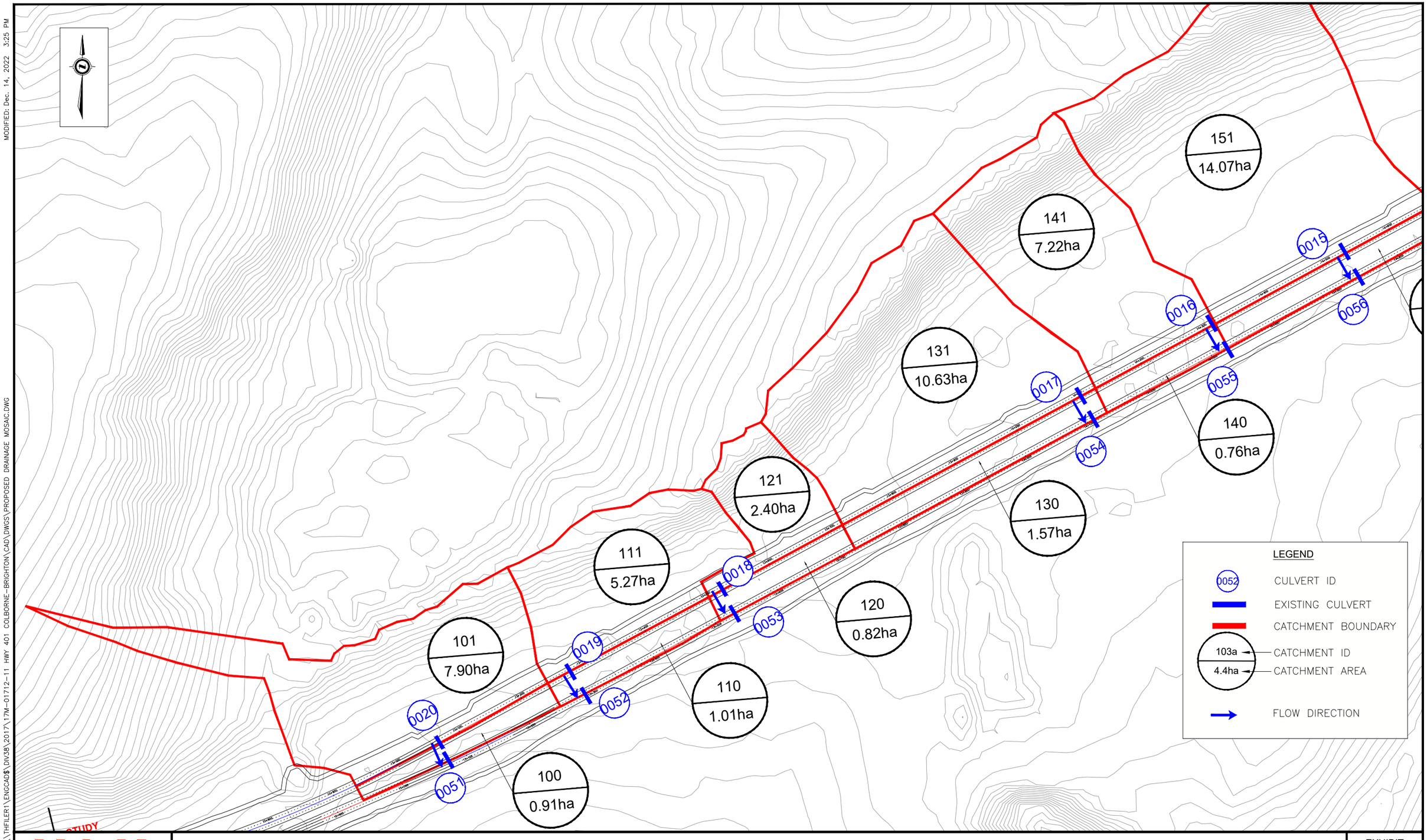
4-27



wsp	PROPOSED CONDITIONS DRAINAGE MOSAICS HIGHWAY 401 COLBORNE TO BRIGHTON	EXHIBIT 5-1

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\PROPOSED DRAINAGE MOSAIC.DWG
MODIFIED: Dec. 14, 2022 3:25 PM

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\PROPOSED DRAINAGE MOSAIC.DWG
MODIFIED: Dec. 14, 2022 3:25 PM



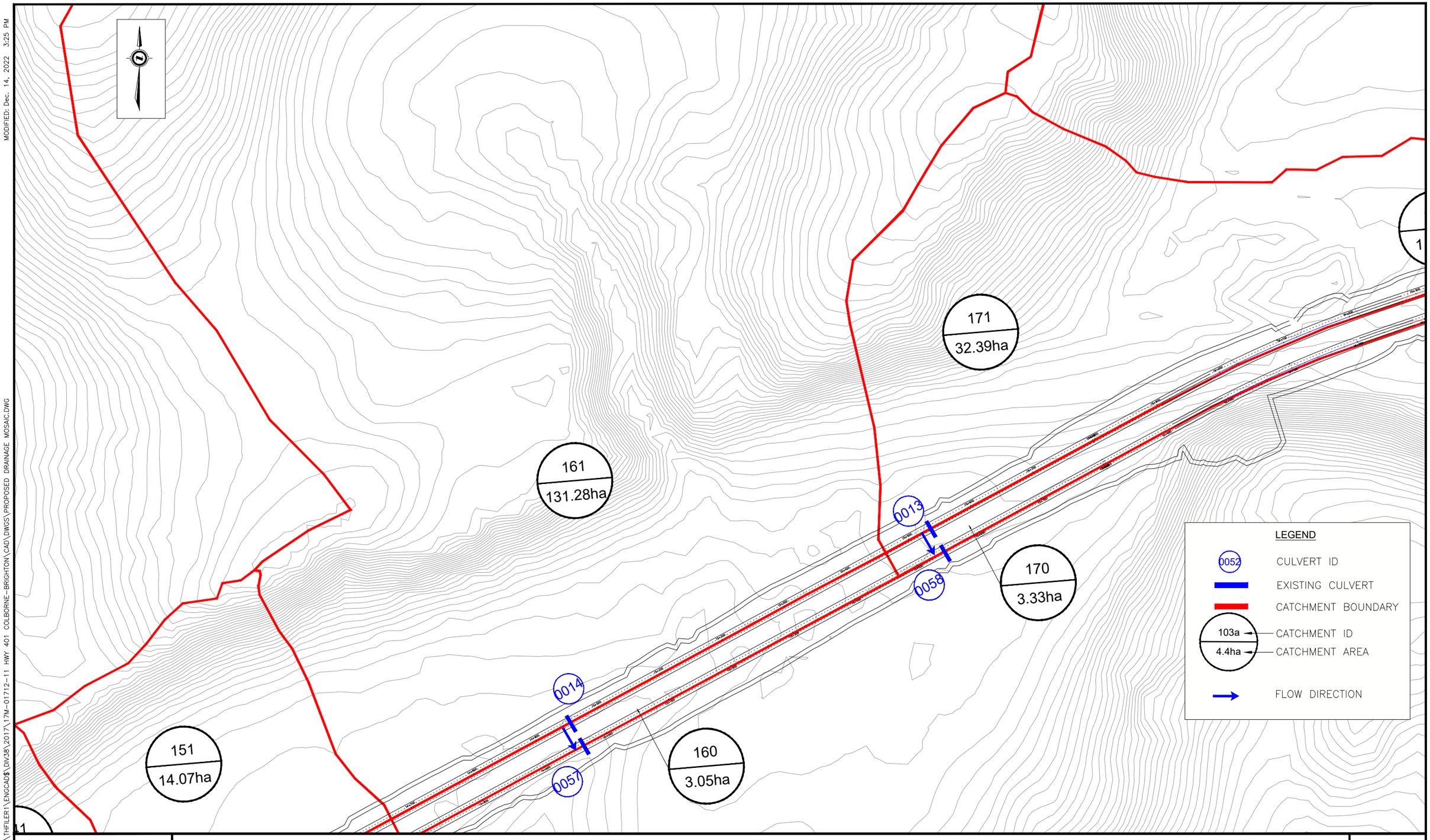
PROPOSED CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-2

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\PROPOSED DRAINAGE MOSAIC.DWG
MODIFIED: Dec. 14, 2022 3:25 PM



wsp

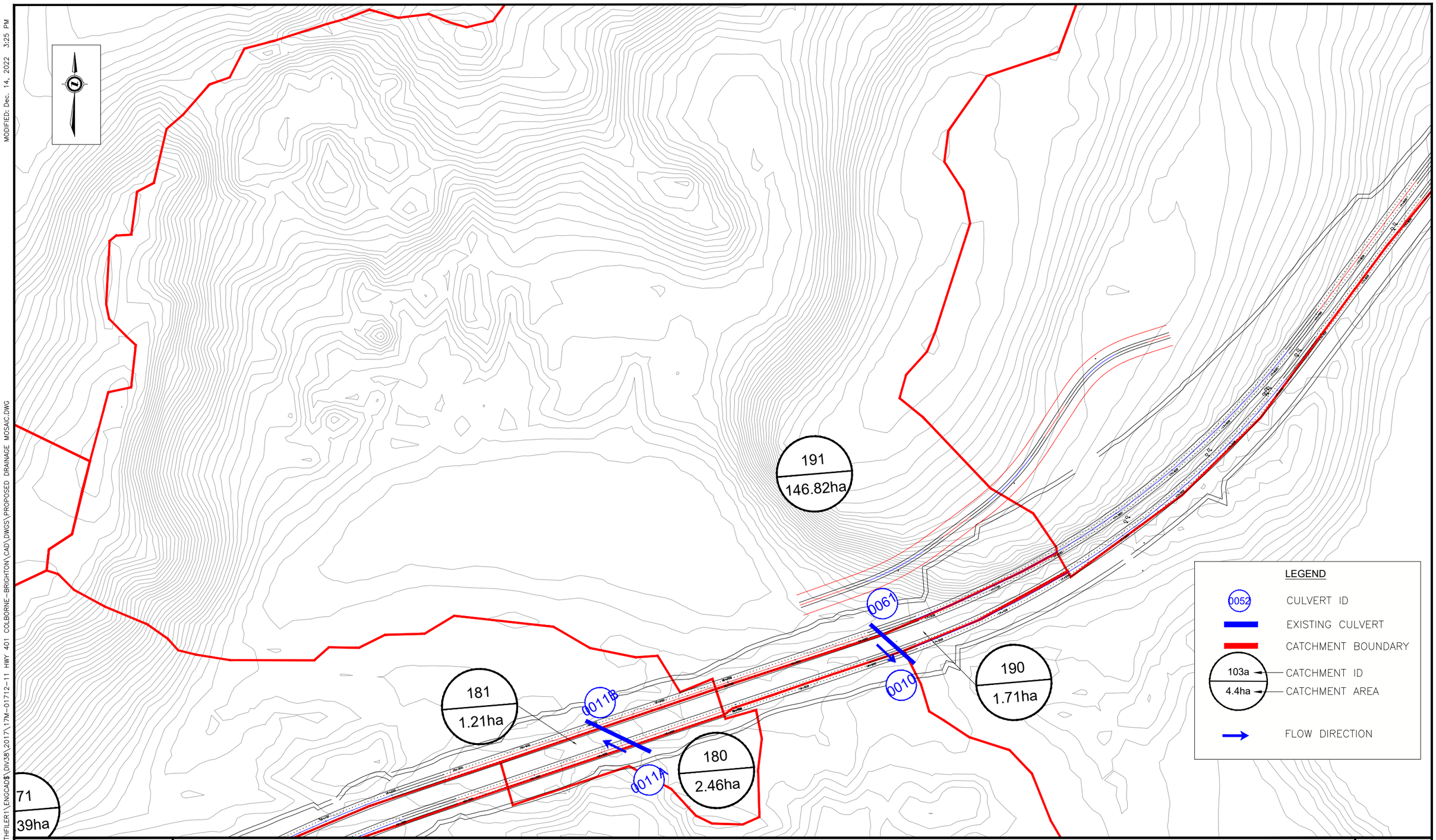
PROPOSED CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-3

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\PROPOSED DRAINAGE MOSAIC.DWG
MODIFIED: Dec. 14, 2022 3:25 PM



wsp

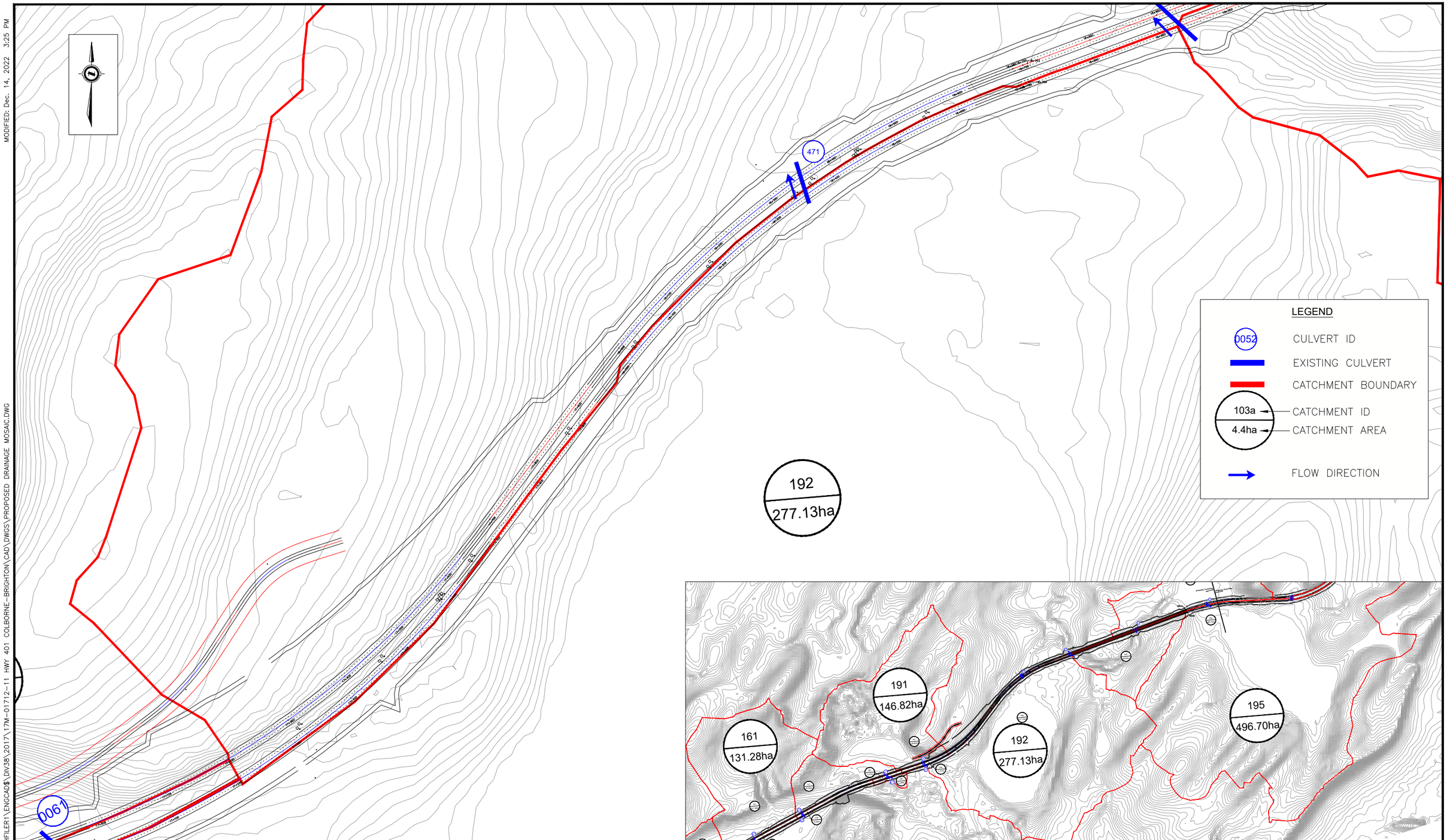
PROPOSED CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-4

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\PROPOSED DRAINAGE MOSAIC.DWG
MODIFIED: Dec. 14, 2022 3:25 PM



PROPOSED CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-5

MODIFIED: Dec. 14, 2022 3:25 PM

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\PROPOSED DRAINAGE MOSAIC.DWG

472

473

474

193
48.62ha

195
496.70ha

STA AHEAD = 10+000.00
STA BACK = 20+220.62

STA AHEAD = 10+000.00
STA BACK = 20+331.72

LEGEND

0052 CULVERT ID

EXISTING CULVERT

CATCHMENT BOUNDARY

103a CATCHMENT ID
4.4ha CATCHMENT AREA

FLOW DIRECTION

wsp

PROPOSED CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-6

MODIFIED: Dec. 14, 2022 3:25 PM

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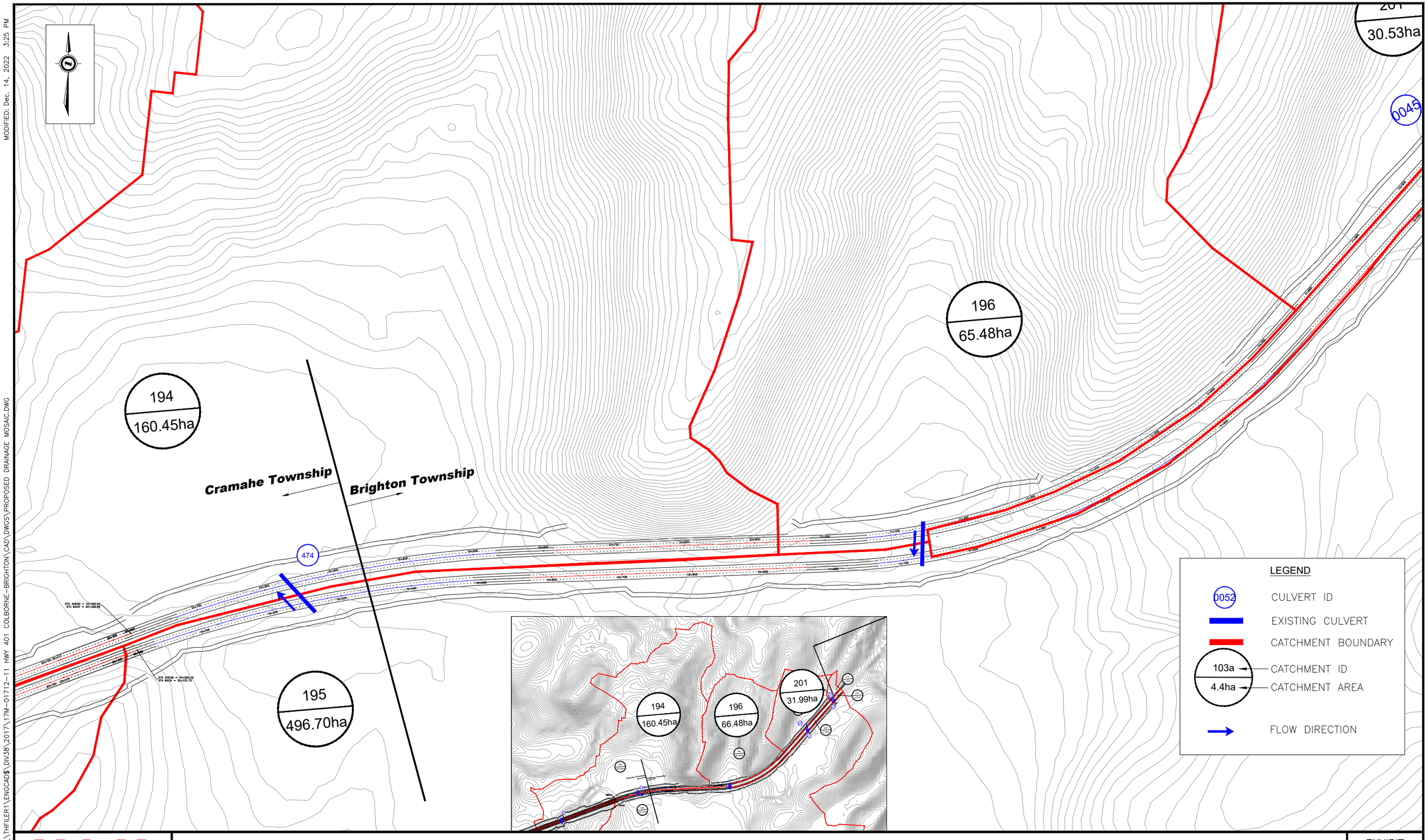
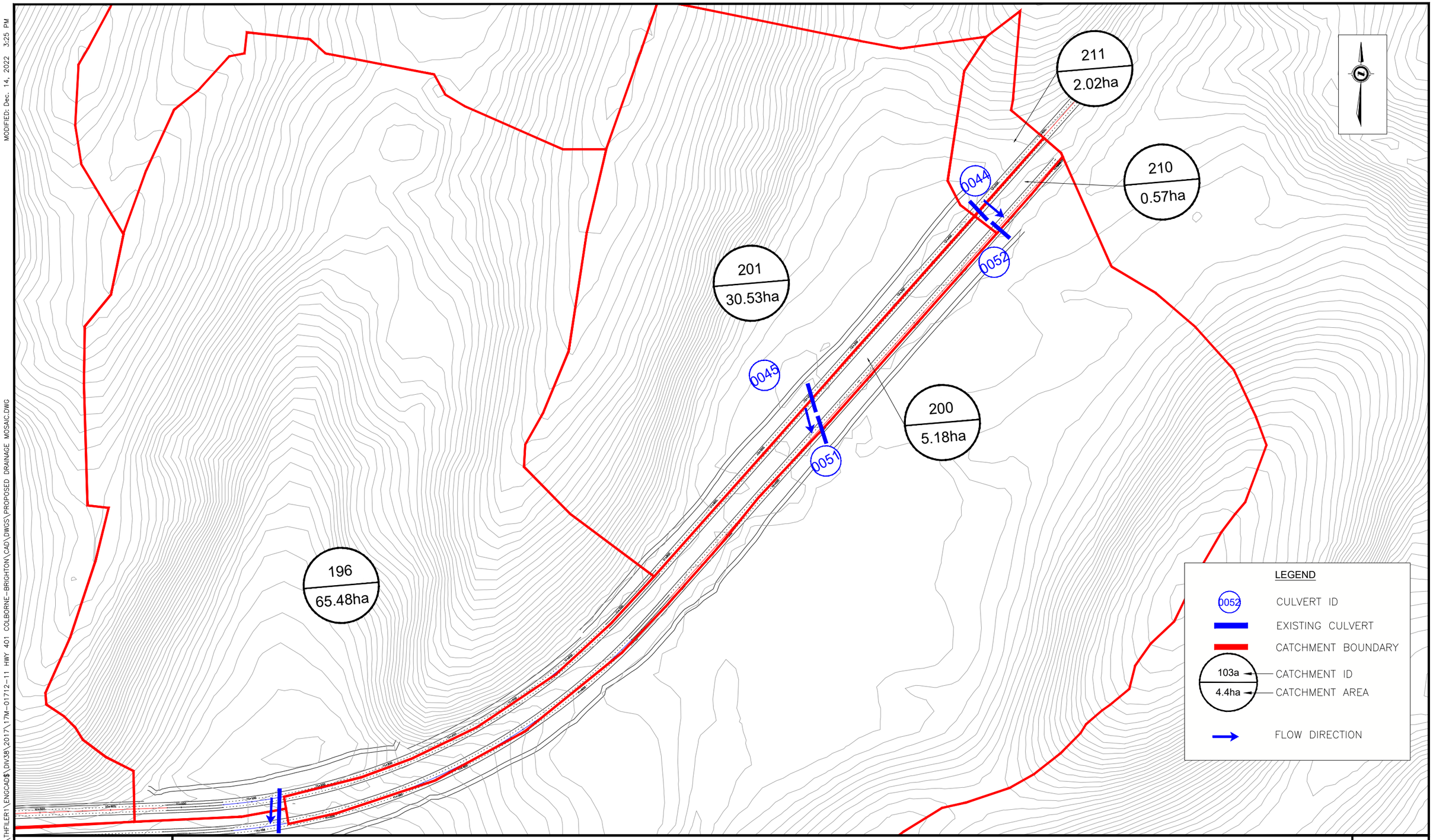


PROPOSED CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-7



PROPOSED CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-8

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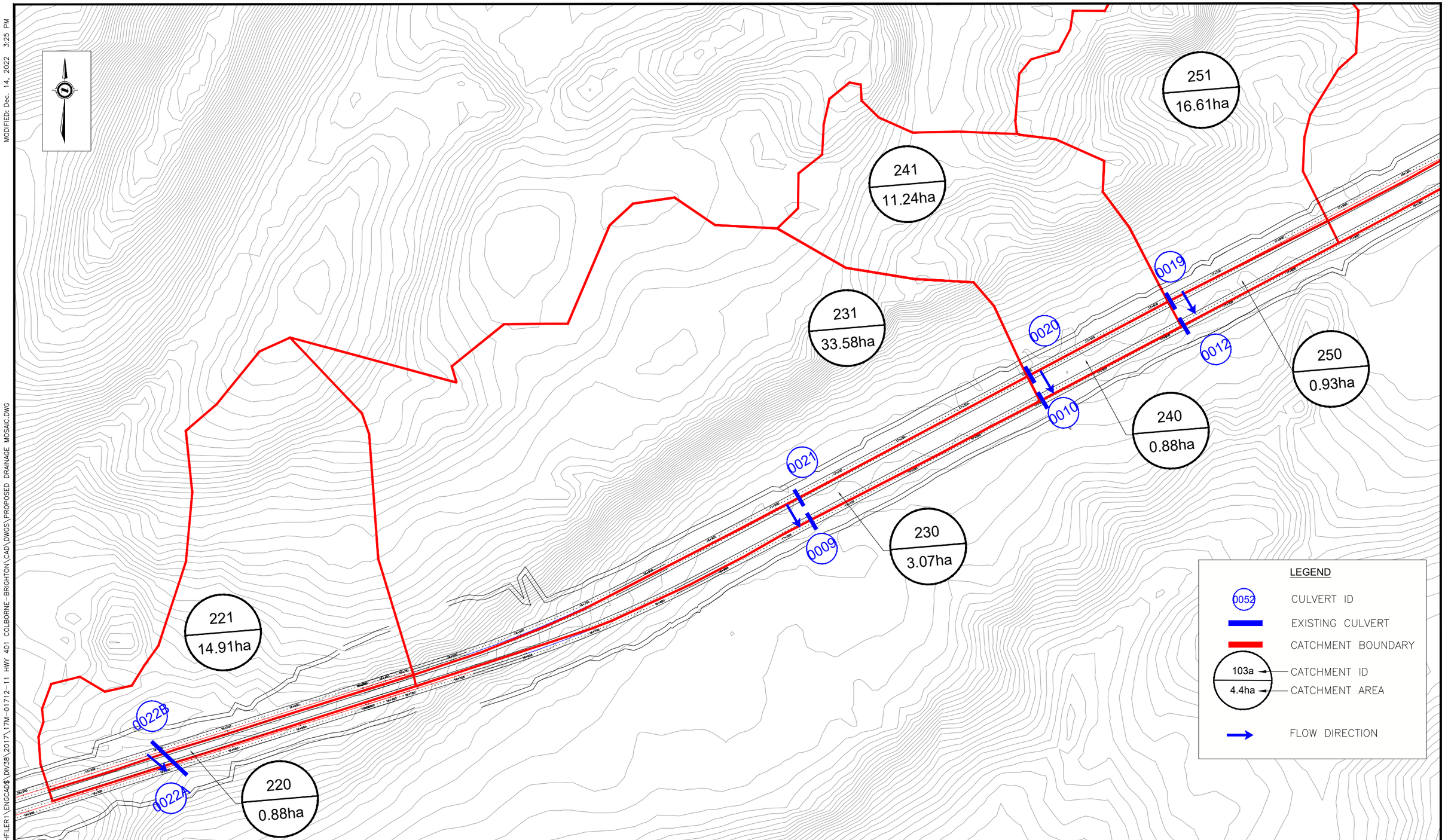

