15117 MEDWAY ROAD FLOODPLAIN MAPPING

FLOOD HAZARD ASSESSMENT

JUNE 3, 2026

PROJECT 25-1266

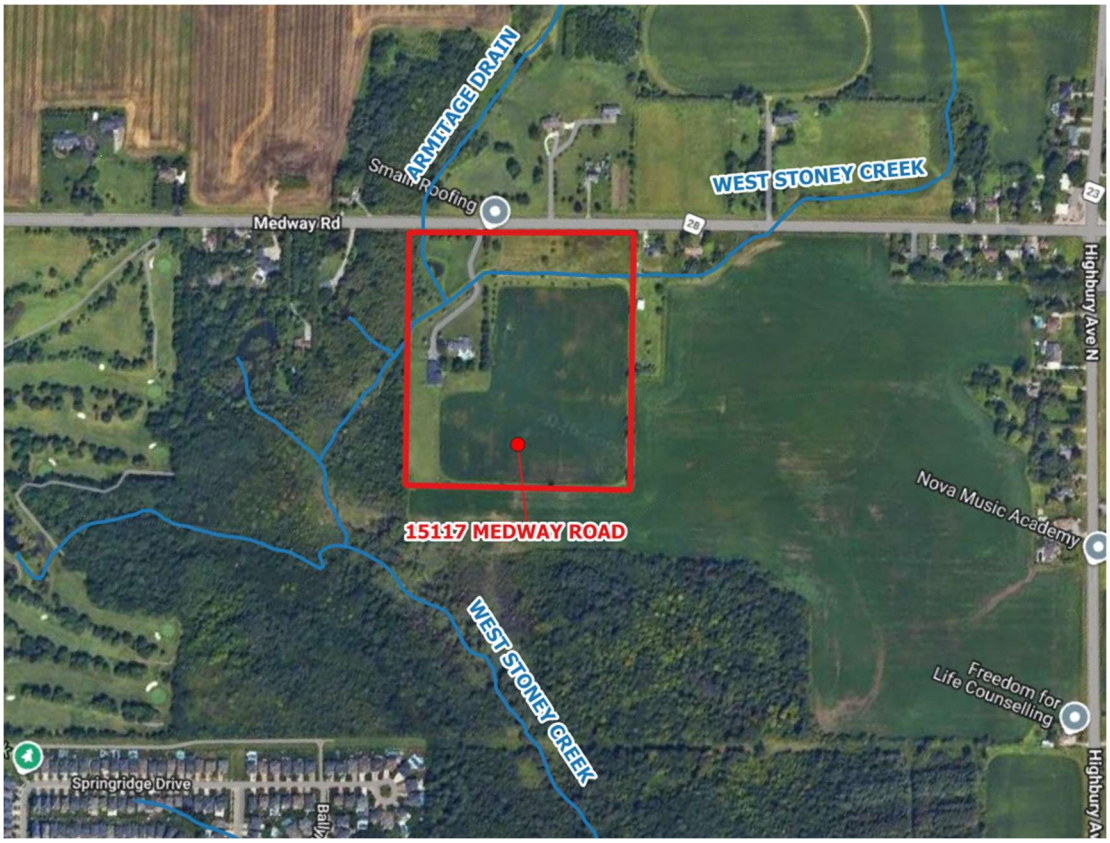

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

1.0 INTRODUCTION 2

1.1 BACKGROUND AND RELEVANT DOCUMENTS 2

1.2 SCOPE OF WORK 3

2.0 HYDROLOGY 5

2.1 METHODOLOGY 5

2.1.1 CATCHMENT DELINEATION 5

2.1.2 SURFICIAL SOILS/INFILTRATION PARAMETERS 5

2.1.3 LAND-USE/PERCENT IMPERVIOUS, DEPRESSION STORAGE, AND MANNING'S ROUGHNESS VALUES 8

2.1.4 CHANNEL ROUTING 11

2.1.5 FLOW NODE LOCATIONS 11

2.1.6 STORM DISTRIBUTIONS 12

2.1.7 WATERSHED FLOW LENGTHS & SLOPE 12

2.1.8 OVERALL WATERSHED MAP 12

2.2 HYDROLOGIC MODELLING RESULTS 14

2.2.1 CATCHMENT RESULTS 14

2.3 SENSITIVITY ANALYSIS 15

2.3.1 HYDRAULIC CONSIDERATIONS 17

3.0 HYDRAULIC ANALYSIS 18

3.1 HYDRAULIC STRUCTURES 18

3.2 HYDRAULIC MODELLING METHODOLOGY 19

3.3 HYDRAULIC MODELLING RESULTS 20

3.4 HYDRAULIC ANALYSIS – SENSITIVITY ANALYSIS 21

3.4.1 SENSITIVITY ANALYSIS RESULTS 22

3.4.2 DEVELOPMENT RECOMMENDATIONS – FREEBOARD 24

3.4.3 SAFE ACCESS ASSESSMENT 24

3.5 FLOODPLAIN MAPPING 25

4.0 CONCLUSIONS AND RECOMMENDATIONS 25

LIST OF TABLES

Table 2.1: Soil Texture Class Within Overall Watershed
Table 2.2: Percent Impervious & Land-use
Table 2.3: Peak flows Through Project Reach
Table 2.4: Sensitivity Analysis Results
Table 2.5: 250-year Sensitivity Analysis Peak Flows
Table 3.1: Hydraulic Structure Summary
Table 3.2: Cross Section Summary
Table 3.3: HEC-RAS Flow Inputs
Table 3.4: Armitage Drain Flood Elevations
Table 3.5: West Stoney Creek Flood Elevations
Table 3.6: West Stoney Creek Downstream of the Armitage Drain Confluence Flood Elevations
Table 3.7: Sensitivity Analysis – Armitage Drain Flood Elevations
Table 3.8: Sensitivity Analysis - West Stoney Creek Flood Elevations
Table 3.9: Sensitivity Analysis – West Stoney Creek Downstream of the Armitage Drain Flood Elevations
Table 3.10: 250-year Relief Flow Results

LIST OF FIGURES

Figure 1.1: Site Location Plan
Figure 2.1: Surficial Soil Groups
Figure 2.2: Overall Landcover
Figure 2.3: Watershed Schematic

LIST OF APPENDICES

Appendix A: Sub-catchment Summary
Appendix B: Hydrologic Analysis Results – 250-year Event
Appendix C: Hydraulic Analysis Results
Appendix D: Floodplain Mapsheets

15117 MEDWAY ROAD FLOODPLAIN MAPPING
FLOOD HAZARD ASSESSMENT

EXECUTIVE SUMMARY

This report has been prepared to determine the existing flood hazard extents on the subject property at 15117 Medway Road within Middlesex County, Ontario. The flood hazard extents will establish development limits on the subject property in accordance with municipal and provincial standards enforced by the Upper Thames River Conservation Authority (UTRCA).

There is no official UTRCA floodplain mapping in this area. Therefore, the UTRCA has requested that an existing conditions flood hazard assessment be completed prior to any potential grading/modifications on the lands.

A hydrologic analysis was completed to determine peak flow rates of West Stoney Creek and Armitage Drain which intersects/is near the subject property. Both watercourses convey runoff from primarily agricultural lands in a southern direction and ultimately discharges to the Thames River. The analysis analyzed the entire contributing watershed and established flows generated from the 250-year storm event. The analysis assessed watershed characteristics such as land-use, slope, vegetative cover, and soil information to establish peak flow rates throughout the watercourse. A sensitivity analysis was completed to account for climate change and quantify levels of uncertainty in support of regulatory flood hazard setbacks.

LIDAR topographic information and hydrologic results were used to undertake a hydraulic analysis of West Stoney Creek and Armitage Drain within the scope of the property. Further sensitivity analysis was completed for the hydraulic analyses and related modelling to not only quantify uncertainty but to determine freeboard levels and factors of safety for development.

The study and analyses resulted in a delineated flood hazard limit for the subject property. It is Greck's recommendation to ensure any future development is located outside of Regulatory floodplain with freeboard in accordance with provincial policy.

1.0 INTRODUCTION

Future development works are proposed for 15117 Medway Road, located in Middlesex County, Ontario. See **Figure 1.1** below for the site location plan.

A new sports facility on the subject lands is proposed, including soccer fields, an Olympic-size swimming pool, basketball courts, ball courts, a gymnasium, and related amenities.

15117 Medway Road is approximately 11ha in size. The property is bound by Medway Road to the north, agricultural lands to the east and south, and West Stoney Creek, forested area, and a single dwelling lot to the west. West Stoney Creek runs east to west, and Armitage Drain runs north to south. Both watercourses confluence at the northwest corner of the subject property.

West Stoney Creek and Armitage Drain convey runoff from primarily agricultural lands in a southerly direction where it ultimately discharges to the Thames River. West Stoney Creek, Armitage Drain and its watershed are located within the Upper Thames River Conservation Authority (UTRCA) jurisdiction, and therefore this authority will be the primary regulator for all works pertaining to flood and erosion hazards, and the conservation of land.

Greck and Associates Limited (Greck) have been engaged by Heikal Group to prepare regulatory floodplain mapping for the subject property to support future development endeavors. To prepare for this deliverable, a hydrologic study of the surrounding watershed was completed to determine peak regulatory flow rates, along with a detailed hydraulic analysis of the watercourses and applicable crossing structures to define flood hazard limits. This report outlines the methodology and results of all analyses undertaken along with recommendations for future development.

1.1 BACKGROUND AND RELEVANT DOCUMENTS

A meeting with UTRCA was held on December 4th 2025 which confirmed that there is no official floodplain map for West Stoney Creek and Armitage Drain within the extents of the subject property, and that UTRCA is in the process of developing a hydrology and hydraulic model for both watercourses which have not been finalized. As such, the UTRCA has requested that an existing conditions flood hazard assessment be completed prior to any potential grading/modifications on the lands.

UTRCA provided a ‘working draft’ PCSWMM hydrology model on December 17th 2025 and a ‘working draft’ HEC-RAS hydraulic model on December 11th 2025. The ‘working draft’ models have not gone through a formal sensitivity analysis or have been peer reviewed.

In addition to this, watercourse crossing and channel cross-sectional topographic survey data collected by UTRCA was also provided on December 11th 2025.

No topographic survey data for the subject property was available at this time. As such, publicly available LIDAR topographic data from the Ontario Ministry of Natural Resources was utilized for the flood hazard assessment. LIDAR referred to as Lidar DTM Lake Erie 2016-18 Package I and M was obtained. The LIDAR DTM was raised by 0.45m to convert the vertical datum from CGVD2013 to CGVD28 as per the Government of Canada Vertical Transformation Tool at Station 813041, to be consistent with the topographic survey and UTRCA hydraulic modelling standards.

1.2 SCOPE OF WORK

The following report has been prepared by Greck and Associates Limited to present the following:

- A hydrologic model of the watershed associated with the West Stoney Creek and Armitage Drain watershed within the scope of the subject property.
- A hydraulic analysis and resulting floodplain mapping of the West Stoney Creek and Armitage Drain within the extents of the subject property
- Floodplain Mapping
- Flood Hazard Assessment and required setbacks; and
- Summary of the methodology, calculations, assumptions, and analyses associated with hydrologic and hydraulic modelling

Figure 1.1:
Site Location Plan

15117 Medway Road,
Middlesex Centre, Ontario

Project #: 25-1266

0 100 200 m

Legend

- Subject Property Limits
- Watercourses

Basemap Image: Google Maps 2026

Greck

June 2026

2.0 HYDROLOGY

The UTRCA 'working draft' hydrology model was reviewed in detail and updated as needed to be incorporated into the hydrology analysis. This section outlines the methodology of the review process, the updates that were made, and results of the hydrologic analysis completed.