PROPOSED CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-9

MODIFIED: Dec. 14, 2022 3:25 PM
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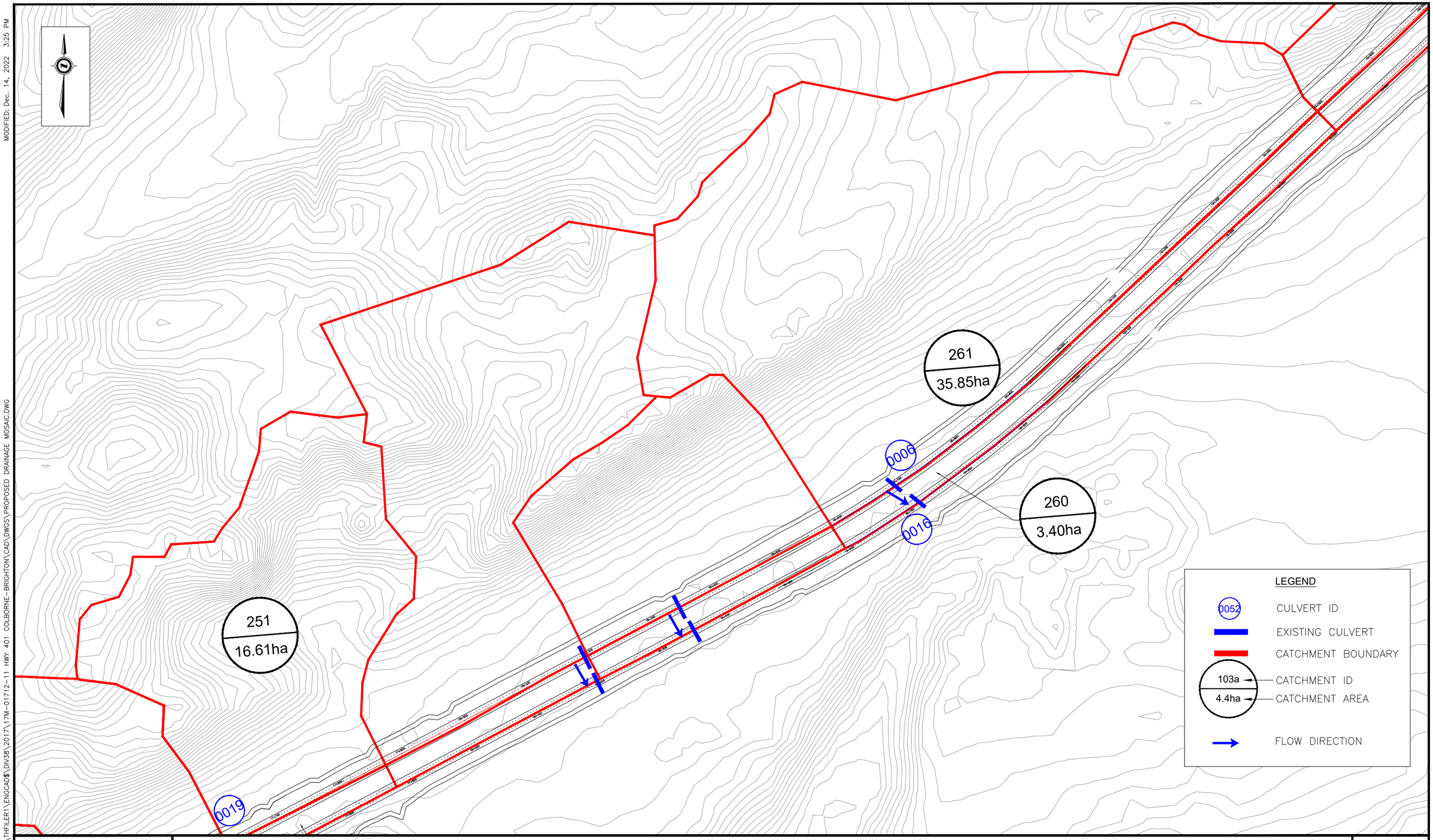

wsp

PROPOSED CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-10

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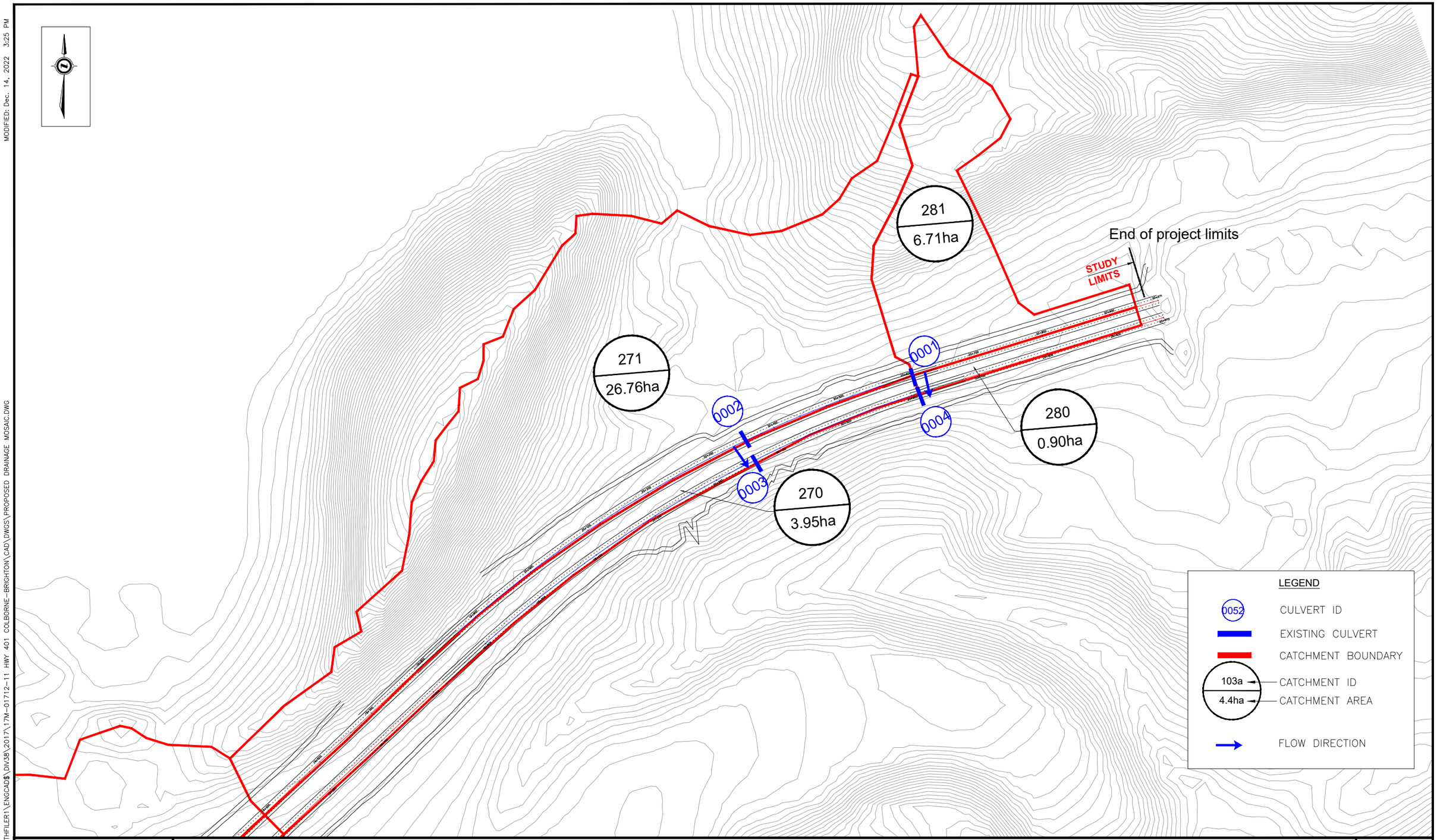

wsp

PROPOSED CONDITIONS DRAINAGE MOSAICS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-11

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS PROPOSED CONDITIONS.DWG
MODIFIED: Jan. 18, 2023 3:48 PM

STUDY LIMITS

12+700
12+800
12+900
12+600
12+700
12+800
12+900

CB

300
0.030ha

305
0.257ha

310
0.261ha

315
0.239ha

320
0.208ha

OUTLET 1

LEGEND

- CATCHMENT BOUNDARY
- 103a — CATCHMENT ID
- 4.4ha — CATCHMENT AREA
- CB — NEW PROPOSED CATCH BASIN
- STORM SEWERS
- FLOW DIRECTION

wsp

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-12

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS PROPOSED CONDITIONS.DWG
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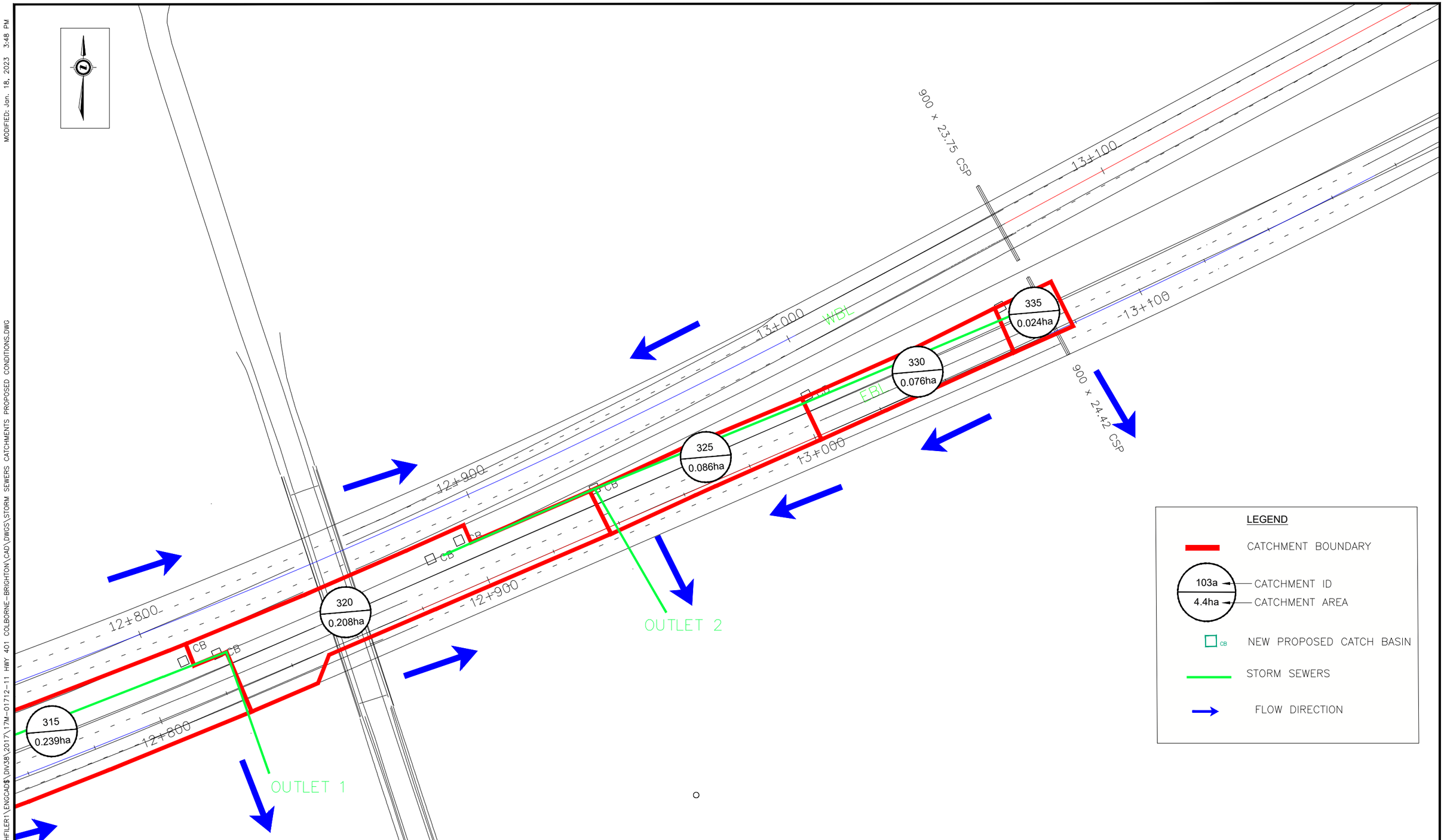
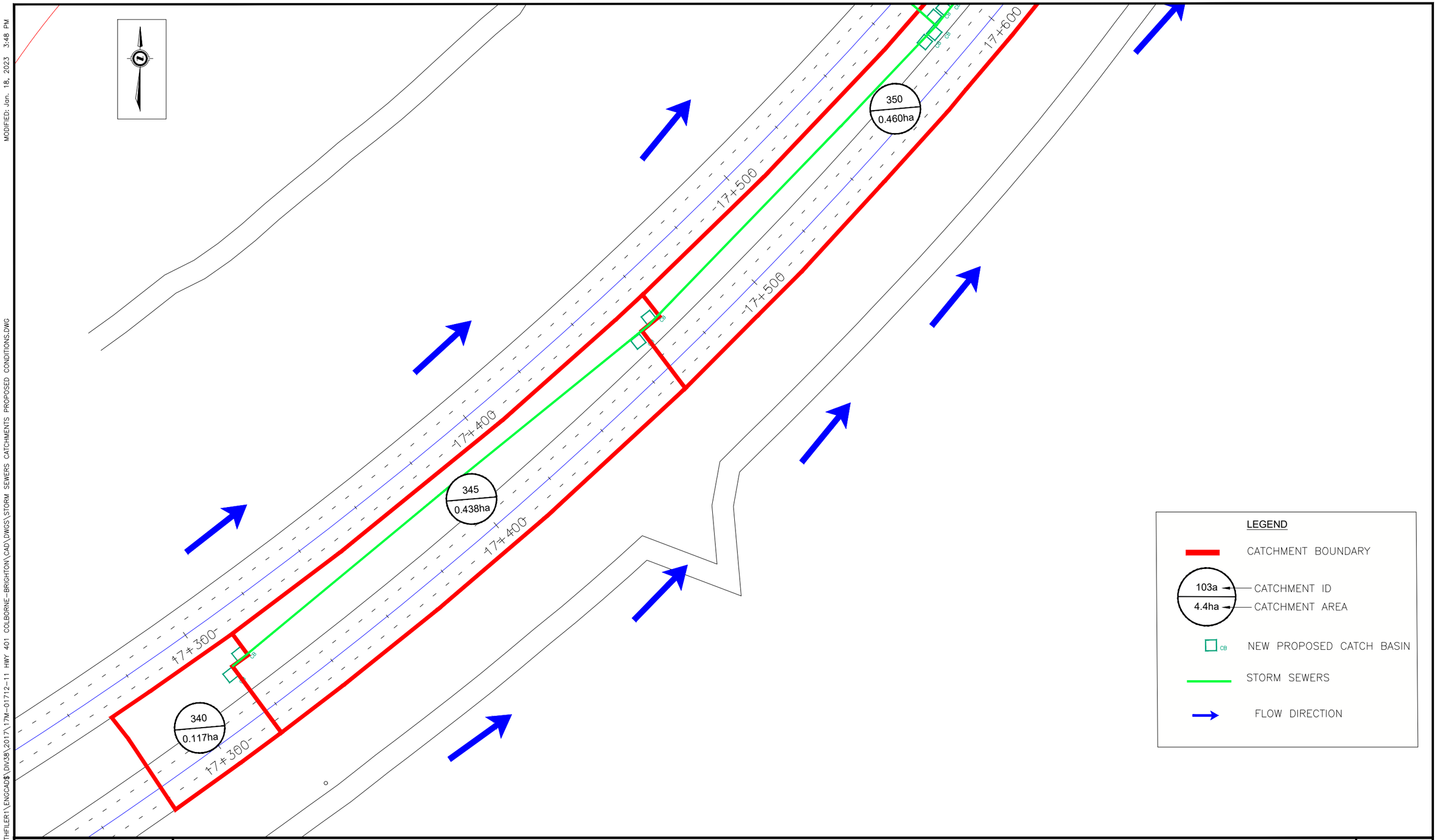


wsp	PROPOSED STORM SEWER CATCHMENTS HIGHWAY 401 COLBORNE TO BRIGHTON	EXHIBIT 5-13



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MODIFIED: Jan. 18, 2023 3:48 PM

wsp

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-14

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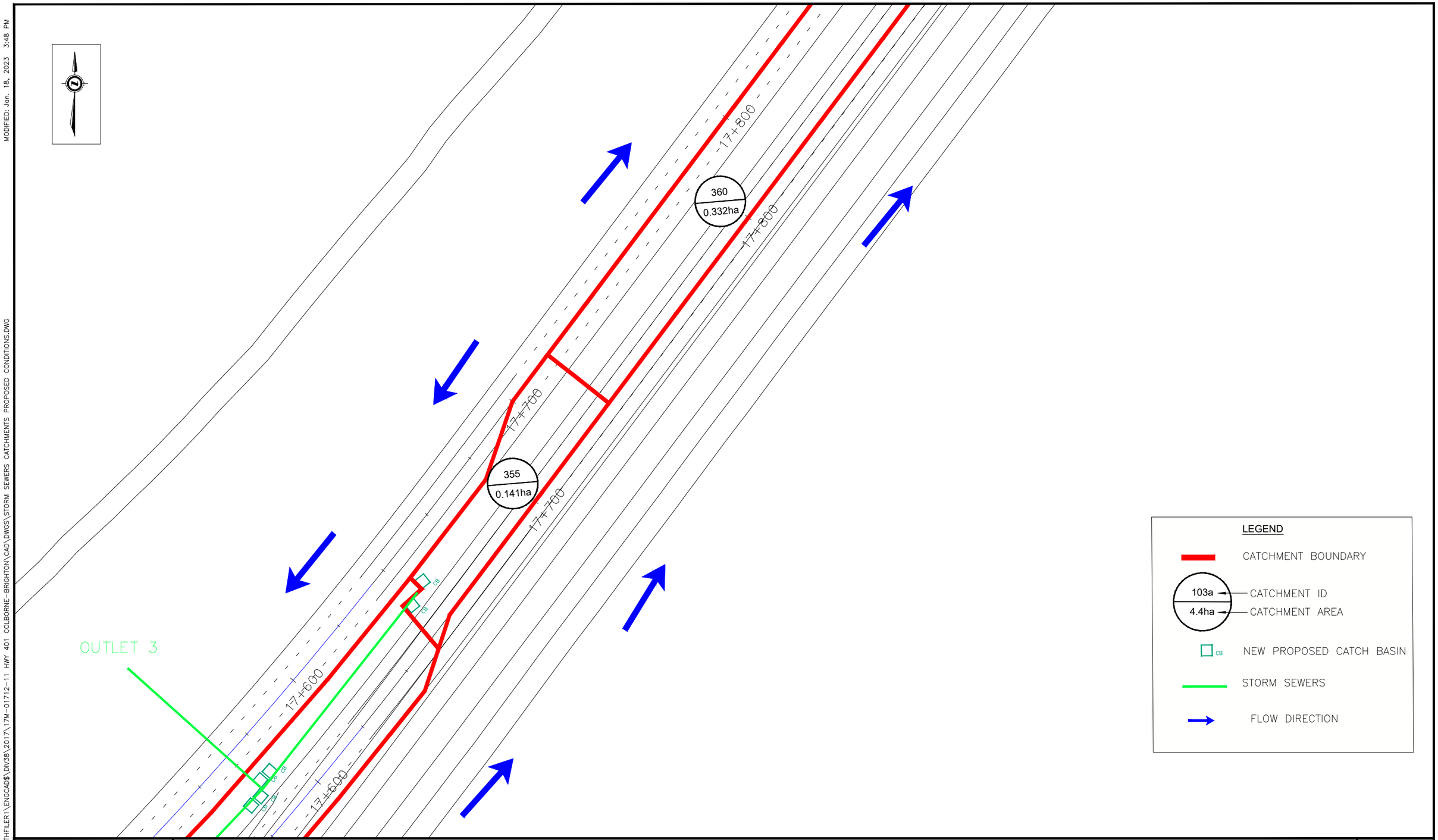

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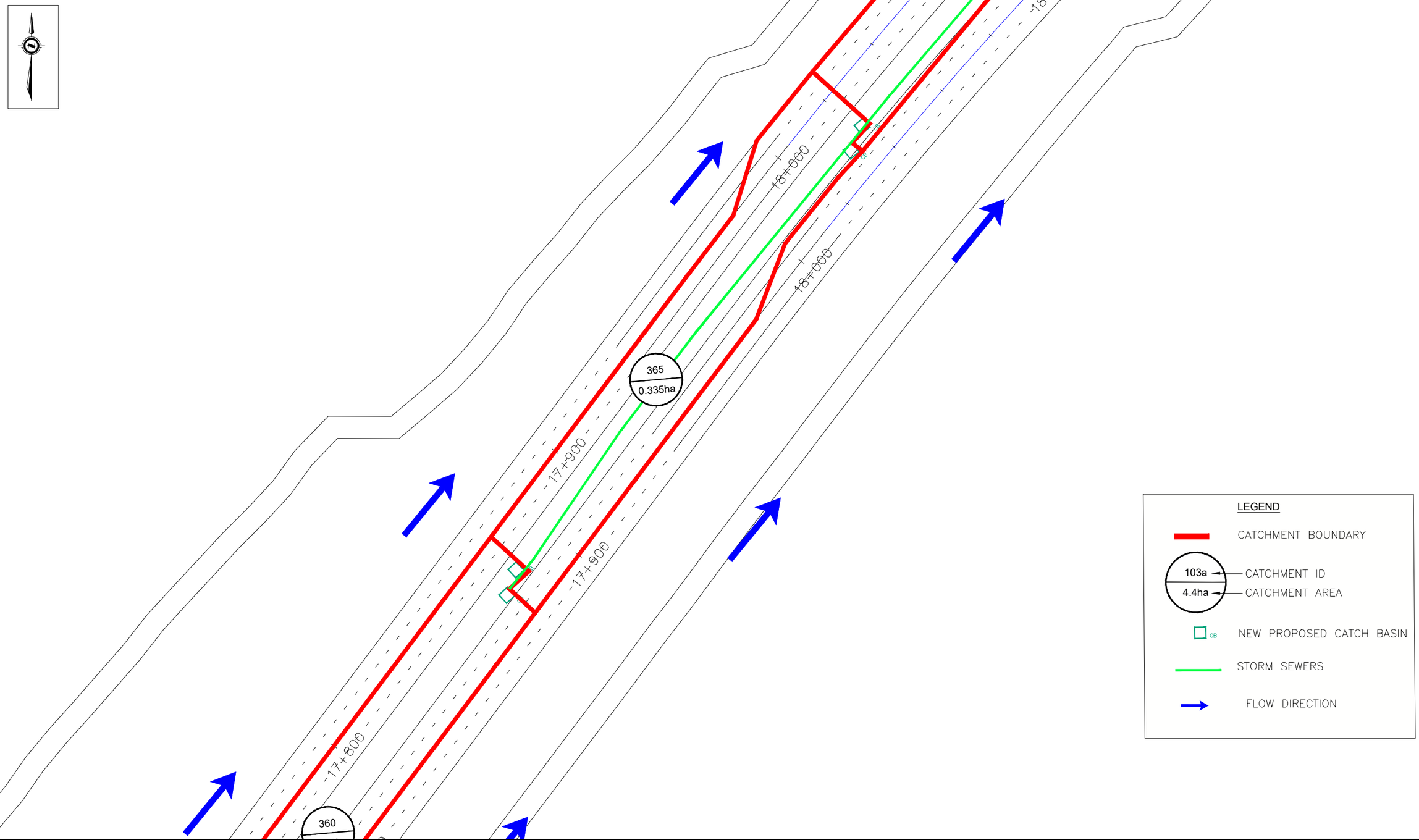
PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-15



PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-16

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS PROPOSED CONDITIONS.DWG
MODIFIED: Jan. 18, 2023 3:48 PM

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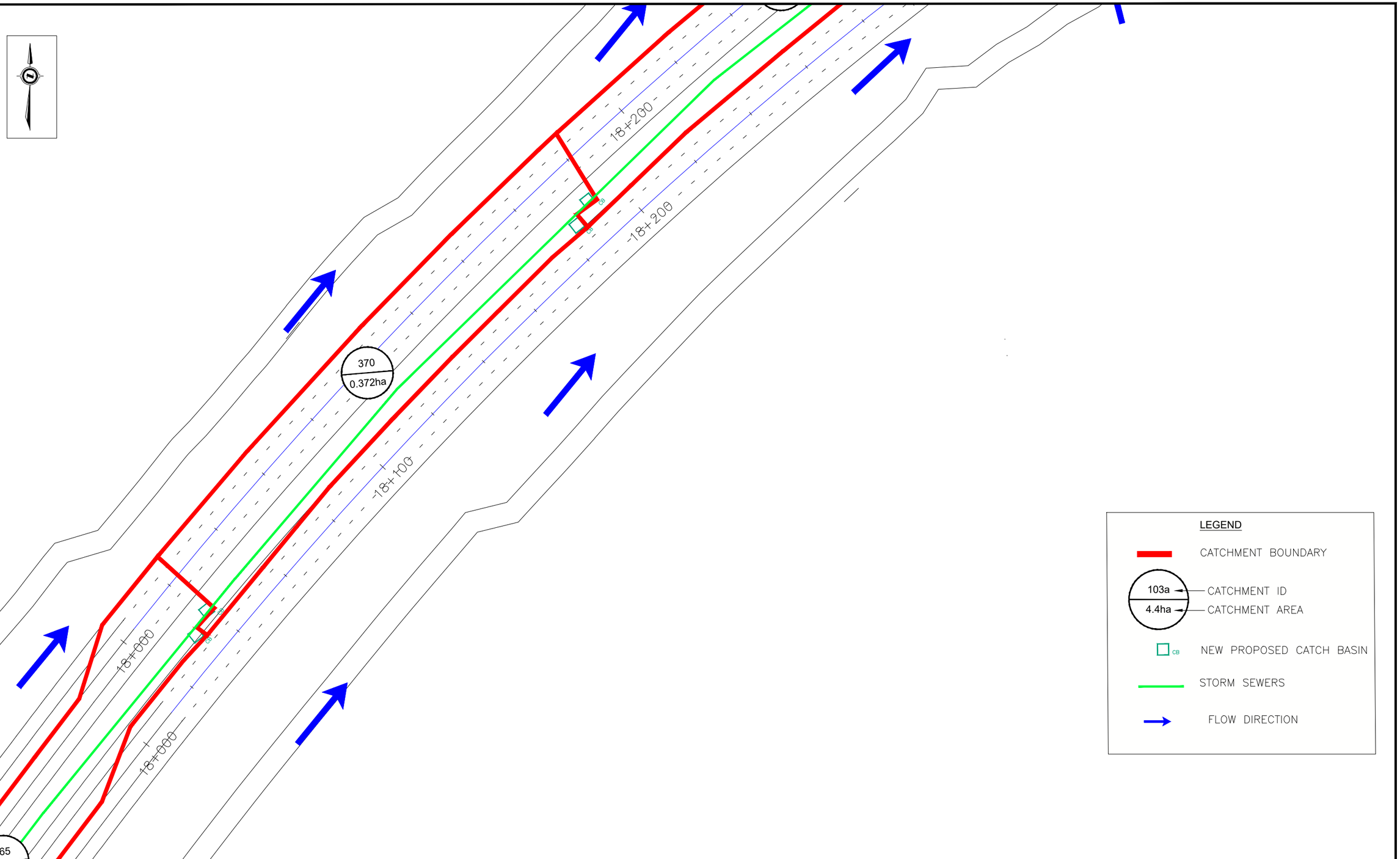


LEGEND

- CATCHMENT BOUNDARY
- 103a / 4.4ha — CATCHMENT ID / CATCHMENT AREA
- CB — NEW PROPOSED CATCH BASIN
- STORM SEWERS
- FLOW DIRECTION