2.1 METHODOLOGY

PCSWMM software was used for the hydrologic modelling presented throughout this report. PCSWMM utilizes hydrologic computations using the Environmental Protection Agency (EPA) Stormwater Management Model (SWMM) hydrologic software. PCSWMM is an approved software by the Ministry of Transportation (MTO) and provides Geographic Information System (GIS) capabilities. The EPA SWMM engine treats each sub-catchment as a non-linear reservoir. Inflows are calculated based on precipitation where outflows are based on a function of infiltration, depression storage and watershed slope.

The methodology of the review and updates of the hydrology modelling inputs is summarized in the below sections.

2.1.1 CATCHMENT DELINEATION

Catchment discretization is required in order to accurately characterize spatial variability, or in this case, to incorporate flow routing throughout the watershed. The UTRCA catchment delineation was reviewed using LIDAR topographic data, which resulted in minor adjustments to the catchment boundaries. A total of 22 sub-catchments were generated to discretize the subject watersheds, for a total area of 598 ha.

2.1.2 SURFICIAL SOILS/INFILTRATION PARAMETERS

Soil information was used to determine the infiltration parameters. Subsurface soil information was reviewed using the Ontario Geological Survey, obtained from the Ministry of Energy and Mines. The Ontario Geological Survey illustrates the hydrologic soil groups of the underlying soils within southern Ontario.

The Modified Green-ampt Infiltration Method was used to calculate infiltration, as it is the most applicable methodology for agricultural and rural land-uses, such as the subject watershed. Parameters including hydraulic conductivity, initial deficit ratio and suction head were based on MTO standards. The Modified Green-Ampt method is typically used within rural and agricultural watersheds due to its ability to account for the degree of saturated soils and their effects on ponded water within the ground surface.

A review of the underlying soils was completed to determine the overall infiltration characteristics of each sub-catchment. Soil information was obtained in a GIS format from the Ontario Geological Survey. The overall surficial soils were determined to be generally of diamicton, and gravel to sandy soils.

A summary of the overall catchment area soil types are provided in **Table 2.1**, and in **Figure 2.1**.

TABLE 2.1: SOIL TEXTURE CLASS WITHIN OVERALL WATERSHED

Soil Texture Class	% Cover	Area (ha)	Initial Deficit (mm/mm)	Suction Head (mm)	Hydraulic Conductivity (mm/hr)
Diamicton	76.0	454.5	0.01	169.93	6.60
Gravel	19.2	114.7	0.01	49.02	120.34
Organic Deposits	1.1	6.5	0.01	49.02	120.34
Sand	3.7	22.3	0.01	49.02	120.34

Soil infiltration rates were determined based on soil texture class as reported in the “Green-ampt Infiltration Parameters from Soils Data” technical paper by Rawls et al. An overall infiltration rate for each sub-catchment was determined using an area weighted calculation. Areas identified as wetland and gravel were assumed to have sandy soil characteristics due to high levels of permeability, while areas identified as diamicton were assumed to have silty loam characteristics, due to their high silt content.

Figure 2.1:
Surficial Soil Groups

15117 Medway Road,
Middlesex Centre, Ontario

Project #: 25-1266

0 250 500 m

Legend

Surficial Soil Groups

- Diamicton (Silt)
- Gravel
- Wetland (High Permeability)
- Sand
- Subcatchment

S-W1, S-W2, S-W3, S-W4, S-W5, S-W6, S-W7, S-W8, S-W9, S-W10, S-W11, S-E1, S-E2, S-E3, S-E4, S-E5, S-E6, S-E7, S-M1, S-M2, S-M3, S-M4

Soil Information from Ontario Geological Survey, obtained from the Ministry of Energy and Mines

Basemap Image: Google Maps 2026

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2.1.3 LAND-USE/PERCENT IMPERVIOUS, DEPRESSION STORAGE, AND MANNING'S ROUGHNESS VALUES

The land-use information was used to establish the overall percent impervious, depression storage, and manning's roughness values for the overall catchment. Land-use information of the watershed was reviewed using the Southern Ontario Land Resource Information System (SOLRIS) in GIS format, dated June 2019. Land-use information was either confirmed or updated via a review of available orthophotography from Google Earth.

Land-use GIS information was extracted from the Southern Ontario Land Resource Information System (SOLRIS). The overall watershed consists of primarily agricultural land-use. A summary of the land-use within each overall watershed is provided in **Table 2.2**.

TABLE 2.2: PERCENT IMPERVIOUS & LAND-USE

Cover	% Cover	Area (ha)	Percent Impervious	Manning's n		Depression Storage	
				Imperv.	Perv.	Imperv.	Perv.
Deciduous Forest	7.2	43.3	0	0.013	0.15	2	10
Treed Swamp	5.0	29.8	0	0.013	0.15	2	15
Thicket Swamp	0.1	0.7	0	0.013	0.15	2	15
Open Water	0.1	0.4	0	0.013	0.15	15	15
Hedge Rows	0.1	0.4	0	0.013	0.15	2	10
Tilled	64.8	387.7	0	0.013	0.15	2	8
Transportation	2.6	15.3	95	0.013	0.15	2	5
Built-Up Area - Pervious	5.5	32.6	10	0.013	0.15	2	5
Built-Up Area - Impervious	0.7	4.1	20	0.013	0.15	2	5
Undifferentiated	14.0	83.8	5	0.013	0.15	2	8

Percent impervious, depression storage, and manning's roughness values associated with each land-use was based on industry standards and engineering judgement.

Undifferentiated lands are classified as agricultural features as outlined in the SOLRIS documentation and confirmed through a review of aerial imagery via Google Maps.

The following default values were applied for all catchments within the PCSWMM hydrologic model:

- Percent of impervious area with no depression storage (25%)

A plan view representation of the land-use within the overall watershed is provided in **Figure 2.2**. An area-weighted calculation was then applied for each sub-catchment to obtain an overall percent impervious and impervious and pervious depression storage associated with each of the 22 sub-catchments. Summary tables outlining all calculations for each of the 22 sub-catchments are provided in **Appendix A**.

Figure 2.2:
Overall Landcover

15117 Medway Road,
Middlesex Centre, Ontario

Project #: 25-1266

0 250 500 m

Legend

Land-use

- Deciduous Forest
- Treed Swamp
- Thicket Swamp
- Open Water
- Hedge Rows
- Tilled
- Transportation
- Built-Up Area - Pervious
- Built-Up Area - Impervious
- Undifferentiated (Agricultural)
- Subcatchment

Land-use iinformation was obtained from the Southern Ontario Land Resource Information System (SOLRIS)

Basemap Image: Google Maps 2026

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June 2026

2.1.4 CHANNEL ROUTING

Flow routing is an important feature in hydrologic modelling. It accounts for the conveyance of flow along the channel and floodplain. The number of flow routing elements required in a hydrologic model is a function of the level of catchment discretization.

The routing of runoff hydrographs produced by each subcatchment takes into consideration the storage of flow in the floodplain. This storage results in the attenuation (lowering) and subsequent lagging (latter time) for peak flows between flow nodes. As the time to peak flows differ between subcatchments and along the channel systems, the instantaneous peaks are not simply additive.

Channel routing between flow nodes was delineated using the PCSWMM WDT tool, with slopes and lengths derived from the DTM via GIS software. Channel routing cross sections were determined by an overall average cross section, rather than selecting a single representative cross section. PCSWMM can determine an average cross section by cutting cross sections at a specific interval (e.g., every 50m) and combining all cross sections into a single cross-sectional profile. This average cross section accounts for geometric variability, as a single cut cross section may not be representative of the entire reach. The average cross section features a QA/QC feature integrated in PCSWMM that removes any outlier cross sections that may not be representative of the length of watercourse. All routing cross sections were then reviewed and filtered based on engineering judgement.

All cross sections were applied with a Manning's n of 0.035 within the channel banks, 0.05 for overbank areas with agricultural fields, and 0.09 for overbank areas with forested or wetland areas. In general, Manning roughness coefficients were chosen to be consistent with HEC-RAS modelling standards.

2.1.5 FLOW NODE LOCATIONS

The UTRCA placed flow nodes were reviewed, and found to be acceptable, with no changes required. Flow nodes were typically placed as per the following:

- Points of confluence between watercourses/drainage ditches
- Areas of land-use changes; and
- Areas of significant grade change in the watercourse.

Flow nodes are important as it is essential to account for spatial variability properly and to incorporate flow routing throughout the watershed.

2.1.6 STORM DISTRIBUTIONS

According to Ontario Regulation 157/06, the regulatory floodplain is defined by the 250-year event throughout the Upper Thames River watershed. The UTRCA provided a 24-hour Chicago storm distribution to model the 250-year storm event.

2.1.7 WATERSHED FLOW LENGTHS & SLOPE

Watershed lengths and slopes are important parameters when determining the runoff generated using a non-linear reservoir model. Runoff from each timestep is derived using the Manning's equation for open channel flow that incorporates the overall subcatchment width and slope. All flow paths are reviewed and were compared to topographic mapping to confirm they are appropriate for each catchment.

The flow length can be a particularly challenging parameter to use in the PCSWMM model for undeveloped or rural watersheds. This parameter is also very sensitive to the over determination of peak flows.

Flow lengths were determined by measuring the longest travel path within the subcatchment until flow channelization occurs. Two to one flow lengths were delineated for each subcatchment using DTM and aerial orthophotography. The slopes and flow lengths are then averaged and assigned to each subcatchment using PCSWMM tools.

2.1.8 OVERALL WATERSHED MAP

The overall watershed map is provided in **Figure 2.3**. This figure outlines each individual sub-catchment, associated travel paths, flow nodes and channel routing.

Figure 2.3:
Watershed Schematic

15117 Medway Road,
Middlesex Centre, Ontario

Project #: 25-1266

0 250 500 m

Legend

- Subcatchment Length
- Channel Routing
- Flow Nodes
- Subcatchments

Basemap Image: Google Maps 2026

Greck

June 2026

2.2 HYDROLOGIC MODELLING RESULTS

Peak flows throughout the project reach are presented in **Table 2.3**. Details pertaining to flow nodes at other locations throughout the watershed can be found within the hydrologic model. Flow nodes were placed at specific areas, such as the upstream and downstream limit of the site and bridge crossing locations.

TABLE 2.3: PEAK FLOWS THROUGH PROJECT REACH

	West Tributary (N-W1)	East Tributary (N-E1)	Middle Tributary (OF1)
Contributing Drainage Area	321.4ha	214.0ha	598.0ha
250-year flows	9.5m^3/s	4.9m^3/s	12.5m^3/s

The 250-year storm will define the Regulatory storm event through the subject property to be used for Regulatory floodplain mapping delineation. Detailed hydrologic results for the 250-year storm event only, are provided in **Appendix B**.

2.2.1 CATCHMENT RESULTS

Each flow node's hydrologic response is plotted for the 250-year storm event in **Figure 2.4**. The hydrologic response illustrates the effects of land-use and/or routing has on an overall watershed.

In **Figure 2.4**, all the peak flows reported by flow nodes are generally in sync with the hyetograph of the 24-hour Chicago Storm Distribution. The peak flows reported at flow nodes N-E1, N-W1, and OF1 are delayed by 2, 1, and 2.5 hours respectively due to flow routing and travel times.