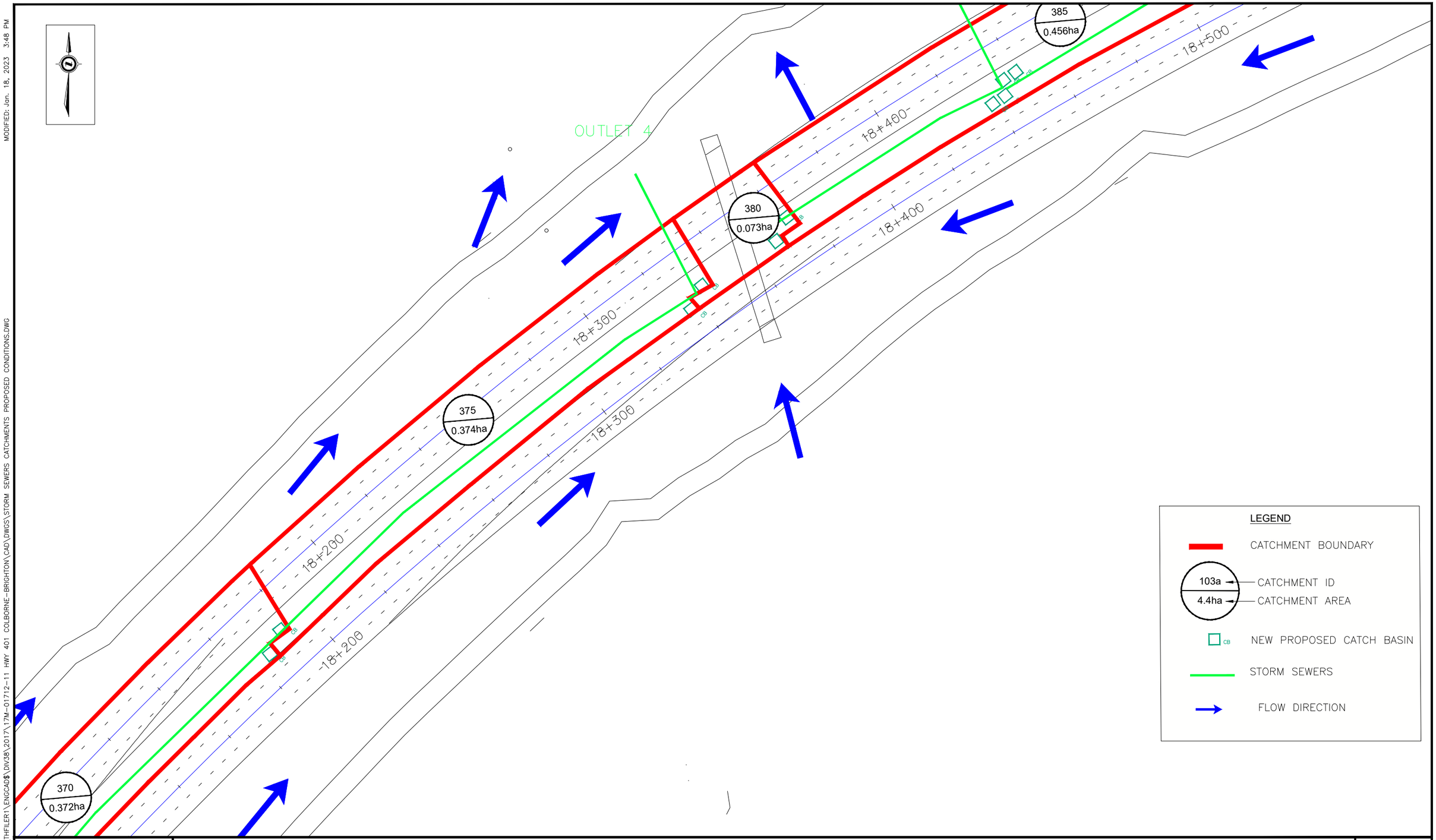
wsp

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-17



PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-18

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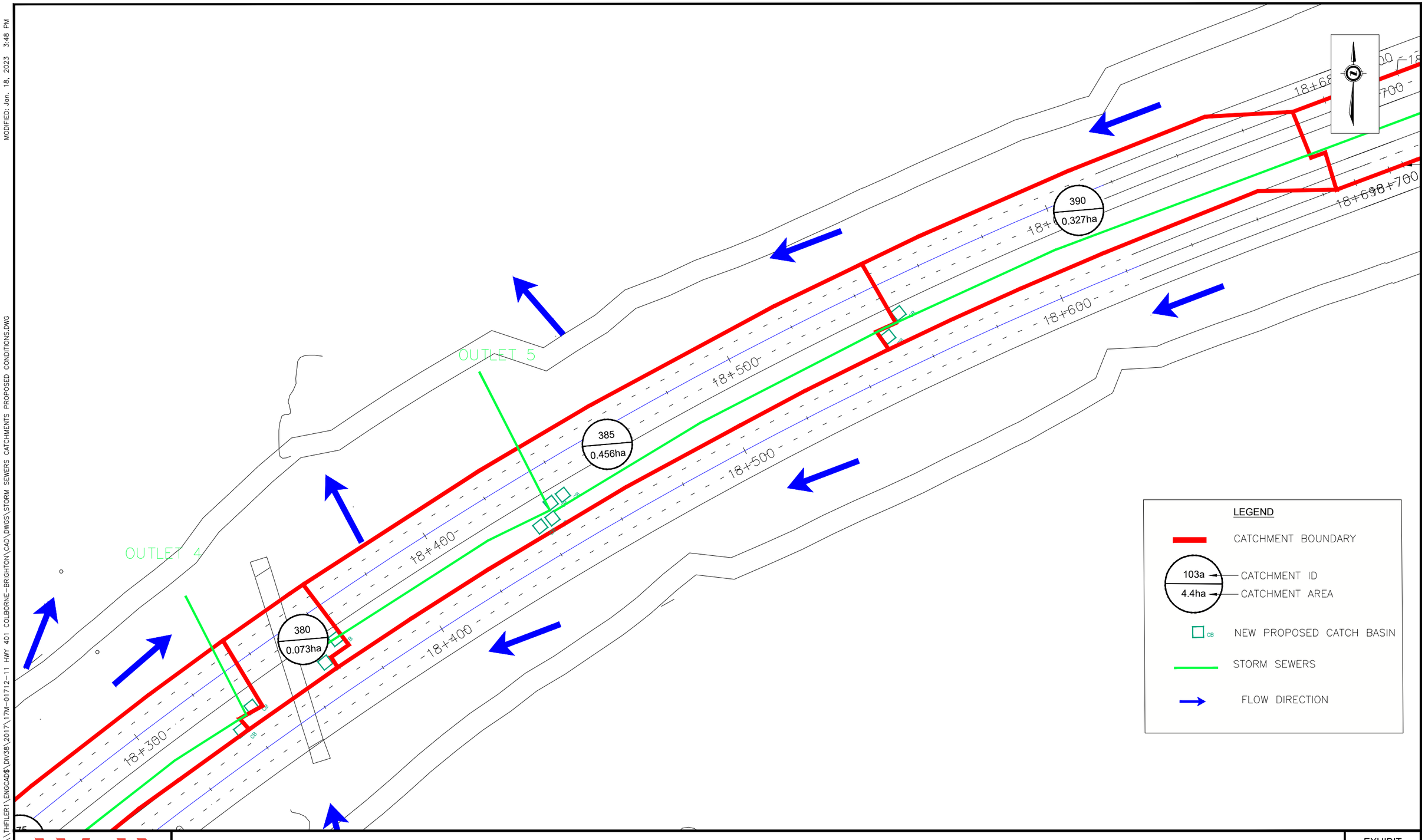
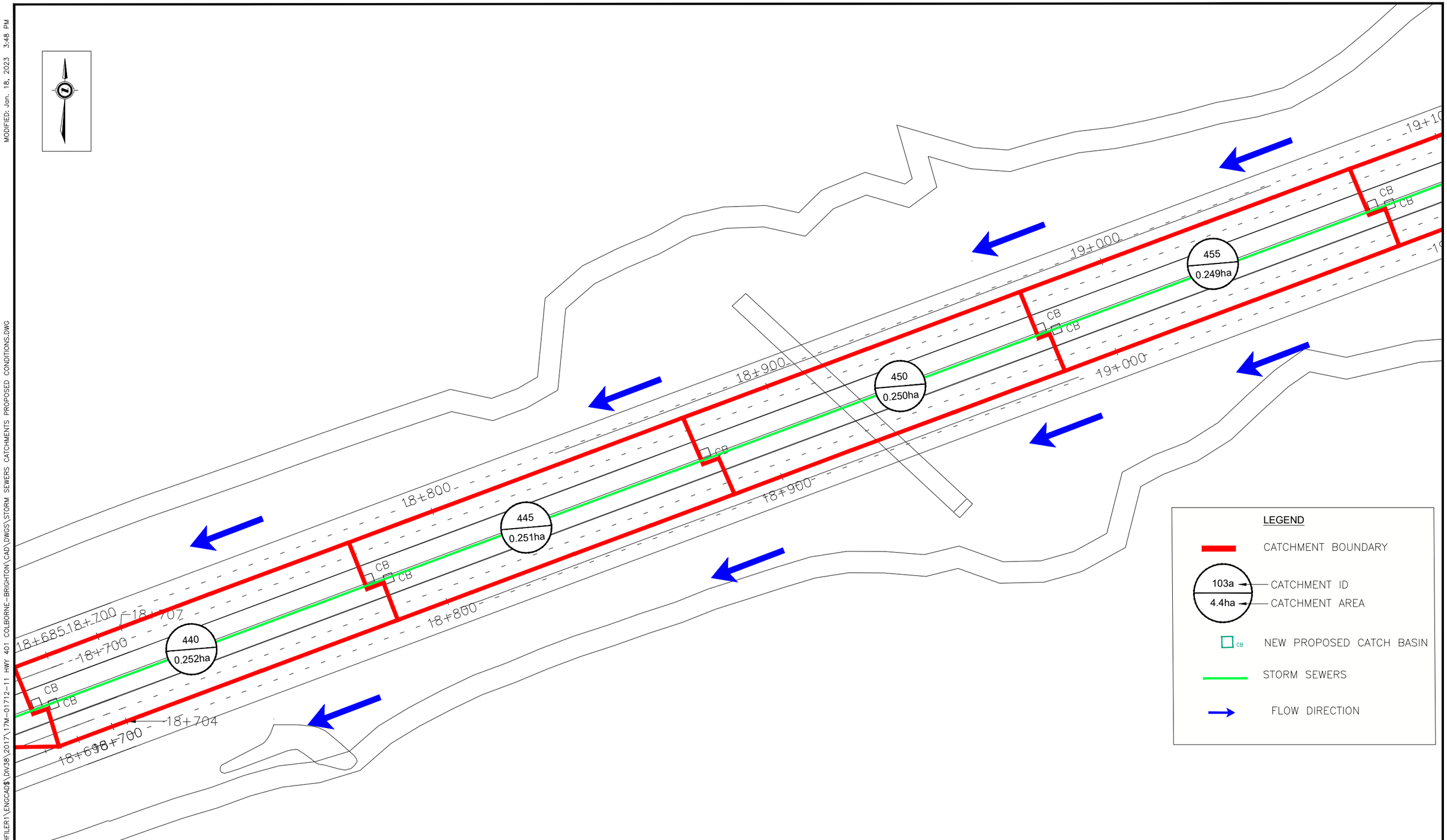


PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-19



PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-20

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MODIFIED: Jan. 18, 2023 3:48 PM

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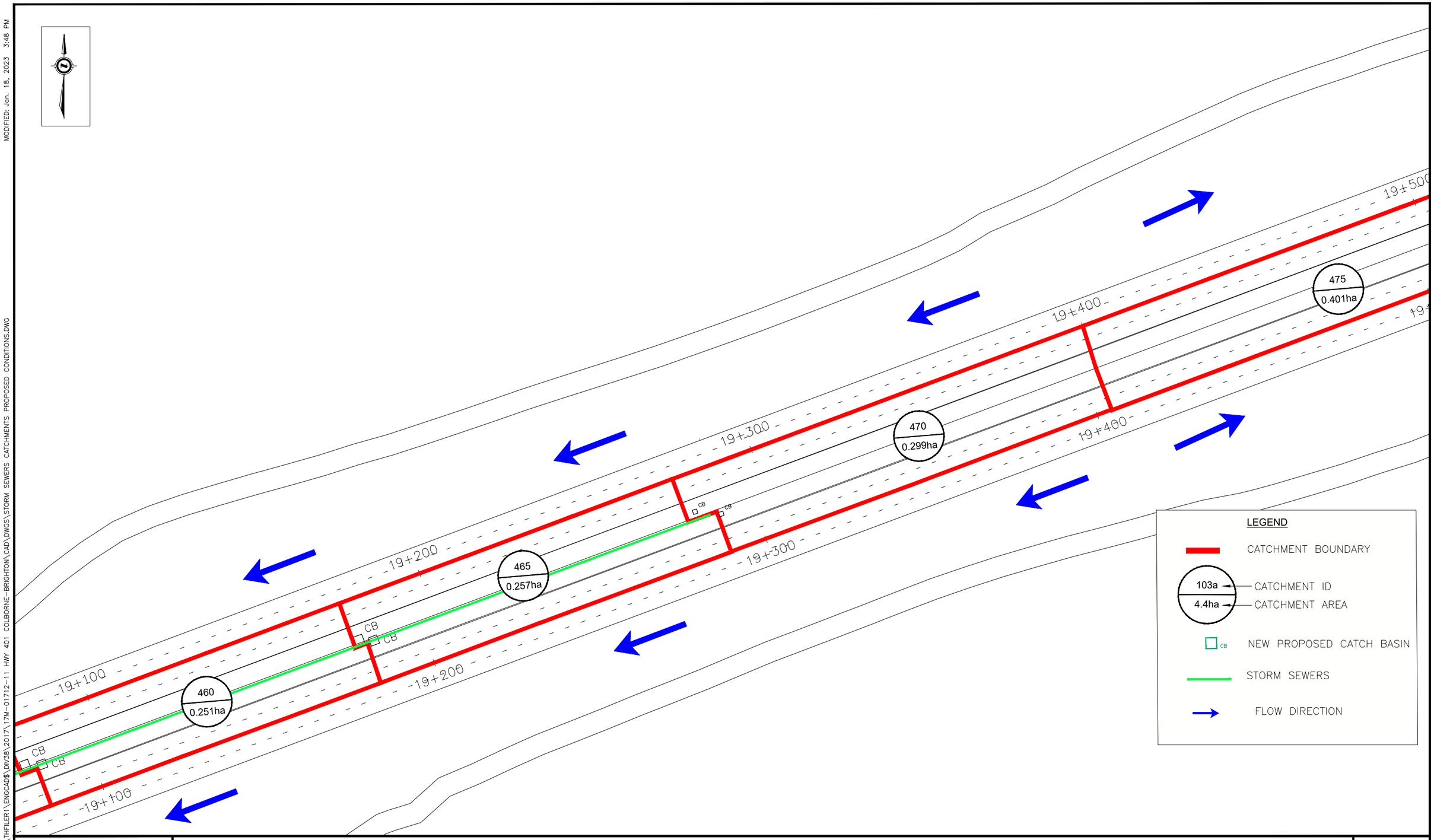

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-21

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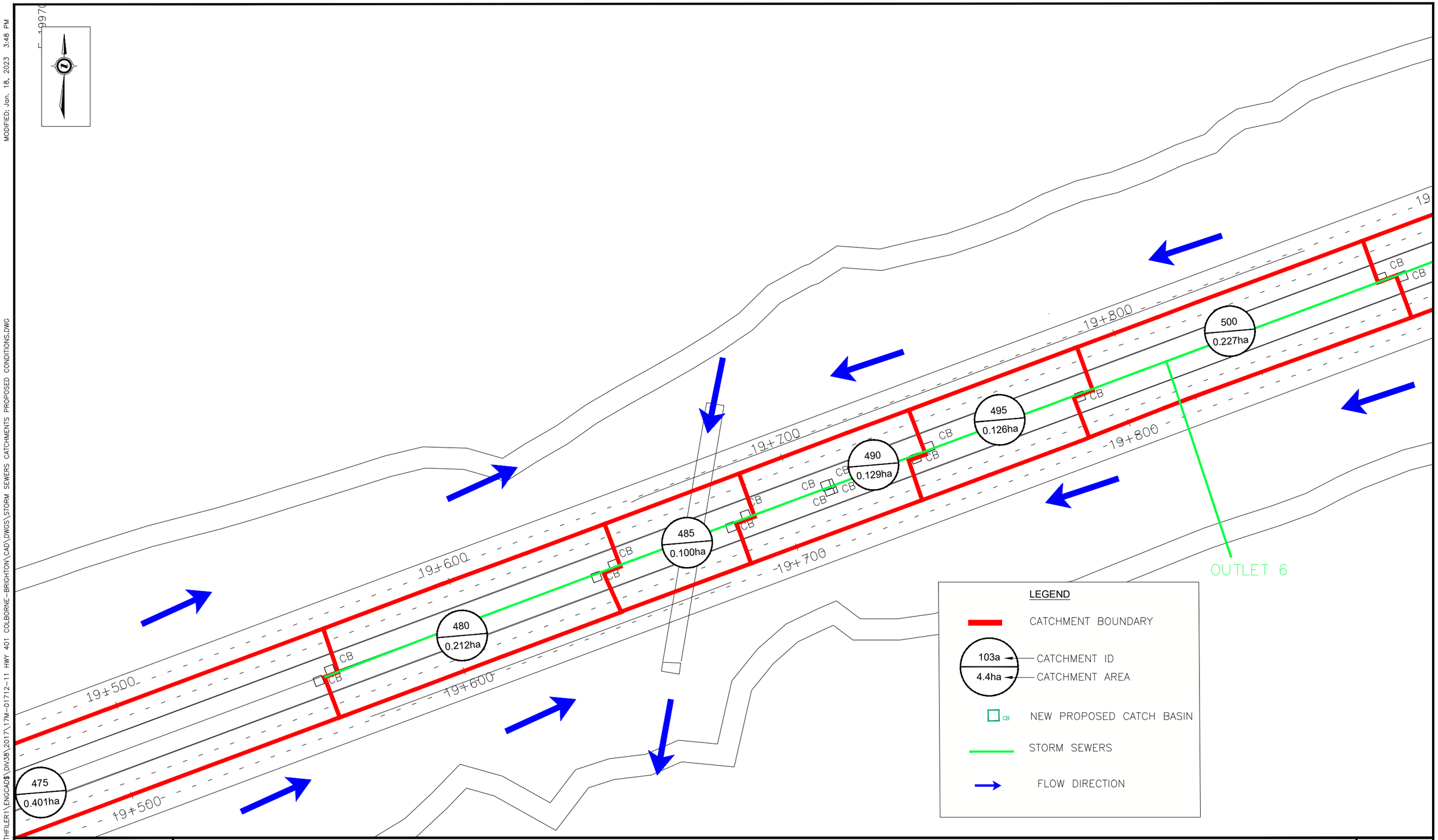


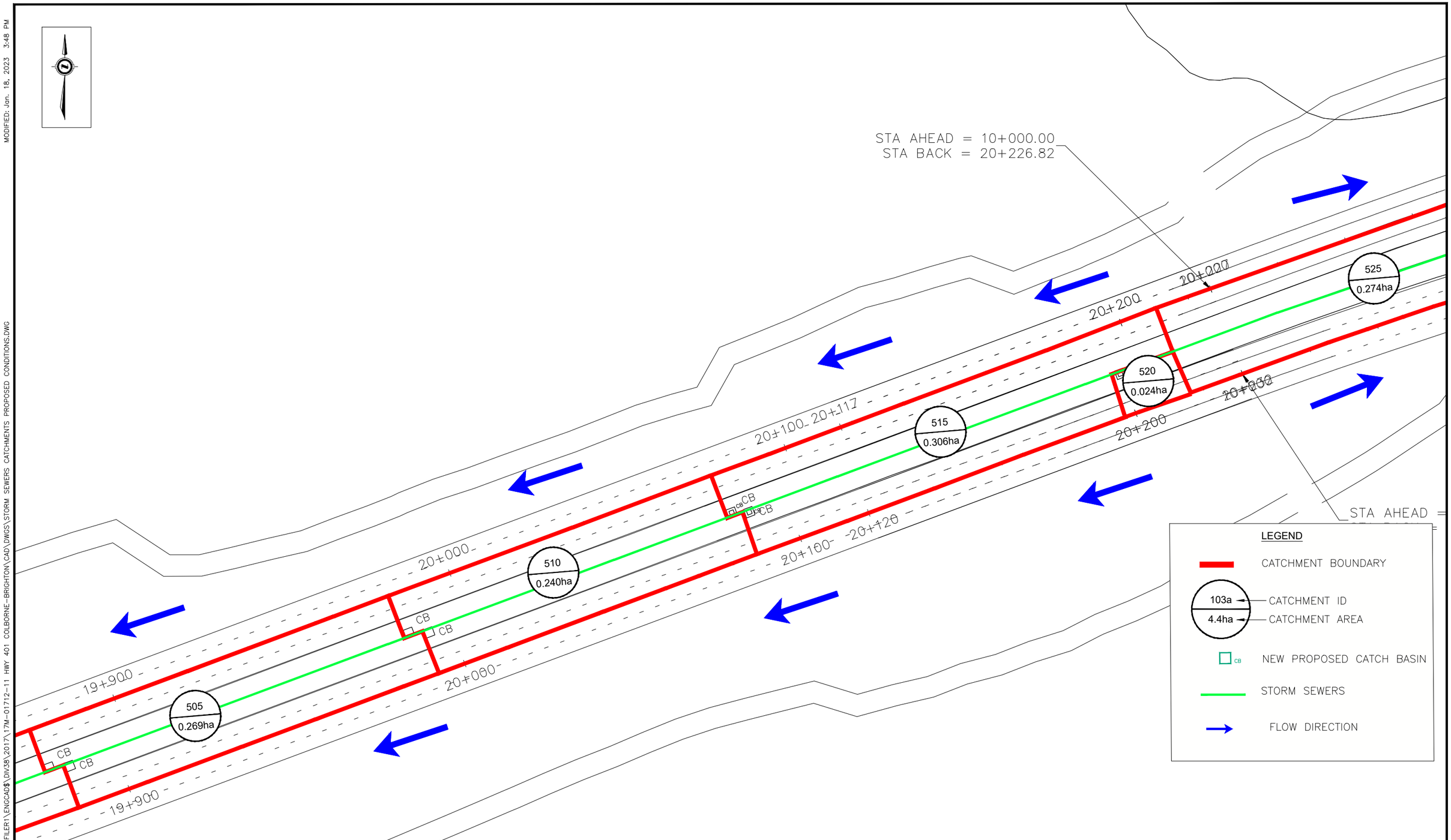
wsp

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-22



PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-23

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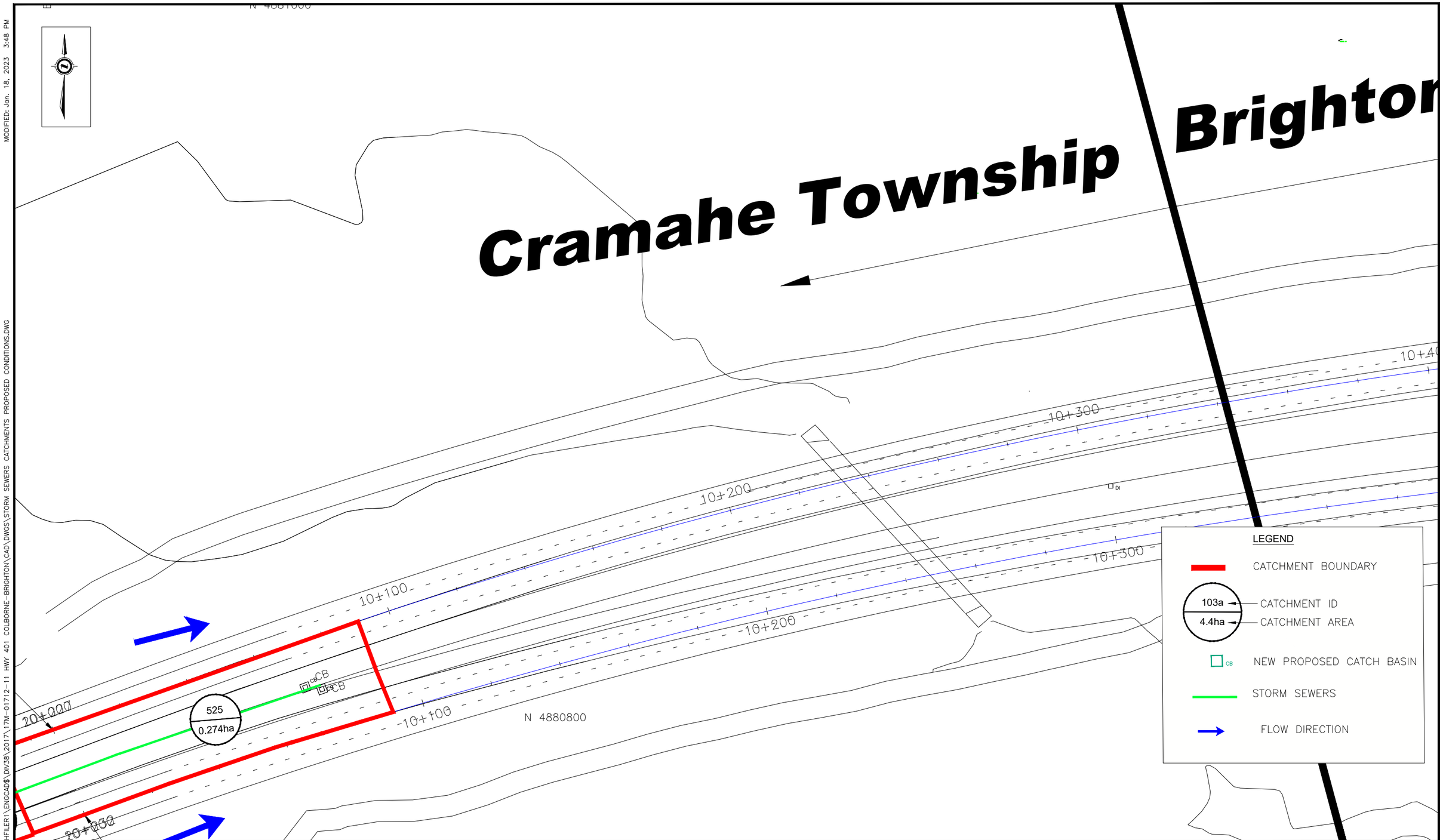

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-24

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MODIFIED: Jan. 18, 2023 3:48 PM

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MODIFIED: Jan. 18, 2023 3:48 PM

STUDY LIMITS

STUDY LIMIT

15+600
15+700
15+800
15+900
15+960

530
0.095ha

535
0.178ha

540
0.205ha

545
0.012ha

550
0.103ha

555
0.108ha

560
0.219ha

CB

OUTLET 7

LEGEND

- CATCHMENT BOUNDARY
- 103a / 4.4ha — CATCHMENT ID / CATCHMENT AREA
- CB — NEW PROPOSED CATCH BASIN
- STORM SEWERS
- FLOW DIRECTION

wsp

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-25

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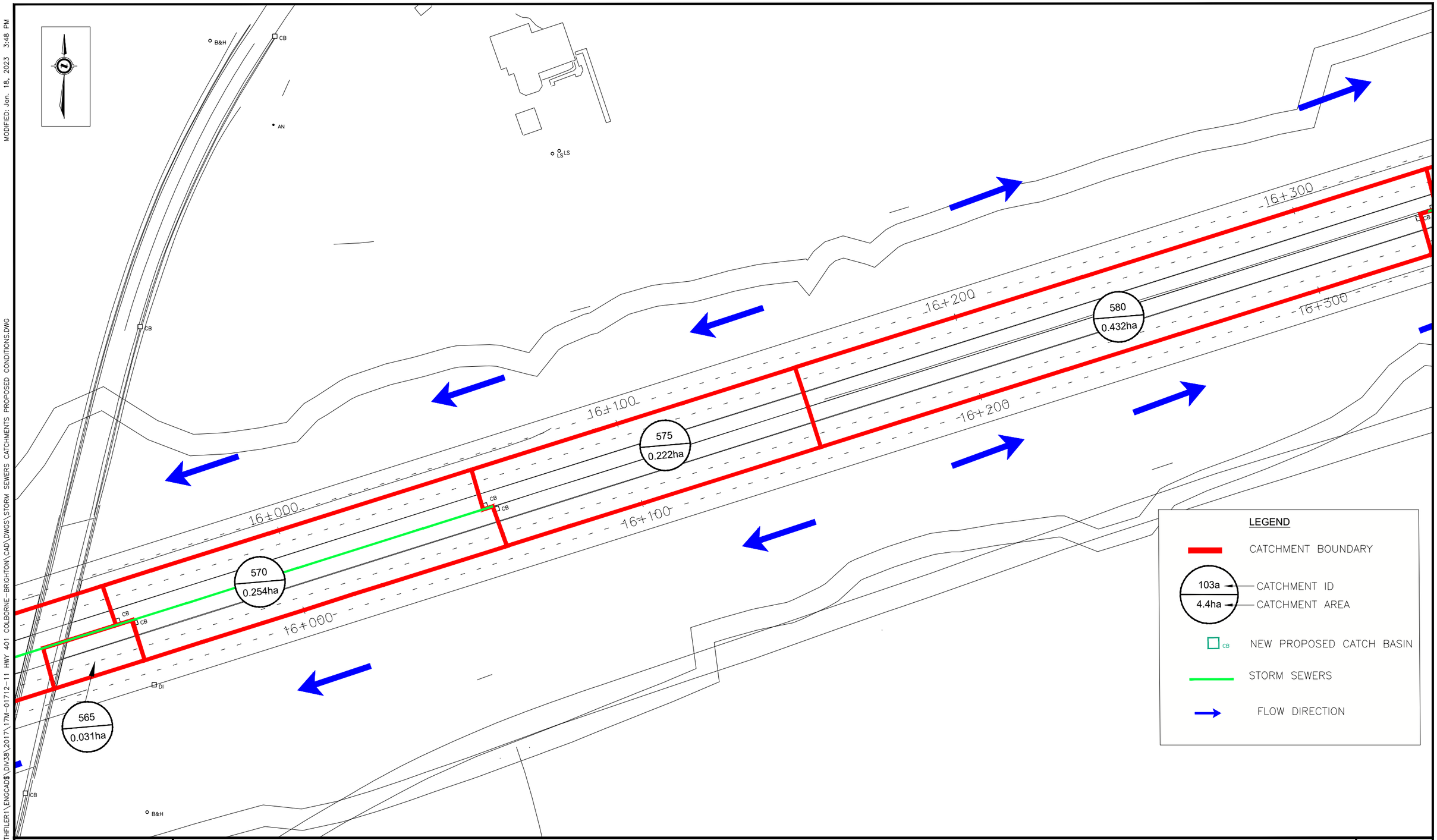

wsp

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-26

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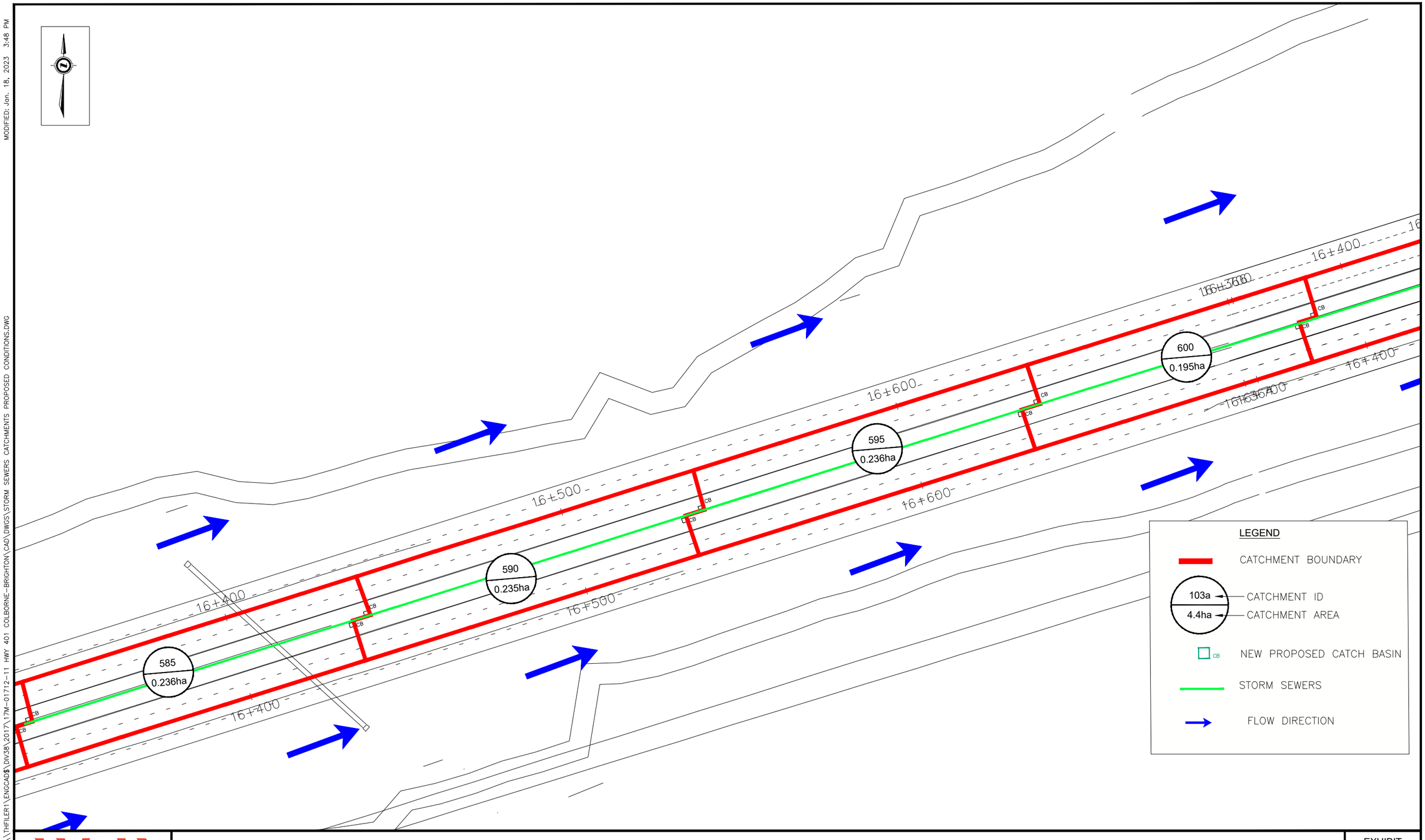

wsp

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-27

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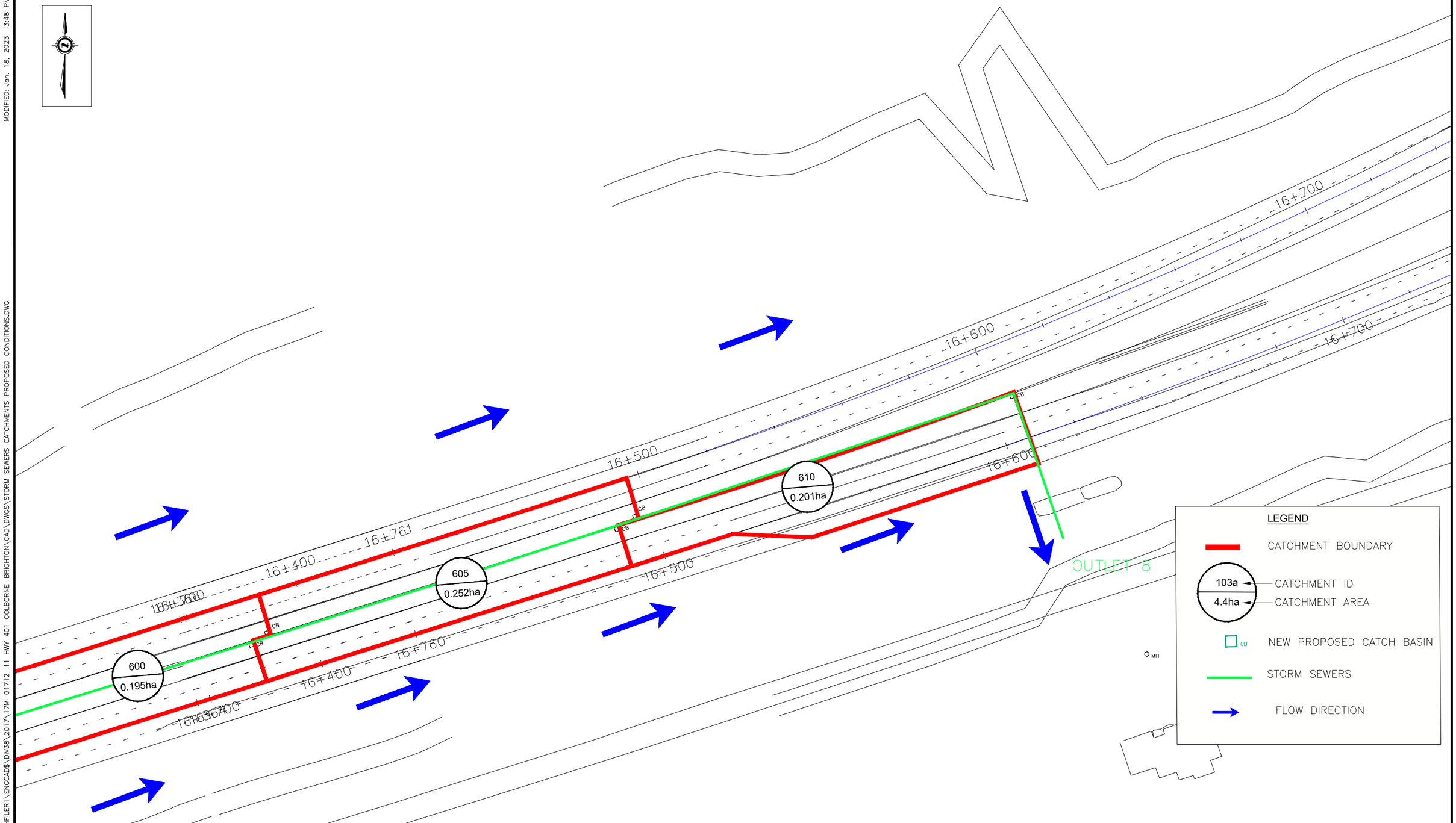

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-28

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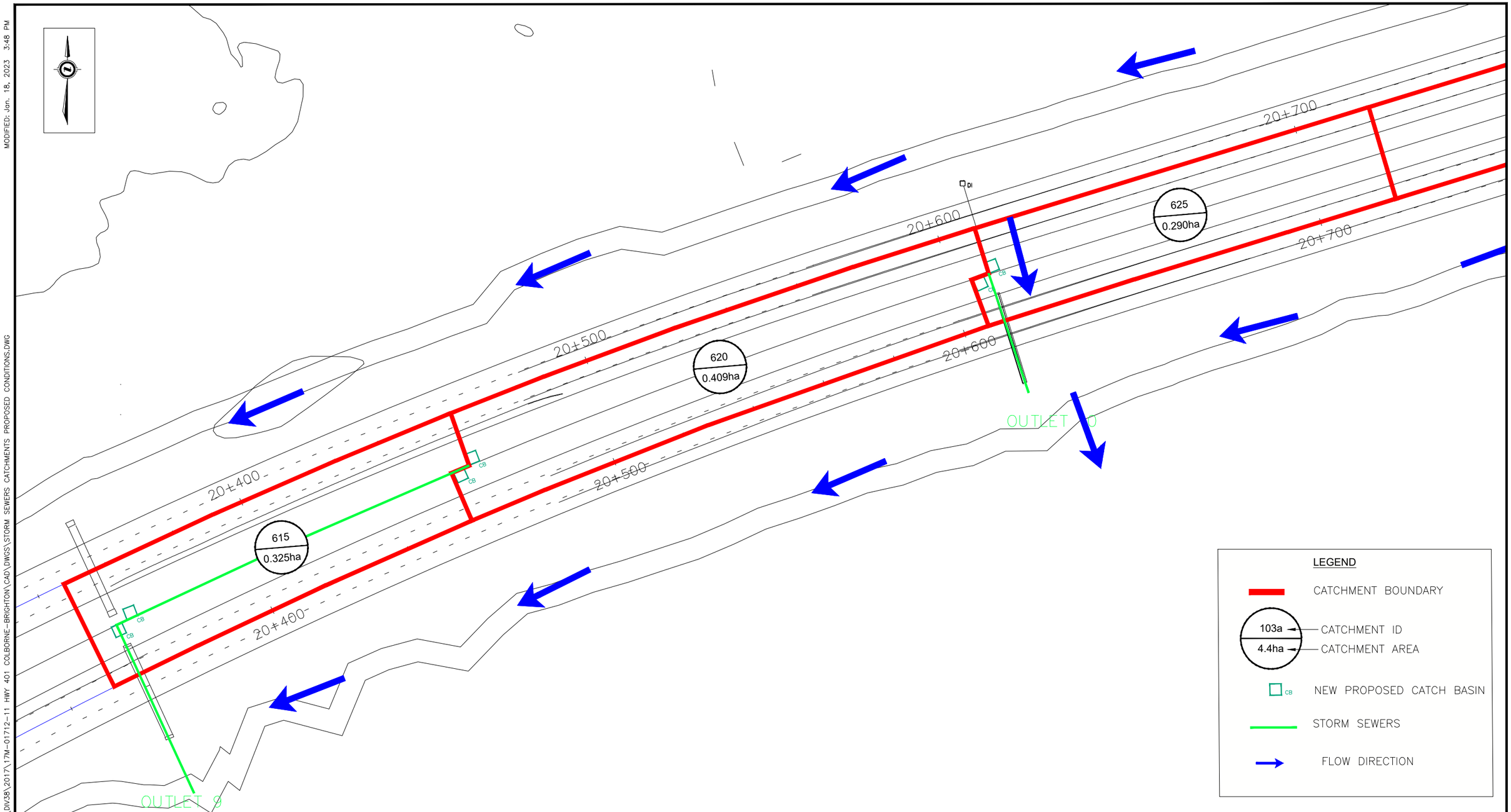


LEGEND

- CATCHMENT BOUNDARY
- 103a / 4.4ha — CATCHMENT ID / CATCHMENT AREA
- CB — NEW PROPOSED CATCH BASIN
- STORM SEWERS
- FLOW DIRECTION

wsp

PROPOSED STORM SEWER CATCHMENTS

HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-29

DRAWING NAME: \\THFILER1\ENGCAD$\DIV38\2017\17M-01712-11 HWY 401 COLBORNE-BRIGHTON\CAD\DWGS\STORM SEWERS CATCHMENTS PROPOSED CONDITIONS.DWG
MODIFIED: Jan. 18, 2023 3:48 PM

STUDY LIMITS

635
0.341ha

630
0.300ha

625
0.290ha

20+700
20+800
20+900
20+971
20+972

OUTLET 11

B&H
W
CB
DI
AN

LEGEND

- CATCHMENT BOUNDARY
- 103a — CATCHMENT ID
- 4.4ha — CATCHMENT AREA
- CB — NEW PROPOSED CATCH BASIN
- STORM SEWERS
- FLOW DIRECTION

wsp

PROPOSED STORM SEWER CATCHMENTS

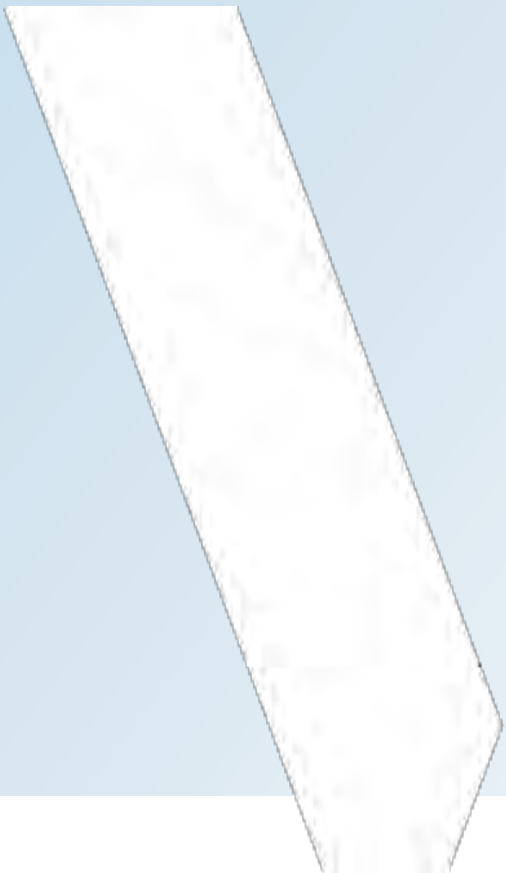
HIGHWAY 401 COLBORNE TO BRIGHTON

EXHIBIT

5-30

APPENDIX

A Field Inspection



APPENDIX

A-1 Culvert Inspection Photographs

Culvert C471 South – Culvert end

Culvert C471 South – Looking East

Culvert C471 South – Looking West

Culvert C471 South – Looking South

Culvert C41 South – Looking inside

Culvert C471 South – Road

Culvert C471 North – Looking North

Culvert C471 North – Looking West

Culvert C471 North – Looking East

Culvert C471 North– Looking inside

Culvert C471 North – High water level

Culvert C471 North – Road

Culvert C472 South – Looking South

Culvert C472 South – Looking East

Culvert C472 South – Looking West

Culvert C472 South – Culvert end

Culvert C472 South – Looking inside

Culvert C472 South – High water level

Culvert C472 South – Stream bank

Culvert C472 South – Road

Culvert C472 North – Culvert end

Culvert C472 North – Looking East

Culvert C472 North – Looking inside

Culvert C472 North – Stream bank

Culvert C472 North – Road

Culvert C473 South – Looking South

Culvert C473 South – Stream bank

Culvert C473 South – Culvert end

Culvert C473 South – Looking West

Culvert C473 South – Looking East

Culvert C473 South – Looking inside

Culvert C473 South – High water level

Culvert C473 South – Exposed Rebar

Culvert C473 South – Road

Culvert C473 North – Looking North

Culvert C473 North – Looking East

Culvert C473 North – Looking West

Culvert C473 North – Stream bank

Culvert C473 North – Looking inside

Culvert C473 North – High water level

Culvert C473 North – East footing

Culvert C473 North – Embankment erosion

Culvert C473 North – Road

Culvert C474 South – Looking South

Culvert C474 South – Looking East

Culvert C474 South – Looking inside

Culvert C474 South – High water level

Culvert C474 South – Looking West

Culvert C474 South – Embankment erosion

Culvert C474 South – Road

Culvert C474 North – Looking North

Culvert C474 North – Looking West

Culvert C474 North – Looking East

Culvert C474 North – Looking inside

Culvert C474 North – High water level

Culvert C474 North – Embankment

Culvert C474 North – Road

APPENDIX

A-2 Culvert Inspection Sheets

Culvert Inspection Form

Location Information

Culvert ID: C471 **WP/GWP**: 4054-17-00

Highway	401
Location	
Chainage:	18+386
TOWNSHIP	Cramahe
Pipe Skew	30 degrees

Physical Characteristics

Material Type:	Concrete box	
Material Thickness	290	(mm)
(H) Depth of Cover:	1 m	
Diameter (or size):	4300x2100	(mm)
Water Course:	Stream ☑ Ditch ☐ Standing ☐ Undefined ☐	
Water Depth (mm):	230	Upstream
	240	Downstream

Roadway Observations

Road Surface Condition: (sags, pavement cracking, clearance)

Observations:

South(u/s) -Small crack on shoulder

North (d/s)-Cracks from median shoulder to abour edge of driving lane

Embankment Conditions: (slope failures, water damage)

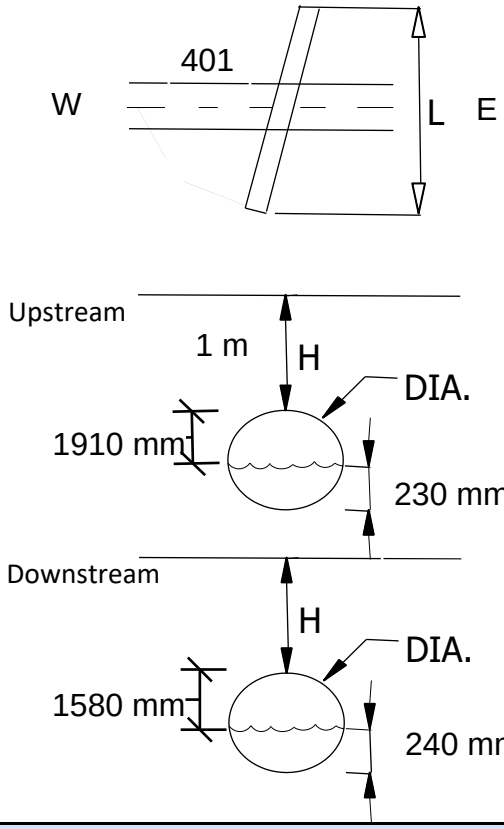
Observations:

South(u/s)-good condition

North(d/s)-bankment erosion

Fill Type: Earth Fill ☑ Rock Fill ☐

Rough Sketch



Culvert Observations

Condition Culvert Overall: (Joint defects, Seam defects, plate buckling, lateral shifting missing bolts, corrosion, excessive abrasion) Good ☑ Fair ☐ Poor ☐

Comments:

South(u/s)-good condition

north (d/s)-erosion at the end of culvert, good condition. Highway water level mark is about 10 cm above the water level.

Beaver Dam drainage isse (A):unstable marshy ground unable to access and couldn't pass wildlife fence

Prepared by: BT & EH Date: May 3, 2022

Culvert Inspection Form

Location Information

Culvert ID: C472 **WP/GWP**: 4054-17-00

Highway	401
Location	
Chainage:	18+914
TOWNSHIP	Cramahe
Pipe Skew	~117 degrees

Physical Characteristics

Material Type:	Concrete box	
Material Thickness	380	(mm)
(H) Depth of Cover:	~10 m	
Diameter (or size):	4300x 2800	(mm)
Water Course:	Stream ☑ Ditch ☐ Standing ☐ Jndefined ☐	
Water Depth (mm):	300	Upstream
	150	Downstream

Roadway Observations

Road Surface Condition: (sags, pavement cracking, clearance)

Observations:

South(u/s)- no visable cracks

North (d/s)- some cracking near middle of road/ far shoulder

Embankment Conditions: (slope failures, water damage)

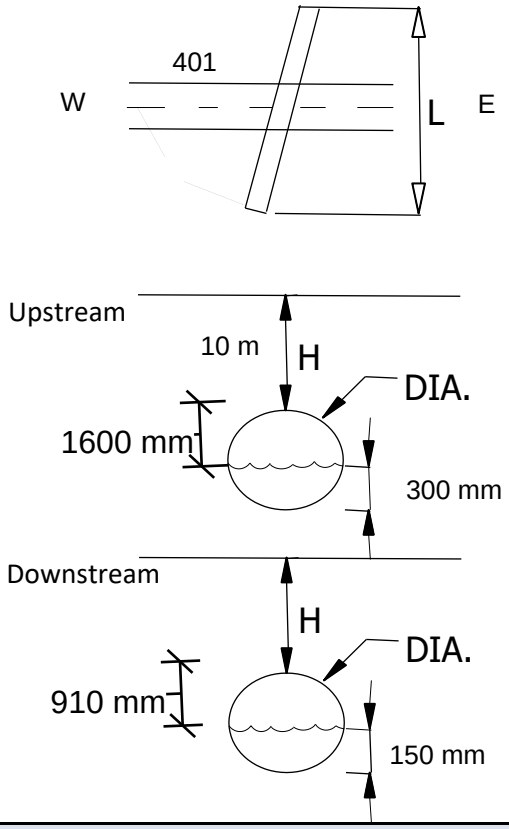
Observations:

South(u/s)- good condition, steep slope

North(d/s)- good condition, steep slope

Fill Type: Earth Fill ☑ Rock Fill ☐

Rough Sketch



Culvert Observations

Condition Culvert Overall: (Joint defects, Seam defects, plate buckling, lateral shifting missing bolts, corrosion, excessive abrasion) Good ☑ Fair ☐ Poor ☐

Comments:

South (u/s)- stream banks has some erosion, culvert in good condition

North(d/s)- quite a bit of erosion neat the end of culvert, water course bank erosion, culvert in good condition

Prepared by: BT & EH Date: May 3, 2022

Culvert Inspection Form

Location Information

Culvert ID: C473 **WP/GWP**: 4054-17-00

Highway	401
Location	
Chainage:	19+710
TOWNSHIP	Cramahe
Pipe Skew	~62 degrees

Physical Characteristics

Material Type:	Concrete box	
Material Thickness	320 mm	(mm)
(H) Depth of Cover:	~6 m	
Diameter (or size):	4300x 2400	(mm)
Water Course:	Stream ☑ Ditch ☐ Standing ☐ Undefined ☐	
Water Depth (mm):	320	Upstream
	230	Downstream

Roadway Observations

Road Surface Condition: (sags, pavement cracking, clearance)

Observations:

South (d/s)- no visable cracks

North(u/s) - no visable cracks

Embankment Conditions: (slope failures, water damage)

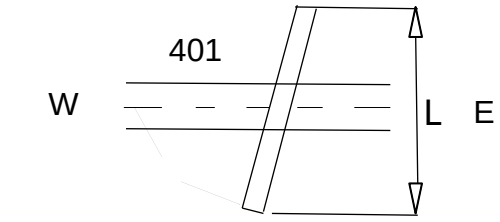
Observations:

South(d/s)- good embankment

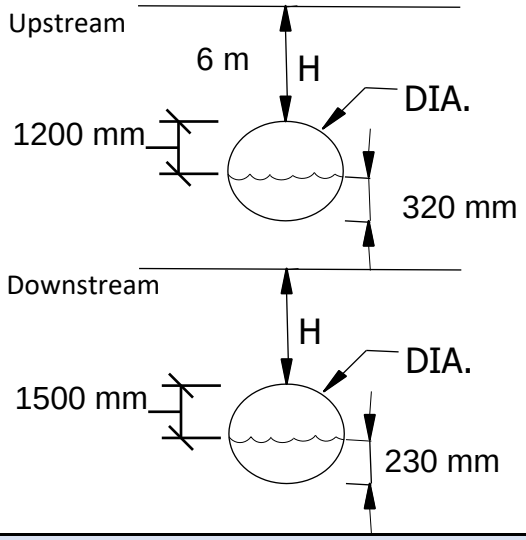
North(u/s)- some erosion

Fill Type: Earth Fill ☑ Rock Fill ☐

Rough Sketch



2100 high opening, 2400 to top



Culvert Observations

Condition Culvert Overall: (Joint defects, Seam defects, plate buckling, lateral shifting missing bolts, corrosion, excessive abrasion) Good ☐ Fair ☑ Poor ☐

Comments:

South(d/s)- exposed rebar on end, as well as some cracking at the ends

North(u/s) - good conditions, minor watercourse bank erosion, fallen tree in stream

Prepared by: BT & EH Date: May 3, 2022

Culvert Inspection Form

Location Information

Culvert ID: C474 **WP/GWP**: 4054-17-00

Highway	401
Location	
Chainage:	10+215
TOWNSHIP	Brighton
Pipe Skew	~118 degrees

Physical Characteristics

Material Type:	Concrete box
Material Thickness	270 (mm)
(H) Depth of Cover:	1.5 m
Diameter (or size):	4300x2300 (mm)
Water Course:	Stream ☑ Ditch ☐ Standing ☐ Undefined ☐
Water Depth (mm):	550 (off to the side) Upstream
	910 (more reflective) Downstream

Roadway Observations

Road Surface Condition: (sags, pavement cracking, clearance)

Observations:

South(u/s)- some visable cracks

North(d/s)- has a viable crack

Embankment Conditions: (slope failures, water damage)

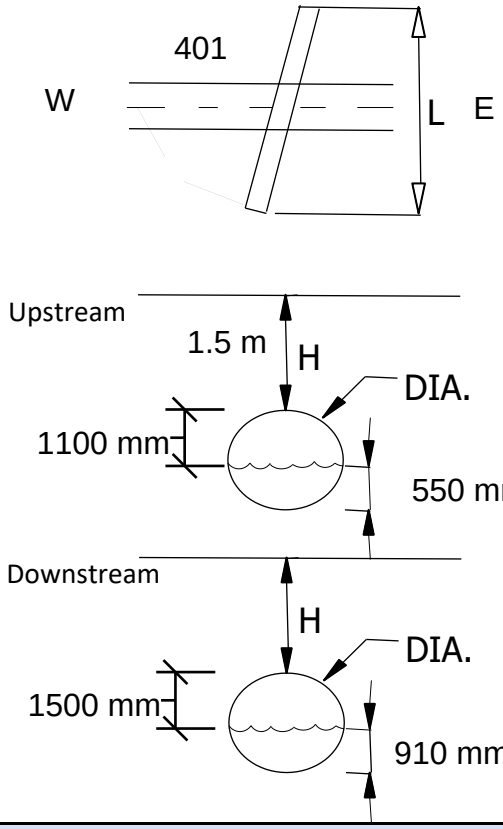
Observations:

South(u/s)- some erosion is present

North(d/s)- some erosion is present

Fill Type: Earth Fill ☑ Rock Fill ☑

Rough Sketch



Culvert Observations

Condition Culvert Overall: (Joint defects, Seam defects, plate buckling, lateral shifting missing bolts, corrosion, excessive abrasion) Good ☑ Fair ☐ Poor ☐

Comments:

South (u/s) - good condition

North (d/s)- good condition

Prepared by: BT & EH Date: May 3, 2022

APPENDIX

A-3 Drainage Issues Field Notes

terrafix®

Project No: _____ Project Title: 401 Colborne to Brighton

Description: _____ Date: May 3, 2022

East bound → drainage issue B → standing water within ROW
→ east of 473 to east 474
- some standing water → ditch drainage poor
- 1036 pic → erosion and standing water
- 1037 pic → silt fence down
- 1038 pic → ditch inlet or catchbasin ✓
- some areas are marshy
- about 90% of ditch is standing water

terrafix®

Project No: 4491 Project Title: 401 Colborne to Brighton

Description: Date: May 4, 2022

westbound

Buried culvert near GPS coords 44.082491 N 77.728133W (I)

topic 3406, 3405, 3404 → checked for missing / buried culvert @ GPS coordinates, could not find any erosion or buried culvert. used metal detector

Catch Basin Issues (C) → & (D) → erosion covers them

- photos 3407 - 3415 → catch basin (C) → some for (D)
- photos 3416 - 3420 → catch basin (C)
- photos 3421 - 3423 → erodible soil (D)

Drainage issue (F)

- photo 3424 → 3426 road grading → some erosion at side
- photos 3430 → 3437 ramp, shows some erosion
- kind of looks like there is a berm @ side near guardrail
- photos 3438 → 3441 → ditch @ MM 509.0

B - N Side → westbound

- photos → 3442 → 3446 → doesn't look like there is too much drainage issues some ponding near fence line.