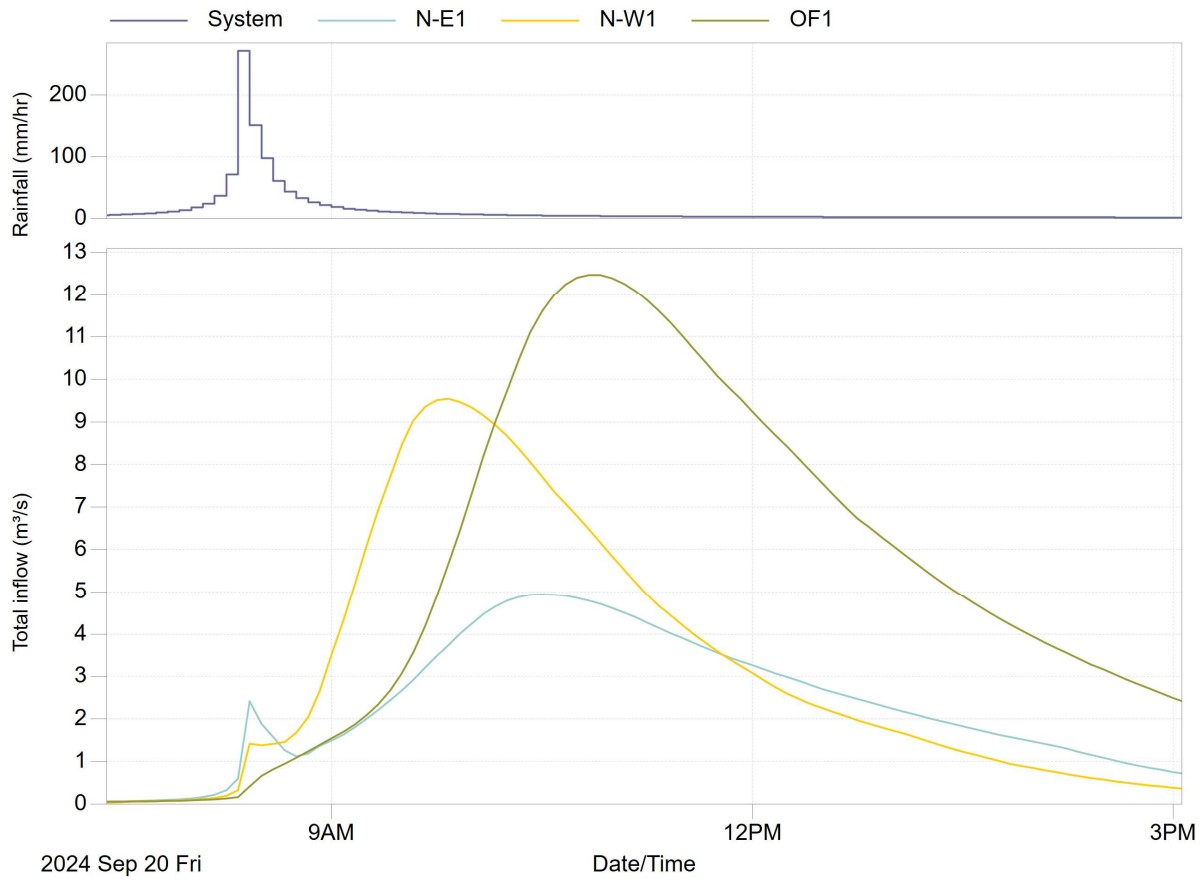

FIGURE 2.4: 250-YEAR HYDROLOGIC RESPONSE THROUGH THE PROJECT REACH

2.3 SENSITIVITY ANALYSIS

A sensitivity analysis was carried out to assess key input parameters and their effects on peak flows, as well as climate change considerations. A sensitivity analysis is important in determining factors of safety that may be applicable to peak flows. The analysis was carried out based on varying the following parameters by a certain percentage determined through engineering judgement and relative confidence in data and methodology, as outlined below:

- Catchment Area: +/- 20%
- Catchment Slope: +/- 20%
- Catchment Length: +/- 20%
- Percent Impervious: +/- 20%
- Impervious Manning roughness: +/- 20%
- Pervious Manning roughness: +/- 20%
- Impervious Depression Storage: +/- 20%
- Pervious Depression Storage: +/- 20%

Soil infiltration parameters were varied as outlined below:

- Suction Head: +/- 20%
- Conductivity: +/- 20%

Channel routing parameters were varied as outlined below:

- Channel routing Length: +/- 20%

The sensitivity analysis was completed for the 250-year storm event only. The sensitivity analysis only observed results at flow nodes N-E1, N-W1, and OF1 as it defines the flood hazard on the subject property.

The Sensitivity-Based Radio Tuning Calibration (SRTC) tool in PCSWMM was used to investigate the sensitivity associated with the model. The SRTC tool allows one to test the sensitivity of specific parameters by adjusting their values and to determine how they may influence specific values (i.e. peak flow). The results of the sensitivity analysis for N-E1, N-W1, and OF1 are presented below in **Table 2.4**.

TABLE 2.4: SENSITIVITY ANALYSIS RESULTS

250-year Storm	Sensitivity	Peak Flow (m^3/s)						Max Change in Peak Flow	
		N-E1		N-W1		OF1			
		+	-	+	-	+	-	%	%
Base Condition	-	4.94		9.54		12.47		-	-
Sub-catchment Area	+/- 20%	5.50	4.31	10.50	8.62	13.98	10.95	12.1%	-12.8%
Sub-catchment Slope	+/- 20%	5.17	4.70	10.06	9.04	13.09	11.85	5.5%	-5.2%
Sub-catchment Length	+/- 20%	4.44	5.40	8.56	10.62	11.23	13.71	-10.3%	11.3%
Imperviousness	+/- 20%	5.01	4.89	9.73	9.38	12.71	12.28	2.0%	-1.7%
N Impervious	+/- 20%	4.94	4.94	9.54	9.54	12.47	12.47	0.0%	0.0%
N Pervious	+/- 20%	4.44	5.40	8.56	10.63	11.23	13.72	-10.3%	11.4%
Impervious Depression Storage	+/- 20%	4.94	4.94	9.54	9.54	12.47	12.47	0.0%	0.0%
Pervious Depression Storage	+/- 20%	4.72	5.11	9.14	9.87	11.93	12.92	-4.5%	3.6%
Suction Head	+/- 20%	4.91	4.97	9.49	9.58	12.39	12.53	-0.6%	0.5%
Conductivity	+/- 20%	4.47	5.33	8.91	10.18	11.44	13.41	-9.7%	7.8%
Routing Length	+/- 20%	3.96	5.94	8.40	10.60	10.35	14.63	-20.0%	20.1%

A list of the most sensitive parameters with a brief description has been provided below:

Sub-catchment Area

Each sub-catchment area was varied by 20% to account for the uncertainties in the LIDAR DTM. A larger sub-catchment area would result in more runoff generated, therefore a higher peak flow. Varying the sub-catchment area varied peak flows by a maximum of 12.8%.

Sub-catchment Length

Each sub-catchment length was varied by 20%. A smaller flow length would result in a lesser travel time to their respective flow-node, therefore a higher peak flow (typically). Flow lengths were established by relatively straight lengths, representative of municipal drains, in lieu of a winding watercourse flow path that is typically automatically calculated in PCSWMM based on the intricacies of LIDAR DTM data. This results in a more conservative flow length and considers the factor of a surcharged floodplain that effectively reduces sub-catchment length, in comparison to a winding, meandering channel. Varying the sub-catchment flow length varied peak flows by a maximum of 11.3%.

Pervious Manning Roughness

The pervious Manning n represents the overland roughness of the catchment, specifically to pervious areas. A higher roughness coefficient causes surface runoff to be discharged at a slower rate and therefore reduces peak flows (typically).

Changes to pervious Manning n by 20% resulted in peak flows being varied by a maximum of 11.4%. This is because the majority of the subject watersheds are rural pervious covered lands with high variability in vegetative cover.

Routing Length

Each conduit length was varied by 20%. A shorter conduit length would result in a lesser slope of channel routing and travel time to their respective flow-node, therefore a higher peak flow (typically). Varying the sub-catchment flow length varied peak flows by a maximum of 20.1%. As such, the routing length was noted to be the most sensitive parameter.

2.3.1 HYDRAULIC CONSIDERATIONS

The lack of significant changes in peak flows due to varying hydrologic parameters gives confidence in the peak flows recommended in this report. The sensitivity analysis resulted

in a maximum increase in peak flows by 20.1%. These peak flows for the 250-year storm event only will be incorporated within the hydraulic analysis to support hydraulic modelling sensitivity and ultimately freeboard setbacks associated with floodplain mapping. A summary of the maximum peak flows as a result of the sensitivity analysis is provided in **Table 2.5**.

TABLE 2.5: 250-YEAR SENSITIVITY ANALYSIS PEAK FLOWS

Node	Base Scenario Peak Flow (m^3/s)	Sensitivity Analysis Peak Flow (m^3/s)
N-E1	4.94	5.94
N-W1	9.54	10.60
OF1	12.47	14.63

3.0 HYDRAULIC ANALYSIS

GeoHEC-RAS software was used for the hydraulic modelling presented throughout this report. GeoHEC-RAS utilizes hydraulic computation using the US Army Corps HEC-RAS software, an industry standard when completing hydraulic analyses throughout Ontario. GeoHEC-RAS provides GIS capabilities that provide integration with GIS data such as land-use and LIDAR DTM, that improves efficiencies and modelling techniques.

The UTRCA 'working draft' hydraulic model was reviewed in detail and updated as needed to be incorporated into the hydraulic analysis. This section outlines the methodology of the review process, the updates that were made, and results of the hydraulic analysis completed.

3.1 HYDRAULIC STRUCTURES

As part of the hydraulic modelling, four (4) watercourse crossings were modeled including two (2) watercourse crossings on Medway Road and (2) watercourse crossings on private driveways.

The watercourse crossings were surveyed by UTRCA and the topographic survey data was provided to Greck to incorporate into the hydraulic model. A summary of the watercourse crossing characteristics are provided in **Table 3.1**.

TABLE 3.1: HYDRAULIC STRUCTURE SUMMARY

Parameter	Medway Road	Medway Road	15161 Medway Road Driveway	15117 Medway Road Driveway
Watercourse	Armitage Drain	West Stoney Creek	West Stoney Creek	West Stoney Creek
Opening Type	CSP Circular Culvert	Concrete Box Culvert	Concrete Circular Culvert	Concrete Circular Culvert
Span (m)	1.50m	2.45m	1.13m	1.21m
Rise (m)	-	1.34m	-	-
Length (m)	27.5m	30.3m	5.0m	7.0m
Upstream Invert Elevation (m)	270.19m	271.13m	270.32m	269.65m
Downstream Invert Elevation (m)	270.19m	271.10m	270.32m	269.65m

3.2 HYDRAULIC MODELLING METHODOLOGY

Three reaches were created to represent the watercourses within the scope of the assessment: the Armitage Drain, West Stoney Creek, and West Stoney Creek downstream of the Armitage Drain confluence. Several cross-sections were cut to define the watercourse geometry for the reaches based on LIDAR DTM. A summary of the cross sections is provided in **Table 3.2**.

TABLE 3.2: CROSS SECTION SUMMARY

Parameter	Armitage Drain	West Stoney Creek	West Stoney Creek (Downstream of Confluence)
Modelled Reach Length (m)	37	36	103
Number of Cross Sections	6	17	4
Average Cross Section Spacing (m)	102	110	62
Channel Roughness	0.035	0.035	0.035
Floodplain Roughness (forest)	0.09	0.09	0.09
Floodplain Roughness (agricultural)	0.05	0.05	0.05

The three watercourses feature a grassed channel, therefore a Manning's roughness factor of 0.035 was applied for the channel. For channel overbanks a Manning's roughness of 0.05 and 0.09 was applied for agricultural and forest land use respectively. Standard ineffective flows were applied at bridge crossings, with additional ineffective flow areas inserted at cross sections where a low-lying isolated pocket exists that would not contribute to conveyance. For the downstream boundary condition, a known water

surface elevation of 269.80m was assigned, which was provided by UTRCA based on downstream floodplain mapping.

The peak flows reported at the downstream flow nodes of each reach in the hydrologic modelling were applied to the entire reach in the hydraulic modelling. The peak flows generated from the 250-year storm event, and the respective downstream flow node, are summarized in **Table 3.3**.