Eastbound on next page →

terrafix®

Project No: _____ Project Title: 401 Colborne to Brighton

Description: _____ Date: May 4, 2022

Eastbound

Eastbound ramp (E)

- photos → 3447 → 3450 → erosion

Eastbound CB (C) & (D)

- photos → 3452 → 3459 → found with metal detector
  → couldn't clear out
  → still water

Issue (G)

→ Washout concerns is warranted → there was an existing ditch but now there isn't
→ photos 3460 - 3464

(A) Issue

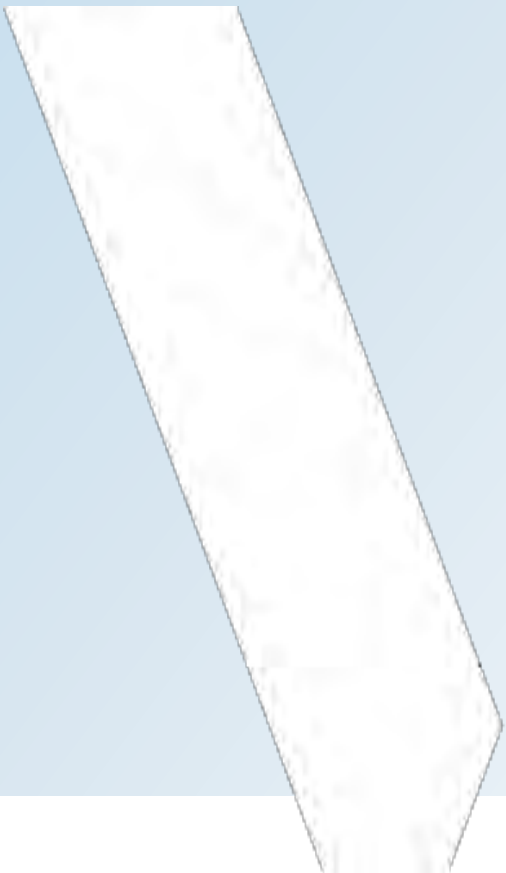
- MM 515.5 → photos phragmites → standing water
  → photos 3465 → 3470

- MM 517.5 → phragmites → standing water
  → photos → 3471 - 3478

APPENDIX

B

Existing Hydrologic Analysis



Highway 401 Colborne to Brighton
WSP Ref.: 17M-01712-11

Summary of Existing Conditions Hydrologic Modelling Parameters

HIGHWAY 401 Colborne to Brighton

Sub-Catchment ID	IUH Class	Drainage Area (ha)	Imperviousness (%)					SCS Curve Number	Initial Abstraction (mm)		Manning's 'n'		Time to Peak (hours)	Number of Linear Reservoirs	Flow Length (m)		Slope (%)	
			Direct	+	Indirect	=	Total		Pervious	Impervious	Pervious	Impervious			Pervious	Impervious	Pervious	Impervious
100	Standard	0.91	61	+	0	=	61.0	67	5.0	2.0	0.36	0.013	n/a	n/a	40	77.68	2.0	1.0
101	Nash	7.90	10	+	0	=	10.0	62	16.8	n/a	n/a	n/a	0.46	3.0	n/a	n/a	n/a	n/a
110	Standard	1.01	30	+	0	=	30.0	55	5.0	2.0	0.35	0.013	n/a	n/a	40	81.96	2.0	1.0
111	Nash	5.33	7	+	0	=	7.0	54	22.8	n/a	n/a	n/a	0.38	3.0	n/a	n/a	n/a	n/a
120	Standard	0.82	32	+	0	=	32.0	55	5.0	2.0	0.35	0.013	n/a	n/a	40	73.80	2.0	1.0
121	Nash	2.33	7	+	0	=	7.0	54	22.8	n/a	n/a	n/a	0.67	3.0	n/a	n/a	n/a	n/a
130	Standard	1.57	34	+	0	=	34.0	55	5.0	2.0	0.35	0.013	n/a	n/a	40	102.35	2.0	1.0
131	Nash	10.63	7	+	0	=	7.0	54	22.8	n/a	n/a	n/a	0.69	3.0	n/a	n/a	n/a	n/a
140	Standard	0.76	26	+	0	=	26.0	55	5.0	2.0	0.35	0.013	n/a	n/a	40	71.35	2.0	1.0
141	Nash	7.22	7	+	0	=	7.0	65	14.6	n/a	n/a	n/a	0.54	3.0	n/a	n/a	n/a	n/a
150	Standard	1.35	26	+	0	=	26.0	55	5.0	2.0	0.35	0.013	n/a	n/a	40	94.72	2.0	1.0
151	Nash	14.07	10	+	0	=	10.0	66	14.2	n/a	n/a	n/a	0.18	3.0	n/a	n/a	n/a	n/a
160	Standard	3.05	28	+	0	=	28.0	55	5.0	2.0	0.35	0.013	n/a	n/a	40	142.49	2.0	1.0
161	Nash	131.28	5	+	0	=	5.0	75	8.6	n/a	n/a	n/a	0.95	3.0	n/a	n/a	n/a	n/a
170	Standard	3.33	29	+	0	=	29.0	55	5.0	2.0	0.35	0.013	n/a	n/a	40	149.09	2.0	1.0
171	Nash	32.39	10	+	0	=	9.0	59	19.1	n/a	n/a	n/a	0.89	3.0	n/a	n/a	n/a	n/a
180	Nash	2.46	8	+	0	=	8.0	55	22.6	n/a	n/a	n/a	0.96	3.0	n/a	n/a	n/a	n/a
181	Standard	1.21	28	+	0	=	28.0	55	5.0	2.0	0.35	0.013	n/a	n/a	40	89.96	2.0	1.0
190	Standard	2.29	46	+	0	=	46.0	57	5.0	2.0	0.35	0.013	n/a	n/a	40	123.53	2.0	1.0
191	Nash	147.11	11	+	1	=	11.6	67	13.4	n/a	n/a	n/a	1.83	3.0	n/a	n/a	n/a	n/a
200	Standard	5.18	33	+	0	=	33.0	72	5.0	2.0	0.35	0.013	n/a	n/a	40	185.76	2.0	1.0
201	Nash	30.53	3	+	4	=	7.2	71	10.7	n/a	n/a	n/a	0.78	3.0	n/a	n/a	n/a	n/a
210	Standard	0.57	30	+	0	=	30.0	69	5.0	2.0	0.35	0.013	n/a	n/a	40	61.73	2.0	1.0
211	Nash	2.02	4	+	5	=	9.4	72	10.5	n/a	n/a	n/a	0.16	3.0	n/a	n/a	n/a	n/a
220	Standard	0.88	100	+	0	=	100	98	5.0	2.0	0.00	0.013	n/a	n/a	40	76.42	2.0	1.0
221	Nash	14.91	6	+	0	=	6	59	18.9	n/a	n/a	n/a	0.41	3.0	n/a	n/a	n/a	n/a
230	Standard	3.07	42	+	0	=	42	62	5.0	2.0	0.35	0.013	n/a	n/a	40	143.00	2.0	1.0
231	Nash	33.58	3	+	0	=	3	58	18.6	n/a	n/a	n/a	0.31	3.0	n/a	n/a	n/a	n/a
240	Standard	0.88	37	+	0	=	37	55	5.0	2.0	0.35	0.013	n/a	n/a	40	76.58	2.0	1.0
241	Nash	11.24	10	+	0	=	10	56	22.2	n/a	n/a	n/a	0.41	3.0	n/a	n/a	n/a	n/a
250	Standard	0.93	26	+	0	=	26	64	5.0	2.0	0.35	0.013	n/a	n/a	40	78.76	2.0	1.0
251	Nash	16.61	3	+	0	=	3	51	24.7	n/a	n/a	n/a	0.51	3.0	n/a	n/a	n/a	n/a
260	Standard	3.40	27	+	0	=	27	76	5.0	2.0	0.35	0.013	n/a	n/a	40	150.51	2.0	1.0
261	Nash	35.85	4	+	0	=	4	59	18.5	n/a	n/a	n/a	1.24	3.0	n/a	n/a	n/a	n/a
270	Standard	3.95	31	+	0	=	31	57	5.0	2.0	0.35	0.013	n/a	n/a	40	162.31	2.0	1.0
271	Nash	26.76	10	+	0	=	10	59	18.9	n/a	n/a	n/a	0.23	3.0	n/a	n/a	n/a	n/a
280	Standard	0.90	51	+	0	=	51	72	5.0	2.0	0.35	0.013	n/a	n/a	40	77.64	2.0	1.0
281	Nash	6.71	7	+	0	=	7	67	12.9	n/a	n/a	n/a	0.43	3.0	n/a	n/a	n/a	n/a

Summary of Existing Conditions Hydrologic Modelling Parameters

HIGHWAY 401 Colborne to Brighton

Sub-Catchment ID	IUH Class	Drainage Area (ha)	Imperviousness (%)					SCS Curve Number	Initial Abstraction (mm)		Manning's 'n'		Time to Peak (hours)	Number of Linear Reservoirs	Flow Length (m)		Slope (%)	
			Direct	+	Indirect	=	Total		Pervious	Impervious	Pervious	Impervious			Pervious	Impervious	Pervious	Impervious
192	Nash	276.67	27	+	2	=	29.4	67	9.4	n/a	n/a	n/a	4.85	3.0	n/a	n/a	n/a	n/a
193	Nash	48.63	15	+	1	=	16.0	64	16.4	n/a	n/a	n/a	1.31	3.0	n/a	n/a	n/a	n/a
194	Nash	160.45	3	+	0	=	3.4	74	9.1	n/a	n/a	n/a	1.95	3.0	n/a	n/a	n/a	n/a
195	Nash	496.69	2	+	0	=	2.2	74	9.2	n/a	n/a	n/a	4.78	3.0	n/a	n/a	n/a	n/a
196	Nash	65.48	2	+	1	=	3.4	73	9.6	n/a	n/a	n/a	0.56	3.0	n/a	n/a	n/a	n/a

```
================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2006)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


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USER:



COMMENTS: ____________________________________________________________


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  ************************************************


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|                  |              ata\Local\Temp\
|                  |              4057dc77-ff29-4e2b-baf3-03ff24407828\5b85e6a2
| Ptotal= 54.00 mm |    Comments: 12SCS002
--------------------
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.17    0.00 |  3.33    2.16 |  6.50   11.77 |  9.67    1.62
                 0.33    1.62 |  3.50    2.16 |  6.67   11.77 |  9.83    1.30
                 0.50    1.62 |  3.67    2.16 |  6.83    5.18 | 10.00    1.30
                 0.67    1.62 |  3.83    2.16 |  7.00    5.18 | 10.17    1.30
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                 1.00    0.76 |  4.17    2.16 |  7.33    3.46 | 10.50    1.84
                 1.17    0.76 |  4.33    2.92 |  7.50    3.46 | 10.67    1.84
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                 1.50    1.40 |  4.67    2.92 |  7.83    3.02 | 11.00    1.19
                 1.67    1.40 |  4.83    3.67 |  8.00    3.02 | 11.17    1.19
                 1.83    1.40 |  5.00    3.67 |  8.17    3.02 | 11.33    1.08
                 2.00    1.40 |  5.17    3.67 |  8.33    2.38 | 11.50    1.08
                 2.17    1.40 |  5.33    5.83 |  8.50    2.38 | 11.67    1.08
                 2.33    1.84 |  5.50    5.83 |  8.67    2.38 | 11.83    1.08
                 2.50    1.84 |  5.67    5.83 |  8.83    2.48 | 12.00    1.08
                 2.67    1.84 |  5.83   46.22 |  9.00    2.48 | 12.17    1.08
                 2.83    1.62 |  6.00   46.22 |  9.17    2.48 |
                 3.00    1.62 |  6.17   46.22 |  9.33    1.62 |
                 3.17    1.62 |  6.33   11.77 |  9.50    1.62 |

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


--------------------
| CALIB            |
| NASHYD   (  0101)|   Area    (ha)=   7.90   Curve Number   (CN)= 62.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  16.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.46

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


                              ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    0.00 | 3.167    1.62 | 6.250   11.77 |  9.33    1.62
                0.167    0.00 | 3.250    2.16 | 6.333   11.77 |  9.42    1.62
                0.250    1.62 | 3.333    2.16 | 6.417   11.77 |  9.50    1.62
                0.333    1.62 | 3.417    2.16 | 6.500   11.77 |  9.58    1.62
                0.417    1.62 | 3.500    2.16 | 6.583   11.77 |  9.67    1.62
                0.500    1.62 | 3.583    2.16 | 6.667   11.77 |  9.75    1.30
                0.583    1.62 | 3.667    2.16 | 6.750    5.18 |  9.83    1.30
                0.667    1.62 | 3.750    2.16 | 6.833    5.18 |  9.92    1.30
                0.750    0.76 | 3.833    2.16 | 6.917    5.18 | 10.00    1.30
                0.833    0.76 | 3.917    2.16 | 7.000    5.18 | 10.08    1.30
                0.917    0.76 | 4.000    2.16 | 7.083    5.18 | 10.17    1.30
```

1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.656

PEAK FLOW (cms)= 0.069 (i)
TIME TO PEAK (hrs)= 6.750
RUNOFF VOLUME (mm)= 7.174
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.133

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

CALIB
STANDHYD (0100) | Area (ha)= 0.91
ID= 1 DT= 5.0 min | Total Imp(%)= 61.00 Dir. Conn.(%)= 61.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.56	0.35
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.68	40.00
Mannings n	=	0.013	0.360

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	13.20	
over (min)	5.00	25.00	
Storage Coeff. (min)=	2.99 (ii)	22.74 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.28	0.05	
			TOTALS

```
     PEAK FLOW       (cms)=       0.07         0.01          0.077 (iii)
     TIME TO PEAK    (hrs)=       6.17         6.42           6.17
     RUNOFF VOLUME    (mm)=      53.00        13.79          37.69
     TOTAL RAINFALL   (mm)=      54.00        54.00          54.00
     RUNOFF COEFFICIENT   =       0.98         0.26           0.70

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  67.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0100):     0.91   0.077     6.17    37.69
     + ID2= 2 (  0101):     7.90   0.069     6.75     7.17
       ================================================
       ID = 3 (  0003):     8.81   0.103     6.17    10.33

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0111)|   Area    (ha)=   5.33   Curve Number   (CN)= 54.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  22.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.38

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

                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    0.00 | 3.167    1.62 | 6.250   11.77 |  9.33    1.62
 0.167    0.00 | 3.250    2.16 | 6.333   11.77 |  9.42    1.62
 0.250    1.62 | 3.333    2.16 | 6.417   11.77 |  9.50    1.62
 0.333    1.62 | 3.417    2.16 | 6.500   11.77 |  9.58    1.62
 0.417    1.62 | 3.500    2.16 | 6.583   11.77 |  9.67    1.62
 0.500    1.62 | 3.583    2.16 | 6.667   11.77 |  9.75    1.30
 0.583    1.62 | 3.667    2.16 | 6.750    5.18 |  9.83    1.30
 0.667    1.62 | 3.750    2.16 | 6.833    5.18 |  9.92    1.30
 0.750    0.76 | 3.833    2.16 | 6.917    5.18 | 10.00    1.30
 0.833    0.76 | 3.917    2.16 | 7.000    5.18 | 10.08    1.30
 0.917    0.76 | 4.000    2.16 | 7.083    5.18 | 10.17    1.30
 1.000    0.76 | 4.083    2.16 | 7.167    5.18 | 10.25    1.84
 1.083    0.76 | 4.167    2.16 | 7.250    3.46 | 10.33    1.84
 1.167    0.76 | 4.250    2.92 | 7.333    3.46 | 10.42    1.84
 1.250    1.40 | 4.333    2.92 | 7.417    3.46 | 10.50    1.84
 1.333    1.40 | 4.417    2.92 | 7.500    3.46 | 10.58    1.84
 1.417    1.40 | 4.500    2.92 | 7.583    3.46 | 10.67    1.84
 1.500    1.40 | 4.583    2.92 | 7.667    3.46 | 10.75    1.19
 1.583    1.40 | 4.667    2.92 | 7.750    3.02 | 10.83    1.19
 1.667    1.40 | 4.750    3.67 | 7.833    3.02 | 10.92    1.19
 1.750    1.40 | 4.833    3.67 | 7.917    3.02 | 11.00    1.19
 1.833    1.40 | 4.917    3.67 | 8.000    3.02 | 11.08    1.19
 1.917    1.40 | 5.000    3.67 | 8.083    3.02 | 11.17    1.19
 2.000    1.40 | 5.083    3.67 | 8.167    3.02 | 11.25    1.08
 2.083    1.40 | 5.167    3.67 | 8.250    2.38 | 11.33    1.08
 2.167    1.40 | 5.250    5.83 | 8.333    2.38 | 11.42    1.08
 2.250    1.84 | 5.333    5.83 | 8.417    2.38 | 11.50    1.08
 2.333    1.84 | 5.417    5.83 | 8.500    2.38 | 11.58    1.08
 2.417    1.84 | 5.500    5.83 | 8.583    2.38 | 11.67    1.08
 2.500    1.84 | 5.583    5.83 | 8.667    2.38 | 11.75    1.08
 2.583    1.84 | 5.667    5.83 | 8.750    2.48 | 11.83    1.08
 2.667    1.84 | 5.750   46.22 | 8.833    2.48 | 11.92    1.08
 2.750    1.62 | 5.833   46.22 | 8.917    2.48 | 12.00    1.08
 2.833    1.62 | 5.917   46.22 | 9.000    2.48 | 12.08    1.08
 2.917    1.62 | 6.000   46.22 | 9.083    2.48 | 12.17    1.08
 3.000    1.62 | 6.083   46.22 | 9.167    2.48 |
 3.083    1.62 | 6.167   46.22 | 9.250    1.62 |

     Unit Hyd Qpeak  (cms)=   0.536

     PEAK FLOW       (cms)=   0.024 (i)
     TIME TO PEAK    (hrs)=   6.750
     RUNOFF VOLUME    (mm)=   3.931
     TOTAL RAINFALL   (mm)=  54.000
     RUNOFF COEFFICIENT   =   0.073

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

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| CALIB            |
| STANDHYD (  0110)|   Area    (ha)=   1.01
|ID= 1 DT= 5.0 min |   Total Imp(%)=  30.00   Dir. Conn.(%)=  30.00
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                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.30         0.71
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      81.96        40.00
     Mannings n           =      0.013        0.350
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NOTE: RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	8.08	
over (min)	5.00	30.00	
Storage Coeff. (min)=	3.09 (ii)	26.71 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.27	0.04	
			TOTALS
PEAK FLOW (cms)=	0.04	0.01	0.044 (iii)
TIME TO PEAK (hrs)=	6.17	6.50	6.17
RUNOFF VOLUME (mm)=	53.00	9.35	22.43
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.17	0.42

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0110):	1.01	0.044	6.17	22.43
	+ ID2= 2 (0111):	5.33	0.024	6.75	3.93
	ID = 3 (0006):	6.34	0.052	6.17	6.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0121)			
ID= 1 DT= 5.0 min	Area (ha)= 2.33	Curve Number (CN)= 54.0	
	Ia (mm)= 22.80	# 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	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30

1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.133

PEAK FLOW (cms)= 0.008 (i)
TIME TO PEAK (hrs)= 7.167
RUNOFF VOLUME (mm)= 3.931
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.073

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

CALIB
STANDHYD (0120) | Area (ha)= 0.82
ID= 1 DT= 5.0 min | Total Imp(%)= 32.00 Dir. Conn.(%)= 32.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.56
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	73.80	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	8.08	
over (min)	5.00	30.00	
Storage Coeff. (min)=	2.90 (ii)	26.52 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.28	0.04	
			TOTALS

PEAK FLOW (cms)=	0.03	0.01	0.038 (iii)
TIME TO PEAK (hrs)=	6.17	6.50	6.17
RUNOFF VOLUME (mm)=	53.00	9.35	23.30
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.17	0.43

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0009)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0120):	0.82	0.038	6.17	23.30
+ ID2= 2 (0121):	2.33	0.008	7.17	3.93
ID = 3 (0009):	3.15	0.039	6.17	8.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0131)
ID= 1 DT= 5.0 min

Area (ha)= 10.63 Curve Number (CN)= 54.0
Ia (mm)= 22.80 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.69

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.588

PEAK FLOW (cms)=	0.035 (i)	
TIME TO PEAK (hrs)=	7.167	
RUNOFF VOLUME (mm)=	3.932	
TOTAL RAINFALL (mm)=	54.000	
RUNOFF COEFFICIENT =	0.073	

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

CALIB
STANDHYD (0130)
ID= 1 DT= 5.0 min

Area (ha)= 1.57
Total Imp(%)= 34.00 Dir. Conn.(%)= 34.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.53	1.04
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	102.35	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	8.08	
over (min)	5.00	30.00	
Storage Coeff. (min)=	3.53 (ii)	27.15 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.26	0.04	
			TOTALS
PEAK FLOW (cms)=	0.07	0.01	0.077 (iii)
TIME TO PEAK (hrs)=	6.17	6.50	6.17
RUNOFF VOLUME (mm)=	53.00	9.35	24.18
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.17	0.45

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0012)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0130):	1.57	0.077	6.17	24.18
	+ ID2= 2 (0131):	10.63	0.035	7.17	3.93
	ID = 3 (0012):	12.20	0.080	6.17	6.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0141)			
ID= 1 DT= 5.0 min	Area (ha)=	7.22	Curve Number (CN)= 65.0
	Ia (mm)=	14.60	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.54	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30

1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.511

PEAK FLOW (cms)= 0.074 (i)
TIME TO PEAK (hrs)= 6.750
RUNOFF VOLUME (mm)= 8.811
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.163

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

CALIB
STANDHYD (0140)
ID= 1 DT= 5.0 min

Area (ha)= 0.76
Total Imp(%)= 26.00 Dir. Conn.(%)= 26.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.20	0.56
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	71.35	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	8.08	
over (min)	5.00	30.00	
Storage Coeff. (min)=	2.84 (ii)	26.46 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.28	0.04	
			TOTALS

PEAK FLOW (cms)=	0.03	0.01	0.030 (iii)
TIME TO PEAK (hrs)=	6.17	6.50	6.17
RUNOFF VOLUME (mm)=	53.00	9.35	20.68
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.17	0.38

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0015)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0140):	0.76	0.030	6.17	20.68
	+ ID2= 2 (0141):	7.22	0.074	6.75	8.81
	ID = 3 (0015):	7.98	0.086	6.67	9.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0151)				
ID= 1 DT= 5.0 min	Area (ha)=	14.07	Curve Number (CN)=	66.0
	Ia (mm)=	14.20	# 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	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 2.986

PEAK FLOW (cms)=	0.283 (i)	
TIME TO PEAK (hrs)=	6.250	
RUNOFF VOLUME (mm)=	9.256	
TOTAL RAINFALL (mm)=	54.000	
RUNOFF COEFFICIENT =	0.171	

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

CALIB STANDHYD (0150)				
ID= 1 DT= 5.0 min	Area (ha)=	1.35		
	Total Imp(%)=	26.00	Dir. Conn.(%)=	26.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.35	1.00
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	94.72	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	8.08	
over (min)	5.00	30.00	
Storage Coeff. (min)=	3.37 (ii)	26.99 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.26	0.04	
			TOTALS
PEAK FLOW (cms)=	0.05	0.01	0.053 (iii)
TIME TO PEAK (hrs)=	6.17	6.50	6.17
RUNOFF VOLUME (mm)=	53.00	9.35	20.69
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.17	0.38

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0018)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	1.35	0.053	6.17	20.69
+ ID2= 2 (0151):	14.07	0.283	6.25	9.26
ID = 3 (0018):	15.42	0.322	6.17	10.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0161)
ID= 1 DT= 5.0 min

Area (ha)= 131.28 Curve Number (CN)= 75.0
Ia (mm)= 8.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.95

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30

1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 5.278

PEAK FLOW (cms)= 1.870 (i)
TIME TO PEAK (hrs)= 7.167
RUNOFF VOLUME (mm)= 15.847
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.293

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

CALIB	
STANDHYD (0160)	Area (ha)= 3.05
ID= 1 DT= 5.0 min	Total Imp(%)= 28.00 Dir. Conn.(%)= 28.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.85	2.20
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	142.49	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	8.08	
over (min)	5.00	30.00	
Storage Coeff. (min)=	4.30 (ii)	27.92 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.23	0.04	
			TOTALS

PEAK FLOW (cms)=	0.11	0.03	0.126 (iii)
TIME TO PEAK (hrs)=	6.17	6.50	6.17
RUNOFF VOLUME (mm)=	53.00	9.35	21.57
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.17	0.40

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0160):	3.05	0.126	6.17	21.57
	+ ID2= 2 (0161):	131.28	1.870	7.17	15.85
	ID = 3 (0021):	134.33	1.900	7.17	15.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0171)				
ID= 1 DT= 5.0 min	Area (ha)=	32.39	Curve Number (CN)=	59.0
	Ia (mm)=	19.10	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.89		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 1.390

PEAK FLOW (cms)=	0.147 (i)	
TIME TO PEAK (hrs)=	7.333	
RUNOFF VOLUME (mm)=	5.761	
TOTAL RAINFALL (mm)=	54.000	
RUNOFF COEFFICIENT =	0.107	

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

CALIB NASHYD (0180)				
ID= 1 DT= 5.0 min	Area (ha)=	2.46	Curve Number (CN)=	55.0
	Ia (mm)=	22.60	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.99		

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

---- TRANSFORMED HYETOGRAPH ----

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

0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.095

PEAK FLOW (cms)= 0.007 (i)
TIME TO PEAK (hrs)= 7.583
RUNOFF VOLUME (mm)= 4.121
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.076

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

CALIB	
STANDHYD (0181)	Area (ha)= 1.21
ID= 1 DT= 5.0 min	Total Imp(%)= 28.00 Dir. Conn.(%)= 28.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.34	0.87
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	89.96	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08

2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	8.08		
over (min)	5.00	30.00		
Storage Coeff. (min)=	3.26 (ii)	26.88 (ii)		
Unit Hyd. Tpeak (min)=	5.00	30.00		
Unit Hyd. peak (cms)=	0.27	0.04		
			TOTALS	
PEAK FLOW (cms)=	0.04	0.01	0.050 (iii)	
TIME TO PEAK (hrs)=	6.17	6.50	6.17	
RUNOFF VOLUME (mm)=	53.00	9.35	21.56	
TOTAL RAINFALL (mm)=	54.00	54.00	54.00	
RUNOFF COEFFICIENT =	0.98	0.17	0.40	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0027)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0180):	2.46	0.007	7.58	4.12
+ ID2= 2 (0181):	1.21	0.050	6.17	21.56
ID = 3 (0027):	3.67	0.051	6.17	9.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0062)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0171):	32.39	0.147	7.33	5.76
+ ID2= 2 (0027):	3.67	0.051	6.17	9.87
ID = 3 (0062):	36.06	0.163	7.33	6.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0170)	Area (ha)= 3.33		
ID= 1 DT= 5.0 min	Total Imp(%)= 29.00	Dir. Conn.(%)= 29.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.97	2.36
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	149.09	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08

2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	8.08	
over (min)	5.00	30.00	
Storage Coeff. (min)=	4.42 (ii)	28.04 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.23	0.04	
			TOTALS
PEAK FLOW (cms)=	0.12	0.03	0.142 (iii)
TIME TO PEAK (hrs)=	6.17	6.50	6.17
RUNOFF VOLUME (mm)=	53.00	9.35	22.00
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.17	0.41

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0024)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0170):		3.33	0.142	6.17	22.00
+ ID2= 2 (0062):		36.06	0.163	7.33	6.18
ID = 3 (0024):		39.39	0.208	6.17	7.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0221)	Area (ha)=	14.91	Curve Number (CN)=	59.0
ID= 1 DT= 5.0 min	Ia (mm)=	18.90	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.41		

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 1.389

PEAK FLOW (cms)= 0.106 (i)
TIME TO PEAK (hrs)= 6.667
RUNOFF VOLUME (mm)= 5.821
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.108

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

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| CALIB            |
| STANDHYD (  0220)|   Area    (ha)=   0.88
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
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		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.87	0.01
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	76.42	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

				TOTALS
Max.Eff.Inten.(mm/hr)	=	46.22	45.00	
over (min)		5.00	5.00	
Storage Coeff. (min)	=	2.96 (ii)	4.83 (ii)	
Unit Hyd. Tpeak (min)	=	5.00	5.00	
Unit Hyd. peak (cms)	=	0.28	0.22	
PEAK FLOW (cms)	=	0.11	0.00	0.113 (iii)
TIME TO PEAK (hrs)	=	6.17	6.17	6.17
RUNOFF VOLUME (mm)	=	53.00	44.31	52.91
TOTAL RAINFALL (mm)	=	54.00	54.00	54.00
RUNOFF COEFFICIENT	=	0.98	0.82	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 98.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ADD HYD  (  0039)|
|   1 +  2 =  3    |
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		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0220):		0.88	0.113	6.17	52.91
+ ID2= 2 (0221):		14.91	0.106	6.67	5.82
ID = 3 (0039):		15.79	0.154	6.17	8.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB            |
| NASHYD   (  0231)|   Area    (ha)=  33.58   Curve Number   (CN)= 58.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  18.60   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31
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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	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 4.137

PEAK FLOW (cms)= 0.265 (i)
TIME TO PEAK (hrs)= 6.417
RUNOFF VOLUME (mm)= 5.712
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.106

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

CALIB STANDHYD (0230) ID= 1 DT= 5.0 min	Area (ha)= 3.07 Total Imp(%)= 42.00 Dir. Conn.(%)= 42.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.29	1.78
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	143.00	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08

2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	10.30	
over (min)	5.00	30.00	
Storage Coeff. (min)=	4.31 (ii)	25.75 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.23	0.04	
			TOTALS
PEAK FLOW (cms)=	0.17	0.03	0.184 (iii)
TIME TO PEAK (hrs)=	6.17	6.50	6.17
RUNOFF VOLUME (mm)=	53.00	11.73	29.06
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.22	0.54

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 62.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0042)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0230):		3.07	0.184	6.17	29.06
+ ID2= 2 (0231):		33.58	0.265	6.42	5.71
ID = 3 (0042):		36.65	0.341	6.42	7.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0241)	Area (ha)=	11.24	Curve Number (CN)= 56.0
ID= 1 DT= 5.0 min	Ia (mm)=	22.20	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.41	

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 1.047

PEAK FLOW (cms)= 0.055 (i)
TIME TO PEAK (hrs)= 6.750
RUNOFF VOLUME (mm)= 4.370
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.081

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

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| CALIB            |
| STANDHYD (  0240)|   Area    (ha)=   0.88
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  37.00
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		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.33	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	76.58	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

				TOTALS
Max.Eff.Inten.(mm/hr)	=	46.22	8.08	
over (min)		5.00	30.00	
Storage Coeff. (min)	=	2.96 (ii)	26.58 (ii)	
Unit Hyd. Tpeak (min)	=	5.00	30.00	
Unit Hyd. peak (cms)	=	0.28	0.04	
PEAK FLOW (cms)	=	0.04	0.01	0.046 (iii)
TIME TO PEAK (hrs)	=	6.17	6.50	6.17
RUNOFF VOLUME (mm)	=	53.00	9.35	25.48
TOTAL RAINFALL (mm)	=	54.00	54.00	54.00
RUNOFF COEFFICIENT	=	0.98	0.17	0.47

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0045)|
|   1 +  2 =  3    |
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	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0240):	0.88	0.046	6.17	25.48
+ ID2= 2 (0241):	11.24	0.055	6.75	4.37
ID = 3 (0045):	12.12	0.071	6.67	5.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB            |
| NASHYD   (  0251)|   Area    (ha)=  16.61   Curve Number   (CN)= 51.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  24.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.51
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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	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 1.244

PEAK FLOW (cms)= 0.048 (i)
TIME TO PEAK (hrs)= 6.917
RUNOFF VOLUME (mm)= 3.141
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.058

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

CALIB STANDHYD (0250) ID= 1 DT= 5.0 min	Area (ha)= 0.93 Total Imp(%)= 26.00 Dir. Conn.(%)= 26.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.69
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	78.76	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08

2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	11.04	
over (min)	5.00	25.00	
Storage Coeff. (min)=	3.01 (ii)	23.87 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.28	0.05	
			TOTALS
PEAK FLOW (cms)=	0.03	0.01	0.040 (iii)
TIME TO PEAK (hrs)=	6.17	6.42	6.17
RUNOFF VOLUME (mm)=	53.00	12.51	23.03
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.23	0.43

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 64.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0048)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0250):		0.93	0.040	6.17	23.03
+ ID2= 2 (0251):		16.61	0.048	6.92	3.14
ID = 3 (0048):		17.54	0.061	6.67	4.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0261)	Area (ha)=	35.85	Curve Number (CN)= 59.0
ID= 1 DT= 5.0 min	Ia (mm)=	18.50	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.24	

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
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 1.104

PEAK FLOW (cms)= 0.137 (i)
TIME TO PEAK (hrs)= 7.833
RUNOFF VOLUME (mm)= 5.944
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.110

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

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| CALIB            |
| STANDHYD (  0260)|   Area    (ha)=   3.40
|ID= 1 DT= 5.0 min |   Total Imp(%)=  27.00   Dir. Conn.(%)=  27.00
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		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.92	2.48
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	150.51	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

				TOTALS
Max.Eff.Inten.(mm/hr)	=	46.22	18.20	
over (min)		5.00	25.00	
Storage Coeff. (min)	=	4.45 (ii)	21.52 (ii)	
Unit Hyd. Tpeak (min)	=	5.00	25.00	
Unit Hyd. peak (cms)	=	0.23	0.05	
PEAK FLOW (cms)	=	0.12	0.08	0.175 (iii)
TIME TO PEAK (hrs)	=	6.17	6.42	6.17
RUNOFF VOLUME (mm)	=	53.00	18.58	27.87
TOTAL RAINFALL (mm)	=	54.00	54.00	54.00
RUNOFF COEFFICIENT	=	0.98	0.34	0.52

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 76.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ADD HYD  (  0051)|
|   1 +  2 =  3    |
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		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0260):		3.40	0.175	6.17	27.87
+ ID2= 2 (0261):		35.85	0.137	7.83	5.94
ID = 3 (0051):		39.25	0.183	6.17	7.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB            |
| NASHYD   (  0271)|   Area    (ha)=  26.76   Curve Number   (CN)= 59.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  18.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.23
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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	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 4.444

PEAK FLOW (cms)= 0.254 (i)
TIME TO PEAK (hrs)= 6.333
RUNOFF VOLUME (mm)= 5.816
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.108

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

CALIB
STANDHYD (0270)
ID= 1 DT= 5.0 min

Area (ha)= 3.95
Total Imp(%)= 31.00 Dir. Conn.(%)= 31.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.22	2.73
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	162.31	40.00
Mannings n	=	0.013	0.350

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	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08

2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	8.66	
over (min)	5.00	30.00	
Storage Coeff. (min)=	4.65 (ii)	27.63 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.22	0.04	
			TOTALS
PEAK FLOW (cms)=	0.16	0.04	0.179 (iii)
TIME TO PEAK (hrs)=	6.17	6.50	6.17
RUNOFF VOLUME (mm)=	53.00	9.98	23.31
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.18	0.43

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 57.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0054)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0270):		3.95	0.179	6.17	23.31
+ ID2= 2 (0271):		26.76	0.254	6.33	5.82
ID = 3 (0054):		30.71	0.372	6.17	8.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0281)	Area (ha)=	6.71	Curve Number (CN)= 67.0
ID= 1 DT= 5.0 min	Ia (mm)=	12.90	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.43	

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.596

PEAK FLOW (cms)= 0.093 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 10.162
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.188

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

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| CALIB            |
| STANDHYD (  0280)|   Area    (ha)=   0.90
|ID= 1 DT= 5.0 min |   Total Imp(%)=  51.00   Dir. Conn.(%)=  51.00
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		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.46	0.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.64	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

				TOTALS
Max.Eff.Inten.(mm/hr)	=	46.22	15.74	
over (min)		5.00	25.00	
Storage Coeff. (min)	=	2.99 (ii)	21.08 (ii)	
Unit Hyd. Tpeak (min)	=	5.00	25.00	
Unit Hyd. peak (cms)	=	0.28	0.05	
PEAK FLOW (cms)	=	0.06	0.01	0.068 (iii)
TIME TO PEAK (hrs)	=	6.17	6.42	6.17
RUNOFF VOLUME (mm)	=	53.00	16.25	34.98
TOTAL RAINFALL (mm)	=	54.00	54.00	54.00
RUNOFF COEFFICIENT	=	0.98	0.30	0.65

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 72.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| ADD HYD  (  0057)|
|   1 +  2 =  3    |
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	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0280):	0.90	0.068	6.17	34.98
+ ID2= 2 (0281):	6.71	0.093	6.58	10.16
ID = 3 (0057):	7.61	0.119	6.50	13.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| CALIB            |
| NASHYD   (  0201)|   Area    (ha)=  30.53   Curve Number   (CN)= 71.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  10.70   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.78
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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	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 1.495

PEAK FLOW (cms)= 0.388 (i)
TIME TO PEAK (hrs)= 7.000
RUNOFF VOLUME (mm)= 12.750
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.236

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

CALIB
STANDHYD (0200)
ID= 1 DT= 5.0 min

Area (ha)= 5.18
Total Imp(%)= 33.00 Dir. Conn.(%)= 33.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.71	3.47
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	185.83	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08

2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	15.74	
over (min)	5.00	25.00	
Storage Coeff. (min)=	5.05 (ii)	23.14 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.21	0.05	
			TOTALS
PEAK FLOW (cms)=	0.22	0.09	0.284 (iii)
TIME TO PEAK (hrs)=	6.17	6.42	6.17
RUNOFF VOLUME (mm)=	53.00	16.25	28.37
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.30	0.53

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 72.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0033)		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0200):		5.18	0.284	6.17	28.37
+ ID2= 2 (0201):		30.53	0.388	7.00	12.75
ID = 3 (0033):		35.71	0.471	6.67	15.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0211)			
ID= 1 DT= 5.0 min	Area (ha)= 2.02	Curve Number (CN)= 72.0	
	Ia (mm)= 10.50	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.16		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.482

PEAK FLOW (cms)= 0.066 (i)
TIME TO PEAK (hrs)= 6.167
RUNOFF VOLUME (mm)= 13.240
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.245

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

CALIB			
STANDHYD (0210)	Area (ha)= 0.57		
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00	Dir. Conn.(%)= 30.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.40
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	61.73	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

				TOTALS
Max.Eff.Inten.(mm/hr)=	46.22	14.15		
over (min)	5.00	25.00		
Storage Coeff. (min)=	2.60 (ii)	21.49 (ii)		
Unit Hyd. Tpeak (min)=	5.00	25.00		
Unit Hyd. peak (cms)=	0.29	0.05		
PEAK FLOW (cms)=	0.02	0.01		0.029 (iii)
TIME TO PEAK (hrs)=	6.17	6.42		6.17
RUNOFF VOLUME (mm)=	53.00	14.72		26.18
TOTAL RAINFALL (mm)=	54.00	54.00		54.00
RUNOFF COEFFICIENT =	0.98	0.27		0.48

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0036)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
ID1= 1 (0210):	0.57	0.029	6.17	26.18	
+ ID2= 2 (0211):	2.02	0.066	6.17	13.24	
ID = 3 (0036):	2.59	0.095	6.17	16.09	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0195)	Area (ha)= 496.69	Curve Number (CN)= 74.0	
ID= 1 DT= 5.0 min	Ia (mm)= 9.20	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 4.78		

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

---- TRANSFORMED HYETOGRAPH ----

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

0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 3.969

PEAK FLOW (cms)= 2.038 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 14.973
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.277

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

CALIB			
NASHYD (0196)	Area (ha)= 65.48	Curve Number (CN)= 73.0	
ID= 1 DT= 5.0 min	Ia (mm)= 9.60	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.56		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 4.466

```
     PEAK FLOW       (cms)=   1.168 (i)
     TIME TO PEAK    (hrs)=   6.750
     RUNOFF VOLUME    (mm)=  14.249
     TOTAL RAINFALL   (mm)=  54.000
     RUNOFF COEFFICIENT   =   0.264

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------
| ADD HYD  (  0059)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0195):   496.69   2.038    12.25    14.97
      + ID2= 2 (  0196):    65.48   1.168     6.75    14.25
        ================================================
        ID = 3 (  0059):   562.17   2.150    12.08    14.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0059)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0059):   562.17   2.150    12.08    14.89
      + ID2= 2 (  0033):    35.71   0.471     6.67    15.02
        ================================================
        ID = 1 (  0059):   597.88   2.216    11.83    14.90

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

```
--------------------
| ADD HYD  (  0059)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0059):   597.88   2.216    11.83    14.90
      + ID2= 2 (  0036):     2.59   0.095     6.17    16.09
        ================================================
        ID = 3 (  0059):   600.47   2.221    11.83    14.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0194)|   Area    (ha)= 160.45   Curve Number   (CN)= 74.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   9.10   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.95

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