TABLE 3.3: HEC-RAS FLOW INPUTS

	Armitage Drain	West Stoney Creek	West Stoney Creek (Downstream of Confluence)
Hydrology Model Flow Node	N-W1	N-E1	OF1
250-year	9.54m^3/s	4.94m^3/s	12.47m^3/s

3.3 HYDRAULIC MODELLING RESULTS

The results of the 250-year flood elevations through the Armitage Drain, West Stoney Creek, and West Stoney Creek downstream of the Armitage Drain confluence are provided below in **Table 3.4**, **Table 3.5**, and **Table 3.6** respectively. Full output tables of the HEC-RAS sections are provided in **Appendix C**. Cross-section numbers are arranged from upstream to downstream and provide 250-year flood elevations.

TABLE 3.4: ARMITAGE DRAIN FLOOD ELEVATIONS

Section	250- year Flood Elevation (m)
12215	273.18
12179	273.18
12153	273.18
12135	Medway Road
12118	271.32
12095	270.94
12032	270.86

TABLE 3.5: WEST STONEY CREEK FLOOD ELEVATIONS

Section	250- year Flood Elevation (m)
12594	272.57
12528	272.43
12509	272.43
12491	Medway Road
12474	272.10
12459	271.99
12382	271.75
12306	271.68
12289	271.57
12283	15161 Medway Road Driveway
12277	271.34
12259	271.27
12224	271.12
12188	271.06
12144	271.05
12090	271.04
12059	271.04
12053	15117 Medway Road Driveway
12046	270.83
12013	270.83

TABLE 3.6: WEST STONEY CREEK DOWNSTREAM OF THE ARMITAGE DRAIN CONFLUENCE FLOOD ELEVATIONS

Section	250- year Flood Elevation (m)
11033	270.68
10857	270.15
10790	269.89
10725	269.80

3.4 HYDRAULIC ANALYSIS – SENSITIVITY ANALYSIS

A sensitivity analysis was carried out to assess the uncertainty of key input parameters and their effects on the flood levels. A sensitivity analysis is important to determine factors of safety and freeboard allowance, and account for the impacts of climate change. The sensitivity analysis for peak flows as per the hydrologic analysis was carried out based on the 250-year storm event only.

Peak Flow Variation

Peak flow rates were modified based on the variation in results from the hydrologic sensitivity analysis in **Section 2.3**. Peak flows were increased as per **Table 2.5** for the 250-year storm event only to account for any uncertainties or assumptions undergone through the hydrologic analysis.

3.4.1 SENSITIVITY ANALYSIS RESULTS

The resulting flood elevations reported from the sensitivity analysis through the modeled reach of Armitage Drain, West Stoney Creek, and West Stoney Creek downstream of the Armitage Drain confluence, are provided below in **Table 3.7**, **Table 3.8**, and **Table 3.9** respectively.

respectively. Full output tables of the HEC-RAS sections from the sensitivity analysis are provided in **Appendix C**.

TABLE 3.7: SENSITIVITY ANALYSIS – ARMITAGE DRAIN FLOOD ELEVATIONS

Section	250-year Flood Elevation (m)		
	Base	Peak Flow Uncertainty	Delta
12215	273.18	273.19	+0.01
12179	273.18	273.19	+0.01
12153	273.18	273.19	+0.01
12135			
12118	271.32	271.40	+0.08
12095	270.94	270.99	+0.05
12032	270.86	270.92	+0.06

Cross Section within Subject Property Limits

TABLE 3.8: SENSITIVITY ANALYSIS - WEST STONEY CREEK FLOOD ELEVATIONS

Section	250-year Flood Elevation (m)		
	Base	Peak Flow Uncertainty	Delta
12594	272.57	272.69	+0.12
12528	272.43	272.59	+0.16
12509	272.43	272.58	+0.15
12491			
12474	272.10	272.18	+0.08
12459	271.99	272.07	+0.08
12382	271.75	271.78	+0.03
12306	271.68	271.70	+0.02
12289	271.57	271.61	+0.04
12283			
12277	271.34	271.47	+0.13
12259	271.27	271.30	+0.03
12224	271.12	271.14	+0.02
12188	271.06	271.11	+0.05
12144	271.05	271.10	+0.05
12090	271.04	271.08	+0.04
12059	271.04	271.08	+0.04
12053			
12046	270.83	270.90	+0.07
12013	270.83	270.89	+0.06

Cross Section within Subject Property Limits

TABLE 3.9: SENSITIVITY ANALYSIS – WEST STONEY CREEK DOWNSTREAM OF THE ARMITAGE DRAIN FLOOD ELEVATIONS

Section	250-year Flood Elevation (m)		
	Base	Peak Flow Uncertainty	Delta
11033	270.68	270.74	+0.06
10857	270.15	270.21	+0.06
10790	269.89	269.92	+0.03
10725	269.80	269.80	0.00

Cross Section within Subject Property Limits

From the sensitivity analysis, adjusting the peak flow value resulted in a maximum increase through the limits of the subject site of 0.08m.

3.4.2 DEVELOPMENT RECOMMENDATIONS – FREEBOARD

Greck recommends to the client that all development areas maintain a 0.3m freeboard from the 250-year flood elevation. A freeboard of 0.3m is an industry standard to account for any uncertainties involved in hydraulic modelling and will provide a sufficient factor of safety for development on the subject property. Floodwaters less than 0.3m in depth permit for safe pedestrian and vehicular ingress/egress as per Ministry of Natural Resources and Forestry (MNRF) Technical Guide: River & Stream Systems: Flood Hazard Limit, 2002.

The resulting above sensitivity analysis concluded that a 0.3m freeboard is adequate to define the freeboard associated with the development.

3.4.3 SAFE ACCESS ASSESSMENT

According to MNRF guidelines, in order for private and emergency vehicles to safely ingress and egress to and from the site, a maximum flood depth of 0.3m, velocity of 3m/s, and depth-velocity product of 0.4m^2/s, is recommended.

During the 250-year storm event, flows from Armitage Drain overtop Medway Road, and flows from West Stoney Creek overtop the private driveways 15161 Medway Road and 15117 Medway Road.

A summary of the relief flow depths, velocities, and depth-velocity product are summarized below in **Table 3.10**.

TABLE 3.10: 250-YEAR RELIEF FLOW RESULTS

	Armitage Drain @ Medway Road	West Stoney Creek @ 15161 Medway Road Driveway	West Stoney Creek @ 15117 Medway Road Driveway
Depth	0.16m	0.20m	0.22m
Velocity	0.47m/s	0.47m/s	0.51m/s
Depth-Velocity Product	0.08m^2/s	0.09m^2/s	0.11m^2/s

All relief flow experienced by the watercourse crossings will not exceed safe access thresholds, thus, it is anticipated that safe access will be provided for the proposed development at 15117 Medway Road.

Safe ingress and egress to the proposed development will be revisited and determined once a grading plan for the proposed development has been prepared.

3.5 FLOODPLAIN MAPPING

The Regulatory floodline and freeboard setback are plotted on **Drawing FPM** provided in **Appendix D**.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Greck and Associates Limited is confident that this report and the analyses completed are consistent with the latest municipal and provincial standards and guidelines with respect to scientific analysis and engineering principles.

In summary:

- A hydrologic model of the watershed associated with the Armitage Drain and West Stoney Creek watershed within the scope of the subject property was developed using PCSWMM to determine 250-year peak flows.
- A hydraulic analysis and resulting floodplain mapping of the Armitage Drain and West Stoney Creek within the extents of the subject property was developed using GeoHEC-RAS. The resulting existing floodplain, governed by the 250-year storm event, has been plotted on **Drawing FPM**.
- A sensitivity analysis was conducted to assess key input parameters used in the hydrology model and their effects on peak flows. The maximum increase through the limits of the subject site was 0.08m as reported from the peak flow sensitivity analysis.
- Founded on engineering/scientific principles, in accordance with UTRCA policy and ministry guidelines, Greck recommends that all development areas maintain a 0.3m freeboard from the 250-year flood elevation.
- Safe ingress and egress will be provided from Medway Road, however, safe ingress and egress to the proposed development will be revisited and determined once a grading plan for the proposed development has been prepared.

APPENDIX A

Sub-catchment Summary

Hydrologic Modelling Inputs
February 6, 2026

Name	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Imperv. (%)	N Imperv	N Perv	Dstore Imperv (mm)	Dstore Perv (mm)	Zero Imperv (%)	Suction Head (mm)	Conductivity (mm/hr)	Initial Deficit (frac.)
S-E1	41.21	1251.96	329.13	0.77	8.57	0.013	0.15	2.00	7.51	25	74.53	96.34	0.01
S-E2	52.44	613.77	854.36	0.78	4.40	0.013	0.15	2.00	8.16	25	159.83	16.10	0.01
S-E3	21.65	443.65	487.96	0.69	4.39	0.013	0.15	2.00	7.75	25	169.93	6.60	0.01
S-E4	31.14	592.76	525.38	2.09	4.53	0.013	0.15	2.00	7.94	25	169.93	6.60	0.01
S-E5	19.69	349.59	563.36	0.78	0.07	0.013	0.15	2.00	9.17	25	169.93	6.60	0.01
S-E6	18.39	254.91	721.51	1.15	1.03	0.013	0.15	2.00	8.25	25	169.93	6.60	0.01
S-E7	29.46	365.58	805.76	0.83	3.34	0.013	0.15	2.00	8.42	25	169.93	6.60	0.01
S-M1	20.94	366.64	571.22	1.07	1.10	0.013	0.15	2.00	9.91	25	79.90	91.29	0.01
S-M2	15.98	224.92	710.45	2.22	5.72	0.013	0.15	2.00	7.94	25	126.77	47.21	0.01
S-M3	16.97	311.56	544.71	2.00	7.34	0.013	0.15	2.01	8.87	25	81.26	90.01	0.01
S-M4	8.68	189.96	456.84	0.55	8.48	0.013	0.15	2.16	8.13	25	89.34	82.41	0.01
S-W1	23.01	360.39	638.46	0.48	4.27	0.013	0.15	2.11	7.94	25	161.77	14.28	0.01
S-W10	48.22	759.54	634.82	1.40	1.45	0.013	0.15	2.03	8.10	25	169.93	6.60	0.01
S-W11	41.56	454.82	913.77	0.83	9.07	0.013	0.15	2.00	7.17	25	169.93	6.60	0.01
S-W2	21.43	482.09	444.50	2.39	3.21	0.013	0.15	2.00	8.92	25	50.25	119.18	0.01
S-W3	26.23	270.11	971.10	0.99	0.69	0.013	0.15	2.00	8.40	25	92.59	79.35	0.01
S-W4	70.06	619.56	1130.76	0.58	1.24	0.013	0.15	2.00	8.60	25	122.43	51.29	0.01
S-W5	9.51	415.77	228.74	1.13	2.60	0.013	0.15	2.00	7.93	25	169.93	6.60	0.01
S-W6	11.06	263.62	419.66	1.03	3.45	0.013	0.15	2.00	7.98	25	169.93	6.60	0.01
S-W7	12.59	366.48	343.68	1.11	7.57	0.013	0.15	2.00	7.82	25	169.93	6.60	0.01
S-W8	28.25	432.75	652.71	1.24	1.88	0.013	0.15	2.00	8.11	25	169.93	6.60	0.01
S-W9	29.51	323.59	911.81	0.91	3.38	0.013	0.15	2.00	9.05	25	169.93	6.60	0.01

APPENDIX B

Hydrologic Analysis Results – 250-year Event

PCSWMM 250-YEAR OUTPUTS

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)

WDT_1m_30 ha

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 22
Number of nodes 19
Number of links 18
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_24h_250yr	Chicago_24h_250yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S-E1	41.21	1251.96	8.57	0.7730	Chicago_24h_250yr	N-E1
S-E2	52.44	613.77	4.40	0.7830	Chicago_24h_250yr	N-E2
S-E3	21.65	443.65	4.39	0.6890	Chicago_24h_250yr	N-E3
S-E4	31.14	592.76	4.53	2.0920	Chicago_24h_250yr	N-E4
S-E5	19.69	349.59	0.07	0.7780	Chicago_24h_250yr	N-E5
S-E6	18.39	254.91	1.03	1.1510	Chicago_24h_250yr	N-E6
S-E7	29.46	365.58	3.34	0.8280	Chicago_24h_250yr	N-E6
S-M1	20.94	366.64	1.10	1.0710	Chicago_24h_250yr	OF1
S-M2	15.98	224.92	5.72	2.2240	Chicago_24h_250yr	N-M1
S-M3	16.97	311.56	7.34	1.9990	Chicago_24h_250yr	N-M2
S-M4	8.68	189.96	8.48	0.5470	Chicago_24h_250yr	N-M3
S-W1	23.01	360.38	4.26	0.4820	Chicago_24h_250yr	N-W1
S-W10	48.22	759.54	1.45	1.4020	Chicago_24h_250yr	N-W8
S-W11	41.56	454.81	9.06	0.8280	Chicago_24h_250yr	N-W9
S-W2	21.43	482.09	3.21	2.3930	Chicago_24h_250yr	N-W1
S-W3	26.23	270.11	0.69	0.9910	Chicago_24h_250yr	N-W2
S-W4	70.06	619.56	1.24	0.5780	Chicago_24h_250yr	N-W4
S-W5	9.51	415.77	2.60	1.1280	Chicago_24h_250yr	N-W4
S-W6	11.06	263.62	3.45	1.0330	Chicago_24h_250yr	N-W4
S-W7	12.59	366.48	7.57	1.1130	Chicago_24h_250yr	N-W5
S-W8	28.25	432.75	1.88	1.2400	Chicago_24h_250yr	N-W6
S-W9	29.51	323.59	3.38	0.9140	Chicago_24h_250yr	N-W7

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
N-E1	JUNCTION	270.97	1.23	0.0	
N-E2	JUNCTION	275.01	1.23	0.0	
N-E3	JUNCTION	280.22	0.91	0.0	
N-E4	JUNCTION	283.00	0.91	0.0	
N-E5	JUNCTION	283.37	0.72	0.0	
N-E6	JUNCTION	285.66	0.72	0.0	
N-M1	JUNCTION	269.19	2.55	0.0	
N-M2	JUNCTION	269.20	2.55	0.0	
N-M3	JUNCTION	269.70	3.44	0.0	
N-W1	JUNCTION	270.73	3.44	0.0	
N-W2	JUNCTION	272.55	2.87	0.0	
N-W3	JUNCTION	273.17	2.49	0.0	
N-W4	JUNCTION	277.24	2.01	0.0	
N-W5	JUNCTION	278.45	1.63	0.0	
N-W6	JUNCTION	278.85	1.21	0.0	
N-W7	JUNCTION	280.01	1.36	0.0	
N-W8	JUNCTION	282.31	0.87	0.0	
N-W9	JUNCTION	283.03	0.76	0.0	
OF1	OUTFALL	268.08	1.05	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C-E1	N-E1	N-M3	CONDUIT	336.8	0.3771	0.0350
C-E2	N-E2	N-E1	CONDUIT	948.7	0.4262	0.0350
C-E3	N-E3	N-E2	CONDUIT	857.8	0.6065	0.0350
C-E4	N-E4	N-E3	CONDUIT	575.3	0.4829	0.0350
C-E5	N-E5	N-E4	CONDUIT	119.6	0.3153	0.0350
C-E6	N-E6	N-E5	CONDUIT	540.2	0.4230	0.0350
C-M1	N-M1	OF1	CONDUIT	348.9	0.3205	0.0350
C-M2	N-M2	N-M1	CONDUIT	116.4	0.0060	0.0350
C-M3	N-M3	N-M2	CONDUIT	339.7	0.1472	0.0350
C-W1	N-W1	N-M3	CONDUIT	139.8	0.7366	0.0350
C-W2	N-W2	N-W1	CONDUIT	372.5	0.4881	0.0350
C-W3	N-W3	N-W2	CONDUIT	226.2	0.2750	0.0350
C-W4	N-W4	N-W3	CONDUIT	581.6	0.6998	0.0350
C-W5	N-W5	N-W4	CONDUIT	505.6	0.2383	0.0350
C-W6	N-W6	N-W5	CONDUIT	170.1	0.2382	0.0350
C-W7	N-W7	N-W4	CONDUIT	487.2	0.5690	0.0350
C-W8	N-W8	N-W7	CONDUIT	402.6	0.5690	0.0350
C-W9	N-W9	N-W8	CONDUIT	329.7	0.2199	0.0350

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C-E1	T-C46	1.03	64.97	0.34	126.00	1	55.50
C-E2	T-C62	1.23	48.88	0.35	100.97	1	45.66
C-E3	T-C91	0.84	68.66	0.33	136.73	1	73.25
C-E4	T-C113	0.91	49.50	0.29	129.00	1	43.55
C-E5	T-C119	0.69	58.90	0.26	151.00	1	38.63
C-E6	T-C151	0.72	68.75	0.27	170.00	1	53.01
C-M1	T-C37	1.05	106.30	0.20	149.00	1	59.35
C-M2	T-C39	2.55	246.89	0.48	193.04	1	33.77
C-M3	T-C41	2.33	146.90	0.38	153.00	1	84.88
C-W1	T-C55	3.44	381.16	0.63	180.02	1	684.25
C-W2	T-C68	2.87	143.14	0.56	121.00	1	193.93
C-W3	T-C75	2.49	161.80	0.85	132.00	1	217.75
C-W4	T-C100	2.01	114.74	0.57	142.00	1	188.99
C-W5	T-C176_2	1.63	105.88	0.61	144.00	1	106.22
C-W6	T-C176_1	1.21	122.30	0.52	156.00	1	110.10
C-W7	T-C141_2	1.36	95.70	0.51	136.00	1	131.54
C-W8	T-C141_1	0.87	49.99	0.32	119.00	1	50.26
C-W9	T-C159	0.76	46.21	0.26	143.00	1	25.25

****
Transect Summary
****

Transect C100
Area:

0.0007	0.0015	0.0024	0.0035	0.0046
0.0058	0.0072	0.0087	0.0103	0.0120
0.0138	0.0157	0.0178	0.0201	0.0226
0.0252	0.0282	0.0315	0.0353	0.0412
0.0493	0.0593	0.0709	0.0830	0.0956
0.1094	0.1246	0.1413	0.1613	0.1841
0.2082	0.2334	0.2610	0.2898	0.3199
0.3513	0.3838	0.4180	0.4543	0.4931
0.5331	0.5757	0.6203	0.6672	0.7157
0.7665	0.8218	0.8792	0.9384	1.0000

Hrad:

0.0571	0.1079	0.1541	0.1971	0.2378

```
            0.2766    0.3129    0.3482    0.3829    0.4169
            0.4506    0.4785    0.5001    0.5222    0.5431
            0.5568    0.5639    0.5485    0.5243    0.3452
            0.3637    0.3277    0.3722    0.4171    0.4624
            0.4623    0.4960    0.5086    0.4807    0.4799
            0.5339    0.5843    0.5719    0.6204    0.6448
            0.6881    0.7218    0.7421    0.7543    0.7786
            0.8097    0.8359    0.8570    0.8657    0.9096
            0.9548    0.9202    0.9458    0.9622    1.0000
Width:
            0.0122    0.0139    0.0156    0.0174    0.0191
            0.0209    0.0227    0.0246    0.0264    0.0283
            0.0301    0.0324    0.0351    0.0379    0.0410
            0.0447    0.0493    0.0567    0.0715    0.1187
            0.1451    0.1805    0.1899    0.1985    0.2063
            0.2361    0.2507    0.2829    0.3480    0.3831
            0.3894    0.4316    0.4560    0.4667    0.4958
            0.5101    0.5313    0.5629    0.6020    0.6330
            0.6581    0.7032    0.7248    0.7705    0.7867
            0.8653    0.8948    0.9296    0.9752    1.0000

Transect C113
Area:
            0.0006    0.0017    0.0033    0.0051    0.0073
            0.0100    0.0135    0.0180    0.0232    0.0289
            0.0352    0.0420    0.0495    0.0576    0.0663
            0.0757    0.0860    0.0973    0.1095    0.1225
            0.1362    0.1510    0.1668    0.1833    0.2009
            0.2196    0.2407    0.2635    0.2869    0.3110
            0.3357    0.3613    0.3881    0.4154    0.4440
            0.4735    0.5038    0.5345    0.5662    0.5989
            0.6335    0.6698    0.7071    0.7452    0.7852
            0.8266    0.8691    0.9122    0.9557    1.0000
Hrad:
            0.0278    0.0578    0.0873    0.1124    0.1336
            0.1526    0.1436    0.1621    0.1876    0.2154
            0.2396    0.2611    0.2828    0.3048    0.3254
            0.3422    0.3522    0.3726    0.3845    0.4071
            0.4320    0.4377    0.4569    0.4817    0.4925
            0.5175    0.4767    0.5069    0.5369    0.5656
            0.5952    0.6072    0.6388    0.6664    0.6780
            0.7034    0.7345    0.7629    0.7859    0.7815
            0.7907    0.8085    0.8342    0.8452    0.8544
            0.8764    0.9012    0.9387    0.9632    1.0000
Width:
            0.0215    0.0303    0.0374    0.0453    0.0547
            0.0652    0.0937    0.1110    0.1238    0.1344
            0.1469    0.1610    0.1750    0.1889    0.2038
            0.2214    0.2443    0.2611    0.2848    0.3009
            0.3153    0.3451    0.3652    0.3807    0.4081
            0.4407    0.5051    0.5200    0.5346    0.5500
            0.5643    0.5954    0.6078    0.6236    0.6551
            0.6735    0.6861    0.7010    0.7208    0.7667
            0.8016    0.8288    0.8480    0.8821    0.9195
            0.9436    0.9649    0.9719    0.9924    1.0000

Transect C119
Area:
            0.0006    0.0016    0.0029    0.0046    0.0064
            0.0085    0.0107    0.0132    0.0158    0.0189
            0.0230    0.0279    0.0346    0.0444    0.0584
            0.0754    0.0941    0.1135    0.1333    0.1534
            0.1738    0.1946    0.2160    0.2383    0.2610
            0.2843    0.3084    0.3337    0.3592    0.3849
            0.4114    0.4384    0.4659    0.4940    0.5223
            0.5507    0.5795    0.6086    0.6383    0.6684
            0.6988    0.7299    0.7623    0.7953    0.8287
            0.8623    0.8961    0.9302    0.9648    1.0000
Hrad:
            0.0260    0.0485    0.0700    0.0936    0.1171
            0.1411    0.1653    0.1885    0.2054    0.2218
            0.2325    0.2377    0.2098    0.1839    0.1625
            0.1491    0.1771    0.2069    0.2394    0.2716
            0.3036    0.3357    0.3539    0.3806    0.4114
            0.4404    0.4615    0.4704    0.5035    0.5346
            0.5496    0.5750    0.6029    0.6271    0.6591
            0.6907    0.7158    0.7494    0.7608    0.7905
            0.8222    0.8343    0.8400    0.8551    0.8853
            0.9185    0.9515    0.9833    1.0143    1.0000
Width:
            0.0228    0.0328    0.0420    0.0489    0.0549
            0.0603    0.0650    0.0698    0.0768    0.1003
            0.1254    0.1552    0.2273    0.3315    0.4391
            0.5117    0.5314    0.5489    0.5570    0.5649
            0.5724    0.5859    0.6178    0.6262    0.6428
            0.6598    0.6930    0.7095    0.7134    0.7278
            0.7486    0.7625    0.7728    0.7877    0.7924
            0.7973    0.8097    0.8172    0.8390    0.8456
            0.8499    0.8897    0.9112    0.9302    0.9362
            0.9389    0.9472    0.9593    0.9707    1.0000

Transect C141
Area:
            0.0006    0.0016    0.0029    0.0046    0.0068
            0.0094    0.0127    0.0165    0.0210    0.0262
            0.0323    0.0396    0.0480    0.0576    0.0686
            0.0808    0.0941    0.1082    0.1231    0.1387
            0.1552    0.1725    0.1905    0.2092    0.2285
            0.2484    0.2690    0.2903    0.3124    0.3353
            0.3588    0.3832    0.4087    0.4353    0.4634
            0.4923    0.5221    0.5531    0.5848    0.6175
            0.6512    0.6858    0.7214    0.7580    0.7961
            0.8356    0.8758    0.9164    0.9578    1.0000
Hrad:
            0.0335    0.0601    0.0835    0.1031    0.1199
            0.1377    0.1511    0.1710    0.1874    0.2004
            0.2037    0.2169    0.2262    0.2396    0.2526
            0.2689    0.2939    0.3175    0.3446    0.3689
            0.3908    0.4176    0.4442    0.4702    0.4969
            0.5228    0.5493    0.5715    0.5937    0.6163
            0.6396    0.6574    0.6706    0.6796    0.6933
            0.7155    0.7376    0.7515    0.7759    0.7913
            0.8152    0.8364    0.8543    0.8641    0.8693
            0.8937    0.9243    0.9574    0.9767    1.0000
Width:
            0.0189    0.0268    0.0350    0.0448    0.0564
            0.0685    0.0840    0.0969    0.1121    0.1307
            0.1586    0.1827    0.2126    0.2408    0.2720
            0.3009    0.3205    0.3410    0.3575    0.3764
            0.3977    0.4136    0.4293    0.4453    0.4603
            0.4758    0.4903    0.5086    0.5268    0.5446
            0.5617    0.5836    0.6102    0.6412    0.6691
            0.6889    0.7087    0.7368    0.7546    0.7813
            0.7998    0.8209    0.8454    0.8780    0.9165
            0.9355    0.9480    0.9575    0.9807    1.0000

Transect C151
Area:
            0.0004    0.0012    0.0023    0.0039    0.0060
            0.0090    0.0132    0.0185    0.0242    0.0309
            0.0390    0.0483    0.0590    0.0704    0.0828
            0.0968    0.1126    0.1296    0.1478    0.1665
            0.1860    0.2061    0.2271    0.2487    0.2707
            0.2932    0.3164    0.3401    0.3644    0.3891
            0.4142    0.4398    0.4659    0.4924    0.5198
            0.5481    0.5768    0.6058    0.6355    0.6658
            0.6967    0.7283    0.7605    0.7930    0.8258
            0.8593    0.8939    0.9290    0.9645    1.0000
Hrad:
            0.0228    0.0438    0.0607    0.0760    0.0954
            0.0888    0.0933    0.1212    0.1440    0.1447
            0.1614    0.1723    0.1880    0.2157    0.2255
            0.2474    0.2444    0.2707    0.2852    0.3146
            0.3346    0.3623    0.3776    0.4081    0.4337
            0.4585    0.4818    0.5044    0.5301    0.5572
            0.5829    0.6086    0.6326    0.6484    0.6697
            0.6862    0.7121    0.7384    0.7532    0.7758
            0.7987    0.8092    0.8351    0.8666    0.8943
            0.8989    0.9159    0.9366    0.9690    1.0000
Width:
            0.0174    0.0268    0.0381    0.0517    0.0627
            0.1016    0.1420    0.1528    0.1683    0.2140
```