```
     Unit Hyd Qpeak  (cms)=   3.143

     PEAK FLOW       (cms)=   1.278 (i)
     TIME TO PEAK    (hrs)=   8.500
```

RUNOFF VOLUME (mm)= 15.029
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.278

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

ADD HYD (0016)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0194):	160.45	1.278	8.50	15.03
	+ ID2= 2 (0059):	600.47	2.221	11.83	14.90
	ID = 3 (0016):	760.92	3.049	9.67	14.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0193) ID= 1 DT= 5.0 min				
	Area	(ha)=	48.63	Curve Number (CN)= 64.0
	Ia	(mm)=	16.40	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=		1.31	

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	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 1.418

PEAK FLOW (cms)= 0.245 (i)
TIME TO PEAK (hrs)= 7.833
RUNOFF VOLUME (mm)= 7.833
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.145

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

ADD HYD (0060)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0016):	760.92	3.049	9.67	14.93
	+ ID2= 2 (0193):	48.63	0.245	7.83	7.83
	ID = 3 (0060):	809.55	3.215	9.50	14.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0191) ID= 1 DT= 5.0 min				
	Area	(ha)=	147.11	Curve Number (CN)= 67.0
	Ia	(mm)=	13.40	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=		1.83	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 3.070

PEAK FLOW (cms)= 0.777 (i)
TIME TO PEAK (hrs)= 8.500
RUNOFF VOLUME (mm)= 9.948
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.184

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

CALIB
STANDHYD (0190)
ID= 1 DT= 5.0 min

Area (ha)= 2.29
Total Imp(%)= 46.00 Dir. Conn.(%)= 46.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.05	1.24
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	123.53	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08

2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	46.22	8.66	
over (min)	5.00	30.00	
Storage Coeff. (min)=	3.95 (ii)	26.92 (ii)	
Unit Hyd. Tpeak (min)=	5.00	30.00	
Unit Hyd. peak (cms)=	0.24	0.04	
			TOTALS
PEAK FLOW (cms)=	0.14	0.02	0.145 (iii)
TIME TO PEAK (hrs)=	6.17	6.50	6.17
RUNOFF VOLUME (mm)=	53.00	9.98	29.76
TOTAL RAINFALL (mm)=	54.00	54.00	54.00
RUNOFF COEFFICIENT =	0.98	0.18	0.55

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 57.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0030)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0190):	2.29	0.145	6.17	29.76	
+ ID2= 2 (0191):	147.11	0.777	8.50	9.95	
ID = 3 (0030):	149.40	0.788	8.50	10.25	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0192)	Area (ha)= 276.67	Curve Number (CN)= 67.0	
ID= 1 DT= 5.0 min	Ia (mm)= 9.40	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 4.85		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	1.62	6.250	11.77	9.33	1.62
0.167	0.00	3.250	2.16	6.333	11.77	9.42	1.62
0.250	1.62	3.333	2.16	6.417	11.77	9.50	1.62
0.333	1.62	3.417	2.16	6.500	11.77	9.58	1.62
0.417	1.62	3.500	2.16	6.583	11.77	9.67	1.62
0.500	1.62	3.583	2.16	6.667	11.77	9.75	1.30
0.583	1.62	3.667	2.16	6.750	5.18	9.83	1.30
0.667	1.62	3.750	2.16	6.833	5.18	9.92	1.30
0.750	0.76	3.833	2.16	6.917	5.18	10.00	1.30
0.833	0.76	3.917	2.16	7.000	5.18	10.08	1.30
0.917	0.76	4.000	2.16	7.083	5.18	10.17	1.30
1.000	0.76	4.083	2.16	7.167	5.18	10.25	1.84
1.083	0.76	4.167	2.16	7.250	3.46	10.33	1.84
1.167	0.76	4.250	2.92	7.333	3.46	10.42	1.84
1.250	1.40	4.333	2.92	7.417	3.46	10.50	1.84
1.333	1.40	4.417	2.92	7.500	3.46	10.58	1.84
1.417	1.40	4.500	2.92	7.583	3.46	10.67	1.84
1.500	1.40	4.583	2.92	7.667	3.46	10.75	1.19
1.583	1.40	4.667	2.92	7.750	3.02	10.83	1.19
1.667	1.40	4.750	3.67	7.833	3.02	10.92	1.19
1.750	1.40	4.833	3.67	7.917	3.02	11.00	1.19
1.833	1.40	4.917	3.67	8.000	3.02	11.08	1.19
1.917	1.40	5.000	3.67	8.083	3.02	11.17	1.19
2.000	1.40	5.083	3.67	8.167	3.02	11.25	1.08
2.083	1.40	5.167	3.67	8.250	2.38	11.33	1.08
2.167	1.40	5.250	5.83	8.333	2.38	11.42	1.08
2.250	1.84	5.333	5.83	8.417	2.38	11.50	1.08
2.333	1.84	5.417	5.83	8.500	2.38	11.58	1.08
2.417	1.84	5.500	5.83	8.583	2.38	11.67	1.08
2.500	1.84	5.583	5.83	8.667	2.38	11.75	1.08
2.583	1.84	5.667	5.83	8.750	2.48	11.83	1.08
2.667	1.84	5.750	46.22	8.833	2.48	11.92	1.08
2.750	1.62	5.833	46.22	8.917	2.48	12.00	1.08
2.833	1.62	5.917	46.22	9.000	2.48	12.08	1.08
2.917	1.62	6.000	46.22	9.083	2.48	12.17	1.08
3.000	1.62	6.083	46.22	9.167	2.48		
3.083	1.62	6.167	46.22	9.250	1.62		

Unit Hyd Qpeak (cms)= 2.179

PEAK FLOW (cms)= 0.877 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 11.721
TOTAL RAINFALL (mm)= 54.000
RUNOFF COEFFICIENT = 0.217

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

ADD HYD (0061)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0192):	276.67	0.877	12.42	11.72
	+ ID2= 2 (0030):	149.40	0.788	8.50	10.25
	ID = 3 (0061):	426.07	1.358	9.92	11.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2006)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
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Summary filename:
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DATE: 12-14-2022 TIME: 02:56:53

USER:

COMMENTS: _____

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  ***********************************************
  ** SIMULATION : 12SCS005                     **
  ***********************************************
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READ STORM	Filename: C:\Users\caeh076182\AppData\Local\Temp\4057dc77-ff29-4e2b-baf3-03ff24407828\2ac052e1
Ptotal= 68.40 mm	Comments: 12SCS005

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.17	0.00	3.33	2.74	6.50	14.91	9.67	2.05
0.33	2.05	3.50	2.74	6.67	14.91	9.83	1.64
0.50	2.05	3.67	2.74	6.83	6.57	10.00	1.64
0.67	2.05	3.83	2.74	7.00	6.57	10.17	1.64
0.83	0.96	4.00	2.74	7.17	6.57	10.33	2.33
1.00	0.96	4.17	2.74	7.33	4.38	10.50	2.33
1.17	0.96	4.33	3.69	7.50	4.38	10.67	2.33
1.33	1.78	4.50	3.69	7.67	4.38	10.83	1.50
1.50	1.78	4.67	3.69	7.83	3.83	11.00	1.50
1.67	1.78	4.83	4.65	8.00	3.83	11.17	1.50
1.83	1.78	5.00	4.65	8.17	3.83	11.33	1.37
2.00	1.78	5.17	4.65	8.33	3.01	11.50	1.37
2.17	1.78	5.33	7.39	8.50	3.01	11.67	1.37
2.33	2.33	5.50	7.39	8.67	3.01	11.83	1.37
2.50	2.33	5.67	7.39	8.83	3.15	12.00	1.37
2.67	2.33	5.83	58.55	9.00	3.15	12.17	1.37
2.83	2.05	6.00	58.55	9.17	3.15		
3.00	2.05	6.17	58.55	9.33	2.05		
3.17	2.05	6.33	14.91	9.50	2.05		

CALIB					
NASHYD (0101)	Area (ha)= 7.90	Curve Number (CN)= 62.0			
ID= 1 DT= 5.0 min	Ia (mm)= 16.80	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.46				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 0.656

PEAK FLOW (cms)= 0.133 (i)
TIME TO PEAK (hrs)= 6.667
RUNOFF VOLUME (mm)= 12.844
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.188

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

CALIB
STANDHYD (0100)
ID= 1 DT= 5.0 min

Area (ha)= 0.91
Total Imp(%)= 61.00 Dir. Conn.(%)= 61.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.56	0.35
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.68	40.00
Mannings n	=	0.013	0.360

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37

2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	20.60	
over (min)	5.00	20.00	
Storage Coeff. (min)=	2.72 (ii)	19.24 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.29	0.06	
			TOTALS
PEAK FLOW (cms)=	0.09	0.01	0.102 (iii)
TIME TO PEAK (hrs)=	6.17	6.33	6.17
RUNOFF VOLUME (mm)=	67.40	21.32	49.42
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.31	0.72

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 67.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0003)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0100):	0.91	0.102	6.17	49.42
	+ ID2= 2 (0101):	7.90	0.133	6.67	12.84
	ID = 3 (0003):	8.81	0.166	6.58	16.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0111) ID= 1 DT= 5.0 min			
Area (ha)=	5.33	Curve Number (CN)=	54.0
Ia (mm)=	22.80	# of Linear Res.(N)=	3.00
U.H. Tp(hrs)=	0.38		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 0.536

PEAK FLOW (cms)= 0.054 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 7.936
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.116

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

CALIB			
STANDHYD (0110)	Area (ha)=	1.01	
ID= 1 DT= 5.0 min	Total Imp(%)=	30.00	Dir. Conn.(%)= 30.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.30	0.71
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	81.96	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

				TOTALS
Max.Eff.Inten.(mm/hr)=	58.55	13.99		
over (min)	5.00	25.00		
Storage Coeff. (min)=	2.81 (ii)	21.78 (ii)		
Unit Hyd. Tpeak (min)=	5.00	25.00		
Unit Hyd. peak (cms)=	0.28	0.05		
PEAK FLOW (cms)=	0.05	0.02		0.061 (iii)
TIME TO PEAK (hrs)=	6.17	6.42		6.17
RUNOFF VOLUME (mm)=	67.40	14.82		30.58
TOTAL RAINFALL (mm)=	68.40	68.40		68.40
RUNOFF COEFFICIENT =	0.99	0.22		0.45

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0110):	1.01	0.061	6.17	30.58
	+ ID2= 2 (0111):	5.33	0.054	6.58	7.94
	ID = 3 (0006):	6.34	0.087	6.17	11.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0121)	Area (ha)=	2.33	Curve Number (CN)= 54.0
ID= 1 DT= 5.0 min	Ia (mm)=	22.80	# 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	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 0.133

PEAK FLOW (cms)= 0.018 (i)
TIME TO PEAK (hrs)= 7.000
RUNOFF VOLUME (mm)= 7.937
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.116

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

CALIB
STANDHYD (0120)
ID= 1 DT= 5.0 min

Area (ha)= 0.82
Total Imp(%)= 32.00 Dir. Conn.(%)= 32.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.56
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	73.80	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37

2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	13.99	
over (min)	5.00	25.00	
Storage Coeff. (min)=	2.64 (ii)	21.61 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.29	0.05	
			TOTALS
PEAK FLOW (cms)=	0.04	0.01	0.052 (iii)
TIME TO PEAK (hrs)=	6.17	6.42	6.17
RUNOFF VOLUME (mm)=	67.40	14.82	31.63
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.22	0.46

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0009)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0120):	0.82	0.052	6.17	31.63
	+ ID2= 2 (0121):	2.33	0.018	7.00	7.94
	ID = 3 (0009):	3.15	0.056	6.17	14.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0131) ID= 1 DT= 5.0 min				
	Area (ha)=	10.63	Curve Number (CN)=	54.0
	Ia (mm)=	22.80	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.69		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 0.588

PEAK FLOW (cms)= 0.079 (i)
TIME TO PEAK (hrs)= 7.000
RUNOFF VOLUME (mm)= 7.937
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.116

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

CALIB			
STANDHYD (0130)	Area (ha)= 1.57		
ID= 1 DT= 5.0 min	Total Imp(%)= 34.00	Dir. Conn.(%)= 34.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.53	1.04
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	102.35	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

				TOTALS
Max.Eff.Inten.(mm/hr)=		58.55	13.99	
over (min)		5.00	25.00	
Storage Coeff. (min)=		3.21 (ii)	22.18 (ii)	
Unit Hyd. Tpeak (min)=		5.00	25.00	
Unit Hyd. peak (cms)=		0.27	0.05	
PEAK FLOW	(cms)=	0.09	0.02	0.104 (iii)
TIME TO PEAK	(hrs)=	6.17	6.42	6.17
RUNOFF VOLUME	(mm)=	67.40	14.82	32.69
TOTAL RAINFALL	(mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT	=	0.99	0.22	0.48

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0012)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0130):	1.57	0.104	6.17	32.69
	+ ID2= 2 (0131):	10.63	0.079	7.00	7.94
	ID = 3 (0012):	12.20	0.119	6.17	11.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0141)	Area (ha)= 7.22	Curve Number (CN)= 65.0	
ID= 1 DT= 5.0 min	Ia (mm)= 14.60	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.54		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 0.511

PEAK FLOW (cms)= 0.136 (i)
TIME TO PEAK (hrs)= 6.750
RUNOFF VOLUME (mm)= 15.188
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.222

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

CALIB
STANDHYD (0140)
ID= 1 DT= 5.0 min

Area (ha)= 0.76
Total Imp(%)= 26.00 Dir. Conn.(%)= 26.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.20	0.56
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	71.35	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37

2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	13.99	
over (min)	5.00	25.00	
Storage Coeff. (min)=	2.58 (ii)	21.55 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.29	0.05	
			TOTALS
PEAK FLOW (cms)=	0.03	0.01	0.042 (iii)
TIME TO PEAK (hrs)=	6.17	6.42	6.17
RUNOFF VOLUME (mm)=	67.40	14.82	28.47
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.22	0.42

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0015)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0140):	0.76	0.042	6.17	28.47	
+ ID2= 2 (0141):	7.22	0.136	6.75	15.19	
ID = 3 (0015):	7.98	0.154	6.67	16.45	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0151)	Area (ha)= 14.07	Curve Number (CN)= 66.0	
ID= 1 DT= 5.0 min	Ia (mm)= 14.20	# 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	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 2.986

PEAK FLOW (cms)= 0.509 (i)
TIME TO PEAK (hrs)= 6.250
RUNOFF VOLUME (mm)= 15.829
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.231

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

CALIB	
STANDHYD (0150)	Area (ha)= 1.35
ID= 1 DT= 5.0 min	Total Imp(%)= 26.00 Dir. Conn.(%)= 26.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.35	1.00
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	94.72	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

				TOTALS
Max.Eff.Inten.(mm/hr)=		58.55	13.99	
over (min)		5.00	25.00	
Storage Coeff. (min)=		3.06 (ii)	22.03 (ii)	
Unit Hyd. Tpeak (min)=		5.00	25.00	
Unit Hyd. peak (cms)=		0.27	0.05	
PEAK FLOW	(cms)=	0.06	0.02	0.074 (iii)
TIME TO PEAK	(hrs)=	6.17	6.42	6.17
RUNOFF VOLUME	(mm)=	67.40	14.82	28.48
TOTAL RAINFALL	(mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT	=	0.99	0.22	0.42

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0018)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
ID1= 1 (0150):	1.35	0.074	6.17	28.48	
+ ID2= 2 (0151):	14.07	0.509	6.25	15.83	
ID = 3 (0018):	15.42	0.577	6.17	16.94	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0161)	Area (ha)= 131.28	Curve Number (CN)= 75.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.60	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.95		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 5.278

PEAK FLOW (cms)= 2.997 (i)
TIME TO PEAK (hrs)= 7.167
RUNOFF VOLUME (mm)= 24.753
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.362

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

CALIB
STANDHYD (0160)
ID= 1 DT= 5.0 min

Area (ha)= 3.05
Total Imp(%)= 28.00 Dir. Conn.(%)= 28.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.85	2.20
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	142.49	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37

2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	13.99	
over (min)	5.00	25.00	
Storage Coeff. (min)=	3.91 (ii)	22.88 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.25	0.05	
			TOTALS
PEAK FLOW (cms)=	0.14	0.05	0.175 (iii)
TIME TO PEAK (hrs)=	6.17	6.42	6.17
RUNOFF VOLUME (mm)=	67.40	14.82	29.54
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.22	0.43

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0021)		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0160):		3.05	0.175	6.17	29.54
+ ID2= 2 (0161):		131.28	2.997	7.17	24.75
ID = 3 (0021):		134.33	3.037	7.17	24.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0171) ID= 1 DT= 5.0 min				
Area (ha)=	32.39	Curve Number (CN)=	59.0	
Ia (mm)=	19.10	# of Linear Res.(N)=	3.00	
U.H. Tp(hrs)=	0.89			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 1.390

PEAK FLOW (cms)= 0.296 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 10.763
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.157

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

CALIB			
NASHYD (0180)	Area (ha)= 2.46	Curve Number (CN)= 55.0	
ID= 1 DT= 5.0 min	Ia (mm)= 22.60	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.99		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 0.095

PEAK FLOW (cms)= 0.015 (i)
TIME TO PEAK (hrs)= 7.417
RUNOFF VOLUME (mm)= 8.270
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.121

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

CALIB			
STANDHYD (0181)	Area (ha)= 1.21		
ID= 1 DT= 5.0 min	Total Imp(%)= 28.00	Dir. Conn.(%)= 28.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.34	0.87
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	89.96	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50

1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	13.99	
over (min)	5.00	25.00	
Storage Coeff. (min)=	2.97 (ii)	21.94 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.28	0.05	
			TOTALS
PEAK FLOW (cms)=	0.06	0.02	0.070 (iii)
TIME TO PEAK (hrs)=	6.17	6.42	6.17
RUNOFF VOLUME (mm)=	67.40	14.82	29.53
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.22	0.43

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0027)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0180):	2.46	0.015	7.42	8.27
+ ID2= 2 (0181):	1.21	0.070	6.17	29.53
ID = 3 (0027):	3.67	0.071	6.17	15.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0062)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0171):	32.39	0.296	7.25	10.76
+ ID2= 2 (0027):	3.67	0.071	6.17	15.28
ID = 3 (0062):	36.06	0.325	7.17	11.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0170)	Area (ha)= 3.33
ID= 1 DT= 5.0 min	Total Imp(%)= 29.00 Dir. Conn.(%)= 29.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.97	2.36
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	149.09	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33

1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	13.99	
over (min)	5.00	25.00	
Storage Coeff. (min)=	4.02 (ii)	22.99 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.24	0.05	
			TOTALS
PEAK FLOW (cms)=	0.16	0.06	0.196 (iii)
TIME TO PEAK (hrs)=	6.17	6.42	6.17
RUNOFF VOLUME (mm)=	67.40	14.82	30.06
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.22	0.44

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0024)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0170):	3.33	0.196	6.17	30.06
+ ID2= 2 (0062):	36.06	0.325	7.17	11.22
ID = 3 (0024):	39.39	0.369	7.17	12.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0221) ID= 1 DT= 5.0 min			
	Area (ha)=	14.91	Curve Number (CN)= 59.0
	Ia (mm)=	18.90	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.41	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37

2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 1.389

PEAK FLOW (cms)= 0.216 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 10.840
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.158

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

CALIB
STANDHYD (0220)
ID= 1 DT= 5.0 min

Area (ha)= 0.88
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.87	0.01
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	76.42	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	57.58		
over (min)	5.00	5.00		
Storage Coeff. (min)=	2.69 (ii)	4.40 (ii)		
Unit Hyd. Tpeak (min)=	5.00	5.00		
Unit Hyd. peak (cms)=	0.29	0.23		
				TOTALS
PEAK FLOW (cms)=	0.14	0.00		0.143 (iii)
TIME TO PEAK (hrs)=	6.17	6.17		6.17
RUNOFF VOLUME (mm)=	67.40	58.61		67.31
TOTAL RAINFALL (mm)=	68.40	68.40		68.40
RUNOFF COEFFICIENT =	0.99	0.86		0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 98.0 Ia = Dep. Storage (Above)
(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 (0220):		0.88	0.143	6.17	67.31
+ ID2= 2 (0221):		14.91	0.216	6.58	10.84
		==========	==========	==========	==========

ID = 3 (0039): 15.79 0.253 6.17 13.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0231)	Area (ha)= 33.58	Curve Number (CN)= 58.0			
ID= 1 DT= 5.0 min	Ia (mm)= 18.60	# 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	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 4.137

PEAK FLOW (cms)= 0.558 (i)
TIME TO PEAK (hrs)= 6.417
RUNOFF VOLUME (mm)= 10.607
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.155

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

CALIB			
STANDHYD (0230)	Area (ha)= 3.07		
ID= 1 DT= 5.0 min	Total Imp(%)= 42.00	Dir. Conn.(%)= 42.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.29	1.78
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	143.00	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33

1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	17.54	
over (min)	5.00	25.00	
Storage Coeff. (min)=	3.92 (ii)	21.25 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.24	0.05	
			TOTALS
PEAK FLOW (cms)=	0.21	0.05	0.249 (iii)
TIME TO PEAK (hrs)=	6.17	6.42	6.17
RUNOFF VOLUME (mm)=	67.40	18.35	38.95
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.27	0.57

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 62.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0042)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0230):		3.07	0.249	6.17	38.95
+ ID2= 2 (0231):		33.58	0.558	6.42	10.61
		36.65	0.669	6.42	12.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0241)	Area (ha)=	11.24	Curve Number (CN)= 56.0
ID= 1 DT= 5.0 min	Ia (mm)=	22.20	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.41	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37

2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 1.047

PEAK FLOW (cms)= 0.123 (i)
TIME TO PEAK (hrs)= 6.667
RUNOFF VOLUME (mm)= 8.684
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.127

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

CALIB	
STANDHYD (0240)	Area (ha)= 0.88
ID= 1 DT= 5.0 min	Total Imp(%)= 37.00 Dir. Conn.(%)= 37.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.33	0.55
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	76.58	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	13.99		
over (min)	5.00	25.00		
Storage Coeff. (min)=	2.70 (ii)	21.67 (ii)		
Unit Hyd. Tpeak (min)=	5.00	25.00		
Unit Hyd. peak (cms)=	0.29	0.05		
				TOTALS
PEAK FLOW (cms)=	0.05	0.01		0.062 (iii)
TIME TO PEAK (hrs)=	6.17	6.42		6.17
RUNOFF VOLUME (mm)=	67.40	14.82		34.26
TOTAL RAINFALL (mm)=	68.40	68.40		68.40
RUNOFF COEFFICIENT =	0.99	0.22		0.50

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0045)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0240):	0.88	0.062	6.17	34.26
	+ ID2= 2 (0241):	11.24	0.123	6.67	8.68

ID = 3 (0045): 12.12 0.147 6.67 10.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0251)	Area (ha)= 16.61	Curve Number (CN)= 51.0	
ID= 1 DT= 5.0 min	Ia (mm)= 24.70	# 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	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 1.244

PEAK FLOW (cms)= 0.119 (i)
TIME TO PEAK (hrs)= 6.833
RUNOFF VOLUME (mm)= 6.636
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.097

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

CALIB			
STANDHYD (0250)	Area (ha)= 0.93		
ID= 1 DT= 5.0 min	Total Imp(%)= 26.00	Dir. Conn.(%)= 26.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.24	0.69
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	78.76	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33

1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	18.70	
over (min)	5.00	20.00	
Storage Coeff. (min)=	2.74 (ii)	19.63 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.28	0.06	
			TOTALS
PEAK FLOW (cms)=	0.04	0.02	0.059 (iii)
TIME TO PEAK (hrs)=	6.17	6.33	6.17
RUNOFF VOLUME (mm)=	67.40	19.49	31.93
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.28	0.47

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 64.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0048)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0250):		0.93	0.059	6.17	31.93
+ ID2= 2 (0251):		16.61	0.119	6.83	6.64
		17.54	0.140	6.67	7.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0261)	Area (ha)=	35.85	Curve Number (CN)= 59.0
ID= 1 DT= 5.0 min	Ia (mm)=	18.50	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.24	

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	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37

2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 1.104

PEAK FLOW (cms)= 0.269 (i)
TIME TO PEAK (hrs)= 7.750
RUNOFF VOLUME (mm)= 10.998
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.161

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

CALIB	
STANDHYD (0260)	Area (ha)= 3.40
ID= 1 DT= 5.0 min	Total Imp(%)= 27.00 Dir. Conn.(%)= 27.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.92	2.48
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	150.51	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	29.05		
over (min)	5.00	20.00		
Storage Coeff. (min)=	4.04 (ii)	18.20 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.24	0.06		
			TOTALS	
PEAK FLOW (cms)=	0.15	0.13	0.261 (iii)	
TIME TO PEAK (hrs)=	6.17	6.33	6.17	
RUNOFF VOLUME (mm)=	67.40	27.99	38.63	
TOTAL RAINFALL (mm)=	68.40	68.40	68.40	
RUNOFF COEFFICIENT =	0.99	0.41	0.56	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 76.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0051)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0260):		3.40	0.261	6.17	38.63
+ ID2= 2 (0261):		35.85	0.269	7.75	11.00

ID = 3 (0051): 39.25 0.306 7.58 13.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0271)	Area (ha)= 26.76	Curve Number (CN)= 59.0			
ID= 1 DT= 5.0 min	Ia (mm)= 18.90	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.23				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 4.444

PEAK FLOW (cms)= 0.537 (i)
TIME TO PEAK (hrs)= 6.250
RUNOFF VOLUME (mm)= 10.829
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.158

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

CALIB			
STANDHYD (0270)	Area (ha)= 3.95		
ID= 1 DT= 5.0 min	Total Imp(%)= 31.00	Dir. Conn.(%)= 31.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.22	2.73
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	162.31	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33

1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	14.93	
over (min)	5.00	25.00	
Storage Coeff. (min)=	4.23 (ii)	22.71 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.24	0.05	
			TOTALS
PEAK FLOW (cms)=	0.20	0.07	0.248 (iii)
TIME TO PEAK (hrs)=	6.17	6.42	6.17
RUNOFF VOLUME (mm)=	67.40	15.76	31.77
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.23	0.46

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 57.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0054)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0270):		3.95	0.248	6.17	31.77
+ ID2= 2 (0271):		26.76	0.537	6.25	10.83
ID = 3 (0054):		30.71	0.705	6.17	13.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0281)	Area (ha)=	6.71	Curve Number (CN)= 67.0
ID= 1 DT= 5.0 min	Ia (mm)=	12.90	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.43	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37

2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 0.596

PEAK FLOW (cms)= 0.165 (i)
TIME TO PEAK (hrs)= 6.500
RUNOFF VOLUME (mm)= 17.053
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.249

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

CALIB	
STANDHYD (0280)	Area (ha)= 0.90
ID= 1 DT= 5.0 min	Total Imp(%)= 51.00 Dir. Conn.(%)= 51.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.46	0.44
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.64	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	25.57		
over (min)	5.00	20.00		
Storage Coeff. (min)=	2.72 (ii)	17.62 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.29	0.06		
				TOTALS
PEAK FLOW (cms)=	0.07	0.02		0.092 (iii)
TIME TO PEAK (hrs)=	6.17	6.33		6.17
RUNOFF VOLUME (mm)=	67.40	24.78		46.51
TOTAL RAINFALL (mm)=	68.40	68.40		68.40
RUNOFF COEFFICIENT =	0.99	0.36		0.68

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 72.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0057)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0280):	0.90	0.092	6.17	46.51
+ ID2= 2 (0281):	6.71	0.165	6.50	17.05

ID = 3 (0057): 7.61 0.201 6.50 20.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0201)	Area (ha)= 30.53	Curve Number (CN)= 71.0			
ID= 1 DT= 5.0 min	Ia (mm)= 10.70	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.78				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 1.495

PEAK FLOW (cms)= 0.650 (i)
TIME TO PEAK (hrs)= 7.000
RUNOFF VOLUME (mm)= 20.621
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.301

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

CALIB			
STANDHYD (0200)	Area (ha)= 5.18		
ID= 1 DT= 5.0 min	Total Imp(%)= 33.00	Dir. Conn.(%)= 33.00	
		IMPERVIOUS	PERVIOUS (i)
	Surface Area (ha)=	1.71	3.47
	Dep. Storage (mm)=	1.00	5.00
	Average Slope (%)=	1.00	2.00
	Length (m)=	185.83	40.00
	Mannings n =	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33

1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	25.57	
over (min)	5.00	20.00	
Storage Coeff. (min)=	4.59 (ii)	19.49 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.23	0.06	
			TOTALS
PEAK FLOW (cms)=	0.28	0.16	0.409 (iii)
TIME TO PEAK (hrs)=	6.17	6.33	6.17
RUNOFF VOLUME (mm)=	67.40	24.78	38.85
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.36	0.57

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 72.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0033)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0200):		5.18	0.409	6.17	38.85
+ ID2= 2 (0201):		30.53	0.650	7.00	20.62
ID = 3 (0033):		35.71	0.767	6.67	23.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0211)	Area (ha)=	2.02	Curve Number (CN)= 72.0
ID= 1 DT= 5.0 min	Ia (mm)=	10.50	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.16	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37

2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 0.482

PEAK FLOW (cms)= 0.110 (i)
TIME TO PEAK (hrs)= 6.167
RUNOFF VOLUME (mm)= 21.300
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.311

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

CALIB	
STANDHYD (0210)	Area (ha)= 0.57
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00 Dir. Conn.(%)= 30.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.17	0.40
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	61.73	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	21.97		
over (min)	5.00	20.00		
Storage Coeff. (min)=	2.37 (ii)	18.20 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.30	0.06		
				TOTALS
PEAK FLOW (cms)=	0.03	0.02		0.042 (iii)
TIME TO PEAK (hrs)=	6.17	6.33		6.17
RUNOFF VOLUME (mm)=	67.40	22.64		36.05
TOTAL RAINFALL (mm)=	68.40	68.40		68.40
RUNOFF COEFFICIENT =	0.99	0.33		0.53

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 69.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0036)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0210):		0.57	0.042	6.17	36.05
+ ID2= 2 (0211):		2.02	0.110	6.17	21.30

ID = 3 (0036): 2.59 0.151 6.17 24.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0195)	Area (ha)= 496.69	Curve Number (CN)= 74.0		
ID= 1 DT= 5.0 min	Ia (mm)= 9.20	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 4.78			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 3.969

PEAK FLOW (cms)= 3.225 (i)
TIME TO PEAK (hrs)= 12.083
RUNOFF VOLUME (mm)= 23.609
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.345

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

CALIB				
NASHYD (0196)	Area (ha)= 65.48	Curve Number (CN)= 73.0		
ID= 1 DT= 5.0 min	Ia (mm)= 9.60	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 0.56			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50

2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 4.466

PEAK FLOW (cms)= 1.916 (i)
TIME TO PEAK (hrs)= 6.667
RUNOFF VOLUME (mm)= 22.635
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.331

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

ADD HYD (0059)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0195):	496.69	3.225	12.08	23.61
+ ID2= 2 (0196):	65.48	1.916	6.67	22.63
ID = 3 (0059):	562.17	3.394	11.83	23.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0059)
3 + 2 = 1

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0059):	562.17	3.394	11.83	23.50
+ ID2= 2 (0033):	35.71	0.767	6.67	23.26
ID = 1 (0059):	597.88	3.496	11.67	23.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0059)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0059):	597.88	3.496	11.67	23.48
+ ID2= 2 (0036):	2.59	0.151	6.17	24.55
ID = 3 (0059):	600.47	3.502	11.67	23.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0194)
ID= 1 DT= 5.0 min

Area (ha)= 160.45 Curve Number (CN)= 74.0
Ia (mm)= 9.10 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.95

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37

2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 3.143

PEAK FLOW (cms)= 2.052 (i)
TIME TO PEAK (hrs)= 8.417
RUNOFF VOLUME (mm)= 23.673
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.346

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

ADD HYD (0016)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0194):	160.45	2.052	8.42	23.67
	+ ID2= 2 (0059):	600.47	3.502	11.67	23.49
	ID = 3 (0016):	760.92	4.837	9.58	23.53

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0193)				
ID= 1 DT= 5.0 min	Area (ha)=	48.63	Curve Number (CN)=	64.0
	Ia (mm)=	16.40	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	1.31		

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	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 1.418

PEAK FLOW (cms)= 0.456 (i)
TIME TO PEAK (hrs)= 7.750
RUNOFF VOLUME (mm)= 13.875
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.203

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

ADD HYD (0060)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3					

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0016):	760.92	4.837	9.58	23.53
+ ID2= 2 (0193):	48.63	0.456	7.75	13.88
ID = 3 (0060):	809.55	5.131	9.33	22.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0191) ID= 1 DT= 5.0 min	Area (ha)= 147.11 Curve Number (CN)= 67.0 Ia (mm)= 13.40 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 1.83

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 3.070

PEAK FLOW (cms)= 1.353 (i)
TIME TO PEAK (hrs)= 8.417
RUNOFF VOLUME (mm)= 16.796
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.246

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

CALIB STANDHYD (0190) ID= 1 DT= 5.0 min	Area (ha)= 2.29 Total Imp(%)= 46.00 Dir. Conn.(%)= 46.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.05	1.24
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	123.53	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33

1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37
2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Max.Eff.Inten.(mm/hr)=	58.55	14.93	
over (min)	5.00	25.00	
Storage Coeff. (min)=	3.59 (ii)	22.07 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.26	0.05	
			TOTALS
PEAK FLOW (cms)=	0.17	0.03	0.194 (iii)
TIME TO PEAK (hrs)=	6.17	6.42	6.17
RUNOFF VOLUME (mm)=	67.40	15.76	39.51
TOTAL RAINFALL (mm)=	68.40	68.40	68.40
RUNOFF COEFFICIENT =	0.99	0.23	0.58

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 57.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0030)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0190):	2.29	0.194	6.17	39.51
+ ID2= 2 (0191):	147.11	1.353	8.42	16.80
ID = 3 (0030):	149.40	1.367	8.42	17.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0192)	Area (ha)= 276.67	Curve Number (CN)= 67.0	
ID= 1 DT= 5.0 min	Ia (mm)= 9.40	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 4.85		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.05	6.250	14.91	9.33	2.05
0.167	0.00	3.250	2.74	6.333	14.91	9.42	2.05
0.250	2.05	3.333	2.74	6.417	14.91	9.50	2.05
0.333	2.05	3.417	2.74	6.500	14.91	9.58	2.05
0.417	2.05	3.500	2.74	6.583	14.91	9.67	2.05
0.500	2.05	3.583	2.74	6.667	14.91	9.75	1.64
0.583	2.05	3.667	2.74	6.750	6.57	9.83	1.64
0.667	2.05	3.750	2.74	6.833	6.57	9.92	1.64
0.750	0.96	3.833	2.74	6.917	6.57	10.00	1.64
0.833	0.96	3.917	2.74	7.000	6.57	10.08	1.64
0.917	0.96	4.000	2.74	7.083	6.57	10.17	1.64
1.000	0.96	4.083	2.74	7.167	6.57	10.25	2.33
1.083	0.96	4.167	2.74	7.250	4.38	10.33	2.33
1.167	0.96	4.250	3.69	7.333	4.38	10.42	2.33
1.250	1.78	4.333	3.69	7.417	4.38	10.50	2.33
1.333	1.78	4.417	3.69	7.500	4.38	10.58	2.33
1.417	1.78	4.500	3.69	7.583	4.38	10.67	2.33
1.500	1.78	4.583	3.69	7.667	4.38	10.75	1.50
1.583	1.78	4.667	3.69	7.750	3.83	10.83	1.50
1.667	1.78	4.750	4.65	7.833	3.83	10.92	1.50
1.750	1.78	4.833	4.65	7.917	3.83	11.00	1.50
1.833	1.78	4.917	4.65	8.000	3.83	11.08	1.50
1.917	1.78	5.000	4.65	8.083	3.83	11.17	1.50
2.000	1.78	5.083	4.65	8.167	3.83	11.25	1.37
2.083	1.78	5.167	4.65	8.250	3.01	11.33	1.37
2.167	1.78	5.250	7.39	8.333	3.01	11.42	1.37
2.250	2.33	5.333	7.39	8.417	3.01	11.50	1.37
2.333	2.33	5.417	7.39	8.500	3.01	11.58	1.37
2.417	2.33	5.500	7.39	8.583	3.01	11.67	1.37
2.500	2.33	5.583	7.39	8.667	3.01	11.75	1.37

2.583	2.33	5.667	7.39	8.750	3.15	11.83	1.37
2.667	2.33	5.750	58.55	8.833	3.15	11.92	1.37
2.750	2.05	5.833	58.55	8.917	3.15	12.00	1.37
2.833	2.05	5.917	58.55	9.000	3.15	12.08	1.37
2.917	2.05	6.000	58.55	9.083	3.15	12.17	1.37
3.000	2.05	6.083	58.55	9.167	3.15		
3.083	2.05	6.167	58.55	9.250	2.05		

Unit Hyd Qpeak (cms)= 2.179

PEAK FLOW (cms)= 1.419 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 18.908
TOTAL RAINFALL (mm)= 68.400
RUNOFF COEFFICIENT = 0.276

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

ADD HYD (0061)		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0192):		276.67	1.419	12.25	18.91
+ ID2= 2 (0030):		149.40	1.367	8.42	17.14
ID = 3 (0061):		426.07	2.261	9.67	18.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L             (v 6.2.2006)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

Output filename:
C:\Users\caeh076182\AppData\Local\Civica\VH5\18e334db-11e6-4c2c-9e9b-68ade393f174\2b3d8f0d-2961-4848-bc93-9bff83cc6050\s
Summary filename:
C:\Users\caeh076182\AppData\Local\Civica\VH5\18e334db-11e6-4c2c-9e9b-68ade393f174\2b3d8f0d-2961-4848-bc93-9bff83cc6050\s

DATE: 12-14-2022 TIME: 02:56:48

USER:

COMMENTS: _____