0.2416	0.2802	0.3141	0.3266	0.3805
0.4119	0.4613	0.4964	0.5187	0.5345
0.5565	0.5693	0.6020	0.6100	0.6247
0.6402	0.6572	0.6749	0.6881	0.6990
0.7112	0.7232	0.7371	0.7600	0.7811
0.7993	0.8106	0.8211	0.8444	0.8589
0.8730	0.9007	0.9112	0.9156	0.9238
0.9629	0.9762	0.9921	0.9954	1.0000

Transect C159

Area:

0.0005	0.0016	0.0032	0.0052	0.0076
0.0105	0.0139	0.0176	0.0218	0.0267
0.0321	0.0382	0.0449	0.0527	0.0615
0.0719	0.0831	0.0950	0.1079	0.1216
0.1359	0.1513	0.1675	0.1845	0.2024
0.2212	0.2410	0.2618	0.2856	0.3110
0.3376	0.3651	0.3933	0.4223	0.4521
0.4839	0.5185	0.5535	0.5888	0.6246
0.6608	0.6972	0.7340	0.7711	0.8085
0.8463	0.8844	0.9227	0.9613	1.0000

Hrad:

0.0263	0.0476	0.0702	0.0904	0.1118
0.1305	0.1514	0.1733	0.1915	0.2000
0.2197	0.2310	0.2459	0.2462	0.2519
0.2574	0.2801	0.2999	0.3135	0.3387
0.3607	0.3713	0.3925	0.4136	0.4293
0.4442	0.4639	0.4770	0.4467	0.4666
0.4839	0.5105	0.5355	0.5598	0.5835
0.5696	0.5797	0.6126	0.6449	0.6752
0.7089	0.7402	0.7725	0.8061	0.8361
0.8657	0.9008	0.9339	0.9675	1.0000

Width:

0.0209	0.0344	0.0454	0.0574	0.0682
0.0807	0.0918	0.1019	0.1141	0.1335
0.1463	0.1655	0.1829	0.2144	0.2480
0.2797	0.2971	0.3173	0.3447	0.3594
0.3773	0.4080	0.4275	0.4468	0.4721
0.4988	0.5204	0.5594	0.6403	0.6676
0.6987	0.7163	0.7356	0.7556	0.7759
0.8775	0.8956	0.9046	0.9141	0.9260
0.9330	0.9427	0.9508	0.9572	0.9674
0.9780	0.9822	0.9883	0.9937	1.0000

Transect C176

Area:

0.0009	0.0025	0.0049	0.0079	0.0115
0.0156	0.0202	0.0255	0.0315	0.0381
0.0452	0.0529	0.0611	0.0699	0.0793
0.0894	0.1005	0.1123	0.1252	0.1395
0.1546	0.1705	0.1871	0.2043	0.2220
0.2403	0.2592	0.2791	0.2997	0.3212
0.3435	0.3665	0.3908	0.4170	0.4444
0.4726	0.5016	0.5317	0.5631	0.5954
0.6291	0.6641	0.7002	0.7386	0.7790
0.8207	0.8630	0.9066	0.9527	1.0000

Hrad:

0.0326	0.0634	0.0887	0.1190	0.1466
0.1761	0.2025	0.2163	0.2441	0.2724
0.3003	0.3258	0.3517	0.3784	0.3997
0.4153	0.4295	0.4469	0.4471	0.4644
0.4864	0.5130	0.5421	0.5734	0.6059
0.6340	0.6547	0.6743	0.6989	0.7176
0.7457	0.7601	0.7588	0.7602	0.7822
0.8114	0.8320	0.8460	0.8666	0.8873
0.8968	0.9179	0.9070	0.9139	0.9327
0.9535	0.9970	1.0170	1.0030	1.0000

Width:

0.0273	0.0402	0.0557	0.0665	0.0784
0.0884	0.0995	0.1177	0.1291	0.1399
0.1505	0.1623	0.1738	0.1847	0.1983
0.2153	0.2339	0.2512	0.2800	0.3003
0.3177	0.3324	0.3451	0.3563	0.3664
0.3789	0.3959	0.4139	0.4288	0.4476
0.4606	0.4822	0.5151	0.5486	0.5681
0.5824	0.6029	0.6285	0.6498	0.6711
0.7015	0.7235	0.7721	0.8083	0.8352
0.8608	0.8656	0.9199	0.9499	1.0000

Transect C37

Area:

0.0003	0.0008	0.0013	0.0020	0.0027
0.0040	0.0059	0.0095	0.0153	0.0233
0.0331	0.0450	0.0591	0.0749	0.0914
0.1094	0.1293	0.1504	0.1724	0.1950
0.2182	0.2418	0.2659	0.2901	0.3144
0.3389	0.3641	0.3898	0.4158	0.4420
0.4684	0.4948	0.5214	0.5480	0.5748
0.6017	0.6291	0.6566	0.6843	0.7122
0.7403	0.7687	0.7972	0.8258	0.8547
0.8836	0.9126	0.9416	0.9708	1.0000

Hrad:

0.0214	0.0448	0.0656	0.0849	0.0998
0.1009	0.1003	0.0888	0.0781	0.0868
0.1004	0.1170	0.1230	0.1360	0.1583
0.1777	0.1880	0.2109	0.2273	0.2491
0.2745	0.2953	0.3236	0.3518	0.3783
0.4032	0.4207	0.4414	0.4677	0.4935
0.5200	0.5473	0.5749	0.6025	0.6294
0.6465	0.6723	0.6975	0.7209	0.7463
0.7674	0.7914	0.8173	0.8428	0.8658
0.8933	0.9206	0.9478	0.9740	1.0000

Width:

0.0146	0.0175	0.0204	0.0233	0.0329
0.0507	0.0873	0.1647	0.2301	0.3089
0.3641	0.4370	0.5137	0.5527	0.5889
0.6548	0.6984	0.7384	0.7613	0.7860
0.7978	0.8218	0.8244	0.8273	0.8335
0.8475	0.8679	0.8855	0.8913	0.8979
0.9028	0.9061	0.9088	0.9113	0.9149
0.9323	0.9372	0.9427	0.9505	0.9555
0.9657	0.9722	0.9763	0.9806	0.9877
0.9897	0.9917	0.9938	0.9968	1.0000

Transect C39

Area:

0.0003	0.0019	0.0060	0.0125	0.0205
0.0295	0.0394	0.0507	0.0630	0.0762
0.0904	0.1050	0.1198	0.1353	0.1512
0.1678	0.1848	0.2022	0.2203	0.2387
0.2574	0.2765	0.2960	0.3166	0.3378
0.3593	0.3813	0.4036	0.4266	0.4509
0.4758	0.5011	0.5266	0.5524	0.5784
0.6045	0.6307	0.6572	0.6837	0.7105
0.7375	0.7648	0.7925	0.8205	0.8491
0.8783	0.9083	0.9385	0.9691	1.0000

Hrad:

0.0167	0.0244	0.0407	0.0570	0.0796
0.1033	0.1269	0.1369	0.1634	0.1875
0.2010	0.2230	0.2502	0.2727	0.2996
0.3120	0.3352	0.3576	0.3773	0.4035
0.4292	0.4529	0.4767	0.4713	0.4988
0.5263	0.5394	0.5588	0.5805	0.5742
0.5916	0.6180	0.6403	0.6689	0.6956
0.7233	0.7490	0.7768	0.8056	0.8259
0.8475	0.8703	0.8936	0.9105	0.9346
0.9466	0.9386	0.9680	0.9968	1.0000

Width:

0.0206	0.0914	0.1723	0.2344	0.2719
0.3014	0.3352	0.3814	0.4077	0.4428
0.4605	0.4725	0.4820	0.5052	0.5177
0.5399	0.5537	0.5679	0.5864	0.5942
0.6023	0.6181	0.6394	0.6746	0.6855
0.6960	0.7098	0.7253	0.7566	0.7886
0.8077	0.8140	0.8255	0.8287	0.8341
0.8381	0.8443	0.8479	0.8520	0.8619
0.8716	0.8801	0.8901	0.9021	0.9290
0.9409	0.9683	0.9699	0.9864	1.0000

Transect C41

Area:

0.0002	0.0008	0.0015	0.0023	0.0034

```
        0.0047    0.0065    0.0100    0.0154    0.0230
        0.0328    0.0432    0.0542    0.0659    0.0783
        0.0915    0.1059    0.1211    0.1373    0.1544
        0.1721    0.1907    0.2097    0.2295    0.2532
        0.2795    0.3061    0.3329    0.3598    0.3870
        0.4145    0.4423    0.4705    0.4988    0.5279
        0.5583    0.5890    0.6199    0.6510    0.6824
        0.7139    0.7455    0.7772    0.8089    0.8406
        0.8724    0.9042    0.9361    0.9680    1.0000
Hrad:
        0.0185    0.0409    0.0602    0.0774    0.0925
        0.1043    0.0829    0.0699    0.0790    0.0843
        0.1037    0.1308    0.1571    0.1749    0.1994
        0.2128    0.2312    0.2510    0.2657    0.2868
        0.3074    0.3281    0.3529    0.3687    0.3118
        0.3422    0.3707    0.4001    0.4300    0.4570
        0.4834    0.5097    0.5374    0.5651    0.5928
        0.5871    0.6160    0.6434    0.6698    0.6971
        0.7267    0.7572    0.7877    0.8182    0.8487
        0.8791    0.9094    0.9397    0.9699    1.0000
Width:
        0.0136    0.0190    0.0245    0.0304    0.0371
        0.0457    0.0786    0.1439    0.2136    0.2763
        0.3197    0.3342    0.3488    0.3811    0.3973
        0.4350    0.4633    0.4882    0.5228    0.5445
        0.5665    0.5879    0.6010    0.6542    0.8216
        0.8261    0.8344    0.8404    0.8448    0.8545
        0.8650    0.8748    0.8822    0.8889    0.9383
        0.9572    0.9620    0.9690    0.9772    0.9836
        0.9868    0.9884    0.9900    0.9915    0.9929
        0.9943    0.9957    0.9972    0.9986    1.0000

Transect C46
Area:
        0.0003    0.0010    0.0017    0.0027    0.0038
        0.0051    0.0109    0.0199    0.0311    0.0452
        0.0603    0.0764    0.0934    0.1113    0.1303
        0.1496    0.1691    0.1887    0.2087    0.2291
        0.2498    0.2709    0.2924    0.3142    0.3366
        0.3596    0.3834    0.4079    0.4324    0.4570
        0.4816    0.5063    0.5311    0.5560    0.5809
        0.6059    0.6309    0.6562    0.6820    0.7083
        0.7351    0.7624    0.7907    0.8196    0.8489
        0.8784    0.9081    0.9384    0.9690    1.0000
Hrad:
        0.0206    0.0424    0.0634    0.0837    0.0996
        0.1123    0.0415    0.0666    0.0829    0.0975
        0.1215    0.1458    0.1688    0.1905    0.2140
        0.2431    0.2719    0.3007    0.3255    0.3505
        0.3749    0.3998    0.4249    0.4482    0.4626
        0.4863    0.5053    0.5225    0.5521    0.5818
        0.6115    0.6409    0.6701    0.6992    0.7279
        0.7566    0.7851    0.8127    0.8384    0.8624
        0.8837    0.9018    0.8578    0.8785    0.9013
        0.9265    0.9442    0.9605    0.9815    1.0000
Width:
        0.0166    0.0227    0.0277    0.0322    0.0381
        0.0478    0.2714    0.3092    0.4163    0.4684
        0.5020    0.5304    0.5597    0.5912    0.6157
        0.6221    0.6282    0.6339    0.6471    0.6593
        0.6720    0.6831    0.6933    0.7062    0.7330
        0.7445    0.7827    0.7854    0.7878    0.7896
        0.7915    0.7936    0.7958    0.7981    0.8006
        0.8031    0.8056    0.8192    0.8368    0.8510
        0.8671    0.8889    0.9231    0.9341    0.9428
        0.9488    0.9623    0.9774    0.9875    1.0000

Transect C55
Area:
        0.0004    0.0013    0.0025    0.0042    0.0061
        0.0082    0.0104    0.0128    0.0152    0.0178
        0.0215    0.0283    0.0389    0.0520    0.0663
        0.0819    0.0996    0.1214    0.1443    0.1675
        0.1914    0.2153    0.2394    0.2636    0.2884
        0.3136    0.3393    0.3654    0.3917    0.4185
        0.4458    0.4733    0.5009    0.5286    0.5565
        0.5847    0.6131    0.6418    0.6705    0.6996
        0.7289    0.7583    0.7879    0.8176    0.8475
        0.8776    0.9080    0.9385    0.9692    1.0000
Hrad:
        0.0193    0.0390    0.0585    0.0685    0.0944
        0.1189    0.1430    0.1649    0.1852    0.2035
        0.1900    0.1521    0.1103    0.1174    0.1377
        0.1609    0.1830    0.1673    0.1971    0.2254
        0.2504    0.2804    0.3105    0.3397    0.3608
        0.3828    0.4080    0.4348    0.4621    0.4791
        0.5064    0.5346    0.5630    0.5909    0.6165
        0.6402    0.6668    0.6935    0.7208    0.7421
        0.7684    0.7958    0.8228    0.8482    0.8744
        0.8965    0.9205    0.9473    0.9737    1.0000
Width:
        0.0223    0.0347    0.0449    0.0616    0.0655
        0.0696    0.0732    0.0776    0.0824    0.0880
        0.1584    0.2826    0.3905    0.4492    0.4891
        0.5171    0.6573    0.7375    0.7431    0.7684
        0.7748    0.7780    0.7806    0.7951    0.8087
        0.8281    0.8404    0.8488    0.8556    0.8815
        0.8880    0.8925    0.8964    0.9009    0.9087
        0.9189    0.9248    0.9303    0.9347    0.9468
        0.9523    0.9562    0.9604    0.9663    0.9713
        0.9807    0.9877    0.9916    0.9958    1.0000

Transect C62
Area:
        0.0005    0.0013    0.0022    0.0033    0.0045
        0.0059    0.0073    0.0090    0.0107    0.0126
        0.0147    0.0171    0.0199    0.0247    0.0322
        0.0404    0.0492    0.0586    0.0691    0.0814
        0.0954    0.1119    0.1314    0.1527    0.1752
        0.1990    0.2237    0.2495    0.2768    0.3051
        0.3343    0.3646    0.3955    0.4270    0.4591
        0.4917    0.5253    0.5595    0.5941    0.6292
        0.6648    0.7007    0.7368    0.7731    0.8098
        0.8469    0.8844    0.9223    0.9609    1.0000
Hrad:
        0.0312    0.0589    0.0856    0.1122    0.1372
        0.1621    0.1863    0.2095    0.2321    0.2485
        0.2632    0.2655    0.2496    0.1384    0.1632
        0.1880    0.2148    0.2322    0.2448    0.2480
        0.2600    0.2783    0.2523    0.2777    0.2988
        0.3256    0.3505    0.3766    0.3944    0.4205
        0.4459    0.4732    0.5028    0.5320    0.5632
        0.5878    0.6133    0.6440    0.6753    0.7042
        0.7361    0.7699    0.8050    0.8386    0.8665
        0.8979    0.9269    0.9553    0.9769    1.0000
Width:
        0.0162    0.0211    0.0254    0.0289    0.0325
        0.0358    0.0390    0.0424    0.0457    0.0503
        0.0554    0.0638    0.0791    0.1778    0.1962
        0.2137    0.2277    0.2512    0.2811    0.3268
        0.3878    0.4426    0.5188    0.5476    0.5841
        0.6086    0.6358    0.6601    0.6991    0.7229
        0.7471    0.7674    0.7832    0.7989    0.8112
        0.8322    0.8519    0.8639    0.8746    0.8880
        0.8974    0.9041    0.9089    0.9153    0.9277
        0.9361    0.9466    0.9577    0.9755    1.0000

Transect C68
Area:
        0.0005    0.0012    0.0021    0.0032    0.0045
        0.0061    0.0082    0.0115    0.0158    0.0215
        0.0278    0.0353    0.0435    0.0522    0.0617
        0.0720    0.0832    0.0953    0.1081    0.1218
        0.1363    0.1511    0.1667    0.1832    0.2004
        0.2181    0.2362    0.2548    0.2739    0.2940
        0.3151    0.3373    0.3608    0.3868    0.4148
        0.4447    0.4760    0.5091    0.5443    0.5823
        0.6223    0.6632    0.7042    0.7455    0.7869
        0.8287    0.8708    0.9136    0.9566    1.0000
Hrad:
        0.0331    0.0629    0.0899    0.1152    0.1377
        0.1594    0.1709    0.1713    0.1491    0.1550
```

0.1847 0.1970 0.2273 0.2524 0.2721
0.2955 0.3132 0.3348 0.3577 0.3775
0.4076 0.4384 0.4511 0.4752 0.5037
0.5339 0.5644 0.5928 0.6145 0.6217
0.6354 0.6515 0.6616 0.6771 0.6777
0.6966 0.7137 0.7290 0.7275 0.6581
0.6699 0.7097 0.7497 0.7895 0.8285
0.8649 0.8956 0.9319 0.9682 1.0000
Width:
0.0140 0.0187 0.0233 0.0278 0.0328
0.0380 0.0662 0.0848 0.1195 0.1388
0.1579 0.1797 0.1915 0.2070 0.2272
0.2442 0.2662 0.2851 0.3030 0.3235
0.3350 0.3454 0.3704 0.3864 0.3988
0.4094 0.4194 0.4307 0.4468 0.4739
0.4971 0.5190 0.5704 0.6173 0.6682
0.7005 0.7351 0.7774 0.8421 0.8874
0.9317 0.9369 0.9414 0.9460 0.9513
0.9593 0.9732 0.9809 0.9883 1.0000

Transect C75
Area:
0.0004 0.0013 0.0025 0.0040 0.0057
0.0077 0.0098 0.0122 0.0155 0.0219
0.0296 0.0383 0.0488 0.0613 0.0743
0.0879 0.1026 0.1179 0.1336 0.1501
0.1672 0.1848 0.2032 0.2221 0.2413
0.2609 0.2808 0.3014 0.3224 0.3438
0.3657 0.3882 0.4124 0.4390 0.4677
0.4980 0.5289 0.5603 0.5922 0.6246
0.6573 0.6905 0.7244 0.7588 0.7937
0.8292 0.8657 0.9062 0.9510 1.0000
Hrad:
0.0283 0.0596 0.0861 0.1172 0.1469
0.1759 0.2024 0.2244 0.2322 0.1674
0.1946 0.2163 0.1913 0.2248 0.2633
0.2945 0.3184 0.3575 0.3939 0.4184
0.4537 0.4808 0.5096 0.5455 0.5836
0.6203 0.6539 0.6776 0.7137 0.7497
0.7849 0.8176 0.8375 0.8421 0.8397
0.7603 0.7958 0.8318 0.8632 0.9009
0.9355 0.9653 0.9942 1.0284 1.0560
1.0882 1.0788 1.0504 1.0444 1.0000
Width:
0.0143 0.0204 0.0270 0.0316 0.0360
0.0402 0.0447 0.0501 0.0929 0.1439
0.1614 0.1804 0.2356 0.2519 0.2606
0.2758 0.2980 0.3049 0.3135 0.3316
0.3406 0.3553 0.3686 0.3763 0.3822
0.3887 0.3969 0.4111 0.4175 0.4246
0.4368 0.4560 0.5038 0.5475 0.5823
0.6054 0.6143 0.6226 0.6341 0.6407
0.6494 0.6612 0.6734 0.6820 0.6947
0.7043 0.7417 0.8402 0.9273 1.0000