```
  ***********************************************
  ** SIMULATION : 12SCS010                     **
  ***********************************************
```

READ STORM	Filename: C:\Users\caeh076182\AppData\Local\Temp\4057dc77-ff29-4e2b-baf3-03ff24407828\aa2a049c
Ptotal= 78.00 mm	Comments: 12SCS010

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.17	0.00	3.33	3.12	6.50	17.00	9.67	2.34
0.33	2.34	3.50	3.12	6.67	17.00	9.83	1.87
0.50	2.34	3.67	3.12	6.83	7.49	10.00	1.87
0.67	2.34	3.83	3.12	7.00	7.49	10.17	1.87
0.83	1.09	4.00	3.12	7.17	7.49	10.33	2.65
1.00	1.09	4.17	3.12	7.33	4.99	10.50	2.65
1.17	1.09	4.33	4.21	7.50	4.99	10.67	2.65
1.33	2.03	4.50	4.21	7.67	4.99	10.83	1.72
1.50	2.03	4.67	4.21	7.83	4.37	11.00	1.72
1.67	2.03	4.83	5.30	8.00	4.37	11.17	1.72
1.83	2.03	5.00	5.30	8.17	4.37	11.33	1.56
2.00	2.03	5.17	5.30	8.33	3.43	11.50	1.56
2.17	2.03	5.33	8.42	8.50	3.43	11.67	1.56
2.33	2.65	5.50	8.42	8.67	3.43	11.83	1.56

2.50	2.65	5.67	8.42	8.83	3.59	12.00	1.56
2.67	2.65	5.83	66.77	9.00	3.59	12.17	1.56
2.83	2.34	6.00	66.77	9.17	3.59		
3.00	2.34	6.17	66.77	9.33	2.34		
3.17	2.34	6.33	17.00	9.50	2.34		

CALIB NASHYD (0101) ID= 1 DT= 5.0 min			
	Area (ha)=	7.90	Curve Number (CN)= 62.0
	Ia (mm)=	16.80	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.46	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.34	6.250	17.00	9.33	2.34
0.167	0.00	3.250	3.12	6.333	17.00	9.42	2.34
0.250	2.34	3.333	3.12	6.417	17.00	9.50	2.34
0.333	2.34	3.417	3.12	6.500	17.00	9.58	2.34
0.417	2.34	3.500	3.12	6.583	17.00	9.67	2.34
0.500	2.34	3.583	3.12	6.667	17.00	9.75	1.87
0.583	2.34	3.667	3.12	6.750	7.49	9.83	1.87
0.667	2.34	3.750	3.12	6.833	7.49	9.92	1.87
0.750	1.09	3.833	3.12	6.917	7.49	10.00	1.87
0.833	1.09	3.917	3.12	7.000	7.49	10.08	1.87
0.917	1.09	4.000	3.12	7.083	7.49	10.17	1.87
1.000	1.09	4.083	3.12	7.167	7.49	10.25	2.65
1.083	1.09	4.167	3.12	7.250	4.99	10.33	2.65
1.167	1.09	4.250	4.21	7.333	4.99	10.42	2.65
1.250	2.03	4.333	4.21	7.417	4.99	10.50	2.65
1.333	2.03	4.417	4.21	7.500	4.99	10.58	2.65
1.417	2.03	4.500	4.21	7.583	4.99	10.67	2.65
1.500	2.03	4.583	4.21	7.667	4.99	10.75	1.72
1.583	2.03	4.667	4.21	7.750	4.37	10.83	1.72
1.667	2.03	4.750	5.30	7.833	4.37	10.92	1.72
1.750	2.03	4.833	5.30	7.917	4.37	11.00	1.72
1.833	2.03	4.917	5.30	8.000	4.37	11.08	1.72
1.917	2.03	5.000	5.30	8.083	4.37	11.17	1.72
2.000	2.03	5.083	5.30	8.167	4.37	11.25	1.56
2.083	2.03	5.167	5.30	8.250	3.43	11.33	1.56
2.167	2.03	5.250	8.42	8.333	3.43	11.42	1.56
2.250	2.65	5.333	8.42	8.417	3.43	11.50	1.56
2.333	2.65	5.417	8.42	8.500	3.43	11.58	1.56
2.417	2.65	5.500	8.42	8.583	3.43	11.67	1.56
2.500	2.65	5.583	8.42	8.667	3.43	11.75	1.56
2.583	2.65	5.667	8.42	8.750	3.59	11.83	1.56
2.667	2.65	5.750	66.77	8.833	3.59	11.92	1.56
2.750	2.34	5.833	66.77	8.917	3.59	12.00	1.56
2.833	2.34	5.917	66.77	9.000	3.59	12.08	1.56
2.917	2.34	6.000	66.77	9.083	3.59	12.17	1.56
3.000	2.34	6.083	66.77	9.167	3.59		
3.083	2.34	6.167	66.77	9.250	2.34		

Unit Hyd Qpeak (cms)= 0.656

PEAK FLOW (cms)= 0.184 (i)
TIME TO PEAK (hrs)= 6.583
RUNOFF VOLUME (mm)= 17.268
TOTAL RAINFALL (mm)= 78.000
RUNOFF COEFFICIENT = 0.221

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

CALIB STANDHYD (0100) ID= 1 DT= 5.0 min				
	Area (ha)=	0.91		
	Total Imp(%)=	61.00	Dir. Conn.(%)=	61.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.56	0.35
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.68	40.00
Mannings n	=	0.013	0.360

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.34	6.250	17.00	9.33	2.34
0.167	0.00	3.250	3.12	6.333	17.00	9.42	2.34
0.250	2.34	3.333	3.12	6.417	17.00	9.50	2.34
0.333	2.34	3.417	3.12	6.500	17.00	9.58	2.34
0.417	2.34	3.500	3.12	6.583	17.00	9.67	2.34
0.500	2.34	3.583	3.12	6.667	17.00	9.75	1.87
0.583	2.34	3.667	3.12	6.750	7.49	9.83	1.87
0.667	2.34	3.750	3.12	6.833	7.49	9.92	1.87
0.750	1.09	3.833	3.12	6.917	7.49	10.00	1.87
0.833	1.09	3.917	3.12	7.000	7.49	10.08	1.87
0.917	1.09	4.000	3.12	7.083	7.49	10.17	1.87
1.000	1.09	4.083	3.12	7.167	7.49	10.25	2.65
1.083	1.09	4.167	3.12	7.250	4.99	10.33	2.65

1.167	1.09	4.250	4.21	7.333	4.99	10.42	2.65
1.250	2.03	4.333	4.21	7.417	4.99	10.50	2.65
1.333	2.03	4.417	4.21	7.500	4.99	10.58	2.65
1.417	2.03	4.500	4.21	7.583	4.99	10.67	2.65
1.500	2.03	4.583	4.21	7.667	4.99	10.75	1.72
1.583	2.03	4.667	4.21	7.750	4.37	10.83	1.72
1.667	2.03	4.750	5.30	7.833	4.37	10.92	1.72
1.750	2.03	4.833	5.30	7.917	4.37	11.00	1.72
1.833	2.03	4.917	5.30	8.000	4.37	11.08	1.72
1.917	2.03	5.000	5.30	8.083	4.37	11.17	1.72
2.000	2.03	5.083	5.30	8.167	4.37	11.25	1.56
2.083	2.03	5.167	5.30	8.250	3.43	11.33	1.56
2.167	2.03	5.250	8.42	8.333	3.43	11.42	1.56
2.250	2.65	5.333	8.42	8.417	3.43	11.50	1.56
2.333	2.65	5.417	8.42	8.500	3.43	11.58	1.56
2.417	2.65	5.500	8.42	8.583	3.43	11.67	1.56
2.500	2.65	5.583	8.42	8.667	3.43	11.75	1.56
2.583	2.65	5.667	8.42	8.750	3.59	11.83	1.56
2.667	2.65	5.750	66.77	8.833	3.59	11.92	1.56
2.750	2.34	5.833	66.77	8.917	3.59	12.00	1.56
2.833	2.34	5.917	66.77	9.000	3.59	12.08	1.56
2.917	2.34	6.000	66.77	9.083	3.59	12.17	1.56
3.000	2.34	6.083	66.77	9.167	3.59		
3.083	2.34	6.167	66.77	9.250	2.34		

Max.Eff.Inten.(mm/hr)=	66.77	27.56	
over (min)	5.00	20.00	
Storage Coeff. (min)=	2.58 (ii)	17.29 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.29	0.06	
			TOTALS
PEAK FLOW (cms)=	0.10	0.02	0.118 (iii)
TIME TO PEAK (hrs)=	6.17	6.33	6.17
RUNOFF VOLUME (mm)=	77.00	26.90	57.45
TOTAL RAINFALL (mm)=	78.00	78.00	78.00
RUNOFF COEFFICIENT =	0.99	0.34	0.74

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 67.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0003)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0100):	0.91	0.118	6.17	57.45
+ ID2= 2 (0101):	7.90	0.184	6.58	17.27
ID = 3 (0003):	8.81	0.224	6.58	21.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0111)	Area (ha)= 5.33	Curve Number (CN)= 54.0	
ID= 1 DT= 5.0 min	Ia (mm)= 22.80	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.38		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.34	6.250	17.00	9.33	2.34
0.167	0.00	3.250	3.12	6.333	17.00	9.42	2.34
0.250	2.34	3.333	3.12	6.417	17.00	9.50	2.34
0.333	2.34	3.417	3.12	6.500	17.00	9.58	2.34
0.417	2.34	3.500	3.12	6.583	17.00	9.67	2.34
0.500	2.34	3.583	3.12	6.667	17.00	9.75	1.87
0.583	2.34	3.667	3.12	6.750	7.49	9.83	1.87
0.667	2.34	3.750	3.12	6.833	7.49	9.92	1.87
0.750	1.09	3.833	3.12	6.917	7.49	10.00	1.87
0.833	1.09	3.917	3.12	7.000	7.49	10.08	1.87
0.917	1.09	4.000	3.12	7.083	7.49	10.17	1.87
1.000	1.09	4.083	3.12	7.167	7.49	10.25	2.65
1.083	1.09	4.167	3.12	7.250	4.99	10.33	2.65
1.167	1.09	4.250	4.21	7.333	4.99	10.42	2.65
1.250	2.03	4.333	4.21	7.417	4.99	10.50	2.65
1.333	2.03	4.417	4.21	7.500	4.99	10.58	2.65
1.417	2.03	4.500	4.21	7.583	4.99	10.67	2.65
1.500	2.03	4.583	4.21	7.667	4.99	10.75	1.72
1.583	2.03	4.667	4.21	7.750	4.37	10.83	1.72
1.667	2.03	4.750	5.30	7.833	4.37	10.92	1.72
1.750	2.03	4.833	5.30	7.917	4.37	11.00	1.72
1.833	2.03	4.917	5.30	8.000	4.37	11.08	1.72
1.917	2.03	5.000	5.30	8.083	4.37	11.17	1.72
2.000	2.03	5.083	5.30	8.167	4.37	11.25	1.56
2.083	2.03	5.167	5.30	8.250	3.43	11.33	1.56
2.167	2.03	5.250	8.42	8.333	3.43	11.42	1.56
2.250	2.65	5.333	8.42	8.417	3.43	11.50	1.56
2.333	2.65	5.417	8.42	8.500	3.43	11.58	1.56
2.417	2.65	5.500	8.42	8.583	3.43	11.67	1.56
2.500	2.65	5.583	8.42	8.667	3.43	11.75	1.56

2.583	2.65	5.667	8.42	8.750	3.59	11.83	1.56
2.667	2.65	5.750	66.77	8.833	3.59	11.92	1.56
2.750	2.34	5.833	66.77	8.917	3.59	12.00	1.56
2.833	2.34	5.917	66.77	9.000	3.59	12.08	1.56
2.917	2.34	6.000	66.77	9.083	3.59	12.17	1.56
3.000	2.34	6.083	66.77	9.167	3.59		
3.083	2.34	6.167	66.77	9.250	2.34		

Unit Hyd Qpeak (cms)= 0.536

PEAK FLOW (cms)= 0.081 (i)
TIME TO PEAK (hrs)= 6.500
RUNOFF VOLUME (mm)= 11.218
TOTAL RAINFALL (mm)= 78.000
RUNOFF COEFFICIENT = 0.144

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

CALIB	
STANDHYD (0110)	Area (ha)= 1.01
ID= 1 DT= 5.0 min	Total Imp(%)= 30.00 Dir. Conn.(%)= 30.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.30	0.71
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	81.96	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.34	6.250	17.00	9.33	2.34
0.167	0.00	3.250	3.12	6.333	17.00	9.42	2.34
0.250	2.34	3.333	3.12	6.417	17.00	9.50	2.34
0.333	2.34	3.417	3.12	6.500	17.00	9.58	2.34
0.417	2.34	3.500	3.12	6.583	17.00	9.67	2.34
0.500	2.34	3.583	3.12	6.667	17.00	9.75	1.87
0.583	2.34	3.667	3.12	6.750	7.49	9.83	1.87
0.667	2.34	3.750	3.12	6.833	7.49	9.92	1.87
0.750	1.09	3.833	3.12	6.917	7.49	10.00	1.87
0.833	1.09	3.917	3.12	7.000	7.49	10.08	1.87
0.917	1.09	4.000	3.12	7.083	7.49	10.17	1.87
1.000	1.09	4.083	3.12	7.167	7.49	10.25	2.65
1.083	1.09	4.167	3.12	7.250	4.99	10.33	2.65
1.167	1.09	4.250	4.21	7.333	4.99	10.42	2.65
1.250	2.03	4.333	4.21	7.417	4.99	10.50	2.65
1.333	2.03	4.417	4.21	7.500	4.99	10.58	2.65
1.417	2.03	4.500	4.21	7.583	4.99	10.67	2.65
1.500	2.03	4.583	4.21	7.667	4.99	10.75	1.72
1.583	2.03	4.667	4.21	7.750	4.37	10.83	1.72
1.667	2.03	4.750	5.30	7.833	4.37	10.92	1.72
1.750	2.03	4.833	5.30	7.917	4.37	11.00	1.72
1.833	2.03	4.917	5.30	8.000	4.37	11.08	1.72
1.917	2.03	5.000	5.30	8.083	4.37	11.17	1.72
2.000	2.03	5.083	5.30	8.167	4.37	11.25	1.56
2.083	2.03	5.167	5.30	8.250	3.43	11.33	1.56
2.167	2.03	5.250	8.42	8.333	3.43	11.42	1.56
2.250	2.65	5.333	8.42	8.417	3.43	11.50	1.56
2.333	2.65	5.417	8.42	8.500	3.43	11.58	1.56
2.417	2.65	5.500	8.42	8.583	3.43	11.67	1.56
2.500	2.65	5.583	8.42	8.667	3.43	11.75	1.56
2.583	2.65	5.667	8.42	8.750	3.59	11.83	1.56
2.667	2.65	5.750	66.77	8.833	3.59	11.92	1.56
2.750	2.34	5.833	66.77	8.917	3.59	12.00	1.56
2.833	2.34	5.917	66.77	9.000	3.59	12.08	1.56
2.917	2.34	6.000	66.77	9.083	3.59	12.17	1.56
3.000	2.34	6.083	66.77	9.167	3.59		
3.083	2.34	6.167	66.77	9.250	2.34		

				TOTALS
Max.Eff.Inten.(mm/hr)=		66.77	17.99	
over (min)		5.00	20.00	
Storage Coeff. (min)=		2.66 (ii)	19.82 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		0.29	0.06	
PEAK FLOW	(cms)=	0.06	0.02	0.075 (iii)
TIME TO PEAK	(hrs)=	6.17	6.33	6.17
RUNOFF VOLUME	(mm)=	77.00	18.98	36.37
TOTAL RAINFALL	(mm)=	78.00	78.00	78.00
RUNOFF COEFFICIENT	=	0.99	0.24	0.47

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0110):	1.01	0.075	6.17	36.37
+ ID2= 2 (0111):	5.33	0.081	6.50	11.22
ID = 3 (0006):	6.34	0.119	6.17	15.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0121)
ID= 1 DT= 5.0 min

Area (ha)= 2.33 Curve Number (CN)= 54.0
Ia (mm)= 22.80 # 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	0.00	3.167	2.34	6.250	17.00	9.33	2.34
0.167	0.00	3.250	3.12	6.333	17.00	9.42	2.34
0.250	2.34	3.333	3.12	6.417	17.00	9.50	2.34
0.333	2.34	3.417	3.12	6.500	17.00	9.58	2.34
0.417	2.34	3.500	3.12	6.583	17.00	9.67	2.34
0.500	2.34	3.583	3.12	6.667	17.00	9.75	1.87
0.583	2.34	3.667	3.12	6.750	7.49	9.83	1.87
0.667	2.34	3.750	3.12	6.833	7.49	9.92	1.87
0.750	1.09	3.833	3.12	6.917	7.49	10.00	1.87
0.833	1.09	3.917	3.12	7.000	7.49	10.08	1.87
0.917	1.09	4.000	3.12	7.083	7.49	10.17	1.87
1.000	1.09	4.083	3.12	7.167	7.49	10.25	2.65
1.083	1.09	4.167	3.12	7.250	4.99	10.33	2.65
1.167	1.09	4.250	4.21	7.333	4.99	10.42	2.65
1.250	2.03	4.333	4.21	7.417	4.99	10.50	2.65
1.333	2.03	4.417	4.21	7.500	4.99	10.58	2.65
1.417	2.03	4.500	4.21	7.583	4.99	10.67	2.65
1.500	2.03	4.583	4.21	7.667	4.99	10.75	1.72
1.583	2.03	4.667	4.21	7.750	4.37	10.83	1.72
1.667	2.03	4.750	5.30	7.833	4.37	10.92	1.72
1.750	2.03	4.833	5.30	7.917	4.37	11.00	1.72
1.833	2.03	4.917	5.30	8.000	4.37	11.08	1.72
1.917	2.03	5.000	5.30	8.083	4.37	11.17	1.72
2.000	2.03	5.083	5.30	8.167	4.37	11.25	1.56
2.083	2.03	5.167	5.30	8.250	3.43	11.33	1.56
2.167	2.03	5.250	8.42	8.333	3.43	11.42	1.56
2.250	2.65	5.333	8.42	8.417	3.43	11.50	1.56
2.333	2.65	5.417	8.42	8.500	3.43	11.58	1.56
2.417	2.65	5.500	8.42	8.583	3.43	11.67	1.56
2.500	2.65	5.583	8.42	8.667	3.43	11.75	1.56
2.583	2.65	5.667	8.42	8.750	3.59	11.83	1.56
2.667	2.65	5.750	66.77	8.833	3.59	11.92	1.56
2.750	2.34	5.833	66.77	8.917	3.59	12.00	1.56
2.833	2.34	5.917	66.77	9.000	3.59	12.08	1.56
2.917	2.34	6.000	66.77	9.083	3.59	12.17	1.56
3.000	2.34	6.083	66.77	9.167	3.59		
3.083	2.34	6.167	66.77	9.250	2.34		

Unit Hyd Qpeak (cms)= 0.133

PEAK FLOW (cms)= 0.026 (i)
TIME TO PEAK (hrs)= 7.000
RUNOFF VOLUME (mm)= 11.219
TOTAL RAINFALL (mm)= 78.000
RUNOFF COEFFICIENT = 0.144

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

CALIB
STANDHYD (0120)
ID= 1 DT= 5.0 min

Area (ha)= 0.82
Total Imp(%)= 32.00 Dir. Conn.(%)= 32.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.56
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	73.80	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.34	6.250	17.00	9.33	2.34
0.167	0.00	3.250	3.12	6.333	17.00	9.42	2.34
0.250	2.34	3.333	3.12	6.417	17.00	9.50	2.34
0.333	2.34	3.417	3.12	6.500	17.00	9.58	2.34
0.417	2.34	3.500	3.12	6.583	17.00	9.67	2.34
0.500	2.34	3.583	3.12	6.667	17.00	9.75	1.87
0.583	2.34	3.667	3.12	6.750	7.49	9.83	1.87
0.667	2.34	3.750	3.12	6.833	7.49	9.92	1.87
0.750	1.09	3.833	3.12	6.917	7.49	10.00	1.87
0.833	1.09	3.917	3.12	7.000	7.49	10.08	1.87
0.917	1.09	4.000	3.12	7.083	7.49	10.17	1.87
1.000	1.09	4.083	3.12	7.167	7.49	10.25	2.65
1.083	1.09	4.167	3.12	7.250	4.99	10.33	2.65

1.167	1.09	4.250	4.21	7.333	4.99	10.42	2.65
1.250	2.03	4.333	4.21	7.417	4.99	10.50	2.65
1.333	2.03	4.417	4.21	7.500	4.99	10.58	2.65
1.417	2.03	4.500	4.21	7.583	4.99	10.67	2.65
1.500	2.03	4.583	4.21	7.667	4.99	10.75	1.72
1.583	2.03	4.667	4.21	7.750	4.37	10.83	1.72
1.667	2.03	4.750	5.30	7.833	4.37	10.92	1.72
1.750	2.03	4.833	5.30	7.917	4.37	11.00	1.72
1.833	2.03	4.917	5.30	8.000	4.37	11.08	1.72
1.917	2.03	5.000	5.30	8.083	4.37	11.17	1.72
2.000	2.03	5.083	5.30	8.167	4.37	11.25	1.56
2.083	2.03	5.167	5.30	8.250	3.43	11.33	1.56
2.167	2.03	5.250	8.42	8.333	3.43	11.42	1.56
2.250	2.65	5.333	8.42	8.417	3.43	11.50	1.56
2.333	2.65	5.417	8.42	8.500	3.43	11.58	1.56
2.417	2.65	5.500	8.42	8.583	3.43	11.67	1.56
2.500	2.65	5.583	8.42	8.667	3.43	11.75	1.56
2.583	2.65	5.667	8.42	8.750	3.59	11.83	1.56
2.667	2.65	5.750	66.77	8.833	3.59	11.92	1.56
2.750	2.34	5.833	66.77	8.917	3.59	12.00	1.56
2.833	2.34	5.917	66.77	9.000	3.59	12.08	1.56
2.917	2.34	6.000	66.77	9.083	3.59	12.17	1.56
3.000	2.34	6.083	66.77	9.167	3.59		
3.083	2.34	6.167	66.77	9.250	2.34		

Max.Eff.Inten.(mm/hr)=	66.77	17.99	
over (min)	5.00	20.00	
Storage Coeff. (min)=	2.50 (ii)	19.65 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.29	0.06	
			TOTALS
PEAK FLOW (cms)=	0.05	0.02	0.064 (iii)
TIME TO PEAK (hrs)=	6.17	6.33	6.17
RUNOFF VOLUME (mm)=	77.00	18.98	37.53
TOTAL RAINFALL (mm)=	78.00	78.00	78.00
RUNOFF COEFFICIENT =	0.99	0.24	0.48

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0009)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0120):	0.82	0.064	6.17	37.53
+ ID2= 2 (0121):	2.33	0.026	7.00	11.22
ID = 3 (0009):	3.15	0.070	6.17	18.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0131) ID= 1 DT= 5.0 min				
	Area (ha)=	10.63	Curve Number (CN)=	54.0
	Ia (mm)=	22.80	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.69		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.34	6.250	17.00	9.33	2.34
0.167	0.00	3.250	3.12	6.333	17.00	9.42	2.34
0.250	2.34	3.333	3.12	6.417	17.00	9.50	2.34
0.333	2.34	3.417	3.12	6.500	17.00	9.58	2.34
0.417	2.34	3.500	3.12	6.583	17.00	9.67	2.34
0.500	2.34	3.583	3.12	6.667	17.00	9.75	1.87
0.583	2.34	3.667	3.12	6.750	7.49	9.83	1.87
0.667	2.34	3.750	3.12	6.833	7.49	9.92	1.87
0.750	1.09	3.833	3.12	6.917	7.49	10.00	1.87
0.833	1.09	3.917	3.12	7.000	7.49	10.08	1.87
0.917	1.09	4.000	3.12	7.083	7.49	10.17	1.87
1.000	1.09	4.083	3.12	7.167	7.49	10.25	2.65
1.083	1.09	4.167	3.12	7.250	4.99	10.33	2.65
1.167	1.09	4.250	4.21	7.333	4.99	10.42	2.65
1.250	2.03	4.333	4.21	7.417	4.99	10.50	2.65
1.333	2.03	4.417	4.21	7.500	4.99	10.58	2.65
1.417	2.03	4.500	4.21	7.583	4.99	10.67	2.65
1.500	2.03	4.583	4.21	7.667	4.99	10.75	1.72
1.583	2.03	4.667	4.21	7.750	4.37	10.83	1.72
1.667	2.03	4.750	5.30	7.833	4.37	10.92	1.72
1.750	2.03	4.833	5.30	7.917	4.37	11.00	1.72
1.833	2.03	4.917	5.30	8.000	4.37	11.08	1.72
1.917	2.03	5.000	5.30	8.083	4.37	11.17	1.72
2.000	2.03	5.083	5.30	8.167	4.37	11.25	1.56
2.083	2.03	5.167	5.30	8.250	3.43	11.33	1.56
2.167	2.03	5.250	8.42	8.333	3.43	11.42	1.56
2.250	2.65	5.333	8.42	8.417	3.43	11.50	1.56
2.333	2.65	5.417	8.42	8.500	3.43	11.58	1.56
2.417	2.65	5.500	8.42	8.583	3.43	11.67	1.56
2.500	2.65	5.583	8.42	8.667	3.43	11.75	1.56

2.583	2.65	5.667	8.42	8.750	3.59	11.83	1.56
2.667	2.65	5.750	66.77	8.833	3.59	11.92	1.56
2.750	2.34	5.833	66.77	8.917	3.59	12.00	1.56
2.833	2.34	5.917	66.77	9.000	3.59	12.08	1.56
2.917	2.34	6.000	66.77	9.083	3.59	12.17	1.56
3.000	2.34	6.083	66.77	9.167	3.59		
3.083	2.34	6.167	66.77	9.250	2.34		

Unit Hyd Qpeak (cms)= 0.588

PEAK FLOW (cms)= 0.117 (i)
TIME TO PEAK (hrs)= 7.000
RUNOFF VOLUME (mm)= 11.220
TOTAL RAINFALL (mm)= 78.000
RUNOFF COEFFICIENT = 0.144

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

CALIB	
STANDHYD (0130)	Area (ha)= 1.57
ID= 1 DT= 5.0 min	Total Imp(%)= 34.00 Dir. Conn.(%)= 34.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.53	1.04
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	102.35	40.00
Mannings n	=	0.013	0.350

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.34	6.250	17.00	9.33	2.34
0.167	0.00	3.250	3.12	6.333	17.00	9.42	2.34
0.250	2.34	3.333	3.12	6.417	17.00	9.50	2.34
0.333	2.34	3.417	3.12	6.500	17.00	9.58	2.34
0.417	2.34	3.500	3.12	6.583	17.00	9.67	2.34
0.500	2.34	3.583	3.12	6.667	17.00	9.75	1.87
0.583	2.34	3.667	3.12	6.750	7.49	9.83	1.87
0.667	2.34	3.750	3.12	6.833	7.49	9.92	1.87
0.750	1.09	3.833	3.12	6.917	7.49	10.00	1.87
0.833	1.09	3.917	3.12	7.000	7.49	10.08	1.87
0.917	1.09	4.000	3.12	7.083	7.49	10.17	1.87
1.000	1.09	4.083	3.12	7.167	7.49	10.25	2.65
1.083	1.09	4.167	3.12	7.250	4.99	10.33	2.65
1.167	1.09	4.250	4.21	7.333	4.99	10.42	2.65
1.250	2.03	4.333	4.21	7.417	4.99	10.50	2.65
1.333	2.03	4.417	4.21	7.500	4.99	10.58	2.65
1.417	2.03	4.500	4.21	7.583	4.99	10.67	2.65
1.500	2.03	4.583	4.21	7.667	4.99	10.75	1.72
1.583	2.03	4.667	4.21	7.750	4.37	10.83	1.72
1.667	2.03	4.750	5.30	7.833	4.37	10.92	1.72
1.750	2.03	4.833	5.30	7.917	4.37	11.00	1.72
1.833	2.03	4.917	5.30	8.000	4.37	11.08	1.72
1.917	2.03	5.000	5.30	8.083	4.37	11.17	1.72
2.000	2.03	5.083	5.30	8.167	4.37	11.25	1.56
2.083	2.03	5.167	5.30	8.250	3.43	11.33	1.56
2.167	2.03	5.250	8.42	8.333	3.43	11.42	1.56
2.250	2.65	5.333	8.42	8.417	3.43	11.50	1.56
2.333	2.65	5.417	8.42	8.500	3.43	11.58	1.56
2.417	2.65	5.500	8.42	8.583	3.43	11.67	1.56
2.500	2.65	5.583	8.42	8.667	3.43	11.75	1.56
2.583	2.65	5.667	8.42	8.750	3.59	11.83	1.56
2.667	2.65	5.750	66.77	8.833	3.59	11.92	1.56
2.750	2.34	5.833	66.77	8.917	3.59	12.00	1.56
2.833	2.34	5.917	66.77	9.000	3.59	12.08	1.56
2.917	2.34	6.000	66.77	9.083	3.59	12.17	1.56
3.000	2.34	6.083	66.77	9.167	3.59		
3.083	2.34	6.167	66.77	9.250	2.34		

				TOTALS
Max.Eff.Inten.(mm/hr)=		66.77	17.99	
over (min)		5.00	25.00	
Storage Coeff. (min)=		3.04 (ii)	20.20 (ii)	
Unit Hyd. Tpeak (min)=		5.00	25.00	
Unit Hyd. peak (cms)=		0.27	0.05	
PEAK FLOW	(cms)=	0.10	0.03	0.123 (iii)
TIME TO PEAK	(hrs)=	6.17	6.42	6.17
RUNOFF VOLUME	(mm)=	77.00	18.98	38.70
TOTAL RAINFALL	(mm)=	78.00	78.00	78.00
RUNOFF COEFFICIENT	=	0.99	0.24	0.50

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 55.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0012)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.