Transect C91
Area:
0.0006 0.0019 0.0039 0.0065 0.0098
0.0137 0.0185 0.0246 0.0324 0.0415
0.0524 0.0640 0.0761 0.0886 0.1014
0.1146 0.1286 0.1434 0.1589 0.1749
0.1915 0.2088 0.2266 0.2451 0.2642
0.2840 0.3047 0.3262 0.3482 0.3713
0.3953 0.4198 0.4453 0.4718 0.4993
0.5275 0.5563 0.5861 0.6165 0.6475
0.6796 0.7129 0.7472 0.7822 0.8179
0.8540 0.8902 0.9266 0.9632 1.0000
Hrad:
0.0254 0.0414 0.0631 0.0858 0.1021
0.1198 0.1375 0.1355 0.1400 0.1537
0.1749 0.2032 0.2325 0.2631 0.2931
0.3155 0.3371 0.3526 0.3788 0.4056
0.4244 0.4464 0.4697 0.4917 0.5092
0.5332 0.5392 0.5646 0.5847 0.5918
0.6136 0.6334 0.6464 0.6548 0.6740
0.6975 0.7131 0.7322 0.7556 0.7729
0.7804 0.7908 0.8105 0.8324 0.8564
0.8885 0.9218 0.9551 0.9883 1.0000
Width:
0.0242 0.0455 0.0626 0.0764 0.0959
0.1147 0.1484 0.1820 0.2314 0.2705
0.2999 0.3150 0.3273 0.3368 0.3462
0.3635 0.3818 0.4069 0.4199 0.4316
0.4515 0.4680 0.4829 0.4988 0.5193
0.5330 0.5654 0.5780 0.5959 0.6279
0.6447 0.6633 0.6894 0.7210 0.7414
0.7567 0.7806 0.8010 0.8165 0.8383
0.8713 0.9020 0.9225 0.9403 0.9556
0.9616 0.9660 0.9704 0.9746 1.0000

Transect T-C100
Area:
0.0007 0.0015 0.0025 0.0036 0.0048
0.0061 0.0075 0.0090 0.0107 0.0125
0.0144 0.0165 0.0188 0.0213 0.0242
0.0275 0.0315 0.0385 0.0479 0.0581
0.0692 0.0821 0.0965 0.1122 0.1294
0.1474 0.1667 0.1886 0.2120 0.2372
0.2640 0.2925 0.3224 0.3536 0.3865
0.4212 0.4565 0.4925 0.5301 0.5690
0.6088 0.6494 0.6905 0.7319 0.7742
0.8173 0.8611 0.9056 0.9515 1.0000
Hrad:
0.0582 0.1161 0.1686 0.2174 0.2634
0.3079 0.3509 0.3915 0.4278 0.4639
0.4974 0.5163 0.5379 0.5911 0.6453
0.6884 0.7113 0.6651 0.6193 0.5978
0.5899 0.5711 0.5694 0.5591 0.5671
0.5785 0.5806 0.5780 0.5811 0.5919
0.5969 0.6117 0.6257 0.6428 0.6611
0.6715 0.6976 0.7259 0.7354 0.7619
0.7878 0.8161 0.8492 0.8828 0.9019
0.9348 0.9598 0.9909 0.9992 1.0000
Width:
0.0160 0.0183 0.0206 0.0228 0.0251
0.0273 0.0295 0.0318 0.0345 0.0371
0.0399 0.0440 0.0482 0.0544 0.0614
0.0704 0.0971 0.1718 0.1977 0.2147
0.2301 0.2786 0.2975 0.3366 0.3531
0.3699 0.4216 0.4500 0.4902 0.5177
0.5582 0.5844 0.6134 0.6389 0.6850
0.7022 0.7167 0.7286 0.7724 0.7889
0.8067 0.8209 0.8279 0.8342 0.8621
0.8698 0.8888 0.8990 0.9422 1.0000

Transect T-C113
Area:
0.0009 0.0024 0.0043 0.0067 0.0094
0.0126 0.0163 0.0203 0.0248 0.0300
0.0360 0.0427 0.0502 0.0585 0.0675
0.0774 0.0881 0.0996 0.1120 0.1253
0.1396 0.1549 0.1709 0.1880 0.2059
0.2244 0.2438 0.2640 0.2851 0.3070
0.3305 0.3552 0.3814 0.4089 0.4376
0.4675 0.4984 0.5302 0.5629 0.5965
0.6313 0.6670 0.7038 0.7419 0.7814
0.8221 0.8644 0.9082 0.9533 1.0000
Hrad:
0.0480 0.0873 0.1243 0.1617 0.1960
0.2255 0.2696 0.3242 0.3710 0.4070
0.4382 0.4632 0.4868 0.5052 0.5240
0.5409 0.5568 0.5729 0.5865 0.6012
0.6129 0.6275 0.6432 0.6535 0.6738
0.6916 0.7057 0.7219 0.7363 0.7546
0.7556 0.7645 0.7719 0.7825 0.7971
0.8096 0.8247 0.8425 0.8586 0.8731
0.8880 0.9060 0.9159 0.9299 0.9376
0.9552 0.9607 0.9730 0.9898 1.0000
Width:
0.0257 0.0358 0.0452 0.0535 0.0622
0.0724 0.0811 0.0889 0.1027 0.1193
0.1322 0.1494 0.1641 0.1836 0.1991

0.2164 0.2345 0.2513 0.2715 0.2898
0.3124 0.3303 0.3469 0.3719 0.3829
0.3979 0.4181 0.4353 0.4552 0.4703
0.5090 0.5372 0.5679 0.5945 0.6158
0.6403 0.6617 0.6792 0.6993 0.7217
0.7436 0.7614 0.7900 0.8144 0.8481
0.8686 0.9083 0.9394 0.9639 1.0000

Transect T-C119
Area:
0.0004 0.0014 0.0026 0.0040 0.0058
0.0080 0.0104 0.0131 0.0161 0.0205
0.0270 0.0360 0.0474 0.0610 0.0759
0.0920 0.1092 0.1278 0.1473 0.1674
0.1879 0.2090 0.2308 0.2533 0.2771
0.3022 0.3276 0.3533 0.3793 0.4056
0.4319 0.4584 0.4851 0.5120 0.5394
0.5670 0.5950 0.6232 0.6521 0.6812
0.7104 0.7398 0.7695 0.8002 0.8322
0.8648 0.8979 0.9313 0.9653 1.0000
Hrad:
0.0302 0.0667 0.1029 0.1321 0.1556
0.1821 0.2295 0.2737 0.3101 0.3206
0.3120 0.2941 0.2835 0.2830 0.2826
0.2975 0.3077 0.3225 0.3366 0.3585
0.3794 0.4023 0.4243 0.4417 0.4467
0.4713 0.4950 0.5206 0.5442 0.5724
0.6009 0.6280 0.6548 0.6742 0.7013
0.7234 0.7520 0.7664 0.7939 0.8209
0.8484 0.8765 0.9018 0.9080 0.9131
0.9301 0.9491 0.9706 0.9952 1.0000
Width:
0.0221 0.0309 0.0376 0.0455 0.0559
0.0657 0.0719 0.0796 0.1001 0.1516
0.2145 0.2922 0.3546 0.4046 0.4434
0.4704 0.5067 0.5433 0.5608 0.5732
0.5899 0.6052 0.6266 0.6502 0.7049
0.7140 0.7256 0.7317 0.7414 0.7444
0.7472 0.7521 0.7575 0.7729 0.7781
0.7898 0.7932 0.8148 0.8196 0.8250
0.8297 0.8335 0.8597 0.8821 0.9179
0.9270 0.9422 0.9550 0.9690 1.0000

Transect T-C141_1
Area:
0.0009 0.0024 0.0045 0.0070 0.0100
0.0138 0.0184 0.0236 0.0296 0.0361
0.0433 0.0511 0.0597 0.0692 0.0792
0.0900 0.1019 0.1156 0.1304 0.1464
0.1636 0.1817 0.2006 0.2201 0.2406
0.2616 0.2833 0.3056 0.3288 0.3530
0.3779 0.4033 0.4294 0.4563 0.4840
0.5123 0.5415 0.5716 0.6024 0.6340
0.6664 0.6995 0.7338 0.7688 0.8050
0.8421 0.8801 0.9193 0.9594 1.0000
Hrad:
0.0414 0.0753 0.1081 0.1369 0.1601
0.1815 0.2281 0.2685 0.3033 0.3351
0.3648 0.3903 0.4118 0.4349 0.4566
0.4747 0.4817 0.4934 0.5063 0.5154
0.5280 0.5442 0.5620 0.5775 0.5938
0.6131 0.6324 0.6503 0.6629 0.6788
0.6987 0.7201 0.7377 0.7523 0.7713
0.7895 0.8030 0.8214 0.8363 0.8550
0.8716 0.8894 0.8993 0.9156 0.9261
0.9419 0.9537 0.9639 0.9882 1.0000
Width:
0.0298 0.0427 0.0542 0.0667 0.0822
0.1010 0.1189 0.1344 0.1513 0.1651
0.1792 0.1982 0.2202 0.2344 0.2505
0.2717 0.3152 0.3447 0.3688 0.4023
0.4289 0.4465 0.4616 0.4825 0.5016
0.5154 0.5297 0.5467 0.5722 0.5930
0.6070 0.6192 0.6371 0.6597 0.6755
0.6925 0.7160 0.7326 0.7547 0.7709
0.7901 0.8071 0.8368 0.8565 0.8849
0.9048 0.9312 0.9617 0.9709 1.0000

Transect T-C141_2
Area:
0.0005 0.0016 0.0032 0.0053 0.0078
0.0108 0.0143 0.0184 0.0232 0.0288
0.0357 0.0441 0.0540 0.0650 0.0770
0.0905 0.1048 0.1202 0.1365 0.1535
0.1714 0.1901 0.2097 0.2299 0.2509
0.2726 0.2950 0.3182 0.3421 0.3667
0.3921 0.4183 0.4450 0.4723 0.5003
0.5287 0.5575 0.5870 0.6173 0.6483
0.6804 0.7132 0.7465 0.7801 0.8151
0.8509 0.8870 0.9239 0.9617 1.0000
Hrad:
0.0304 0.0639 0.0930 0.1222 0.1498
0.1764 0.2184 0.2601 0.2933 0.3189
0.3324 0.3412 0.3488 0.3610 0.3690
0.3796 0.3930 0.4083 0.4234 0.4401
0.4567 0.4736 0.4914 0.5098 0.5288
0.5475 0.5646 0.5844 0.6015 0.6186
0.6378 0.6562 0.6763 0.6972 0.7161
0.7414 0.7647 0.7783 0.7975 0.8169
0.8303 0.8487 0.8732 0.8993 0.8987
0.9247 0.9510 0.9581 0.9821 1.0000
Width:
0.0226 0.0346 0.0471 0.0591 0.0714
0.0841 0.0982 0.1139 0.1335 0.1575
0.1982 0.2378 0.2722 0.2932 0.3303
0.3605 0.3848 0.4065 0.4302 0.4509
0.4726 0.4939 0.5138 0.5324 0.5503
0.5686 0.5898 0.6061 0.6266 0.6469
0.6640 0.6821 0.6975 0.7119 0.7296
0.7374 0.7483 0.7743 0.7919 0.8107
0.8363 0.8555 0.8648 0.8743 0.9214
0.9278 0.9339 0.9711 0.9805 1.0000

Transect T-C151
Area:
0.0005 0.0013 0.0028 0.0048 0.0072
0.0100 0.0136 0.0180 0.0235 0.0298
0.0365 0.0445 0.0539 0.0648 0.0774
0.0926 0.1092 0.1270 0.1456 0.1651
0.1854 0.2064 0.2281 0.2502 0.2728
0.2958 0.3191 0.3429 0.3672 0.3919
0.4173 0.4432 0.4698 0.4969 0.5245
0.5526 0.5812 0.6102 0.6398 0.6701
0.7008 0.7320 0.7637 0.7960 0.8287
0.8619 0.8957 0.9301 0.9648 1.0000
Hrad:
0.0371 0.0606 0.0866 0.1163 0.1614
0.2009 0.2290 0.2513 0.2625 0.2813
0.2946 0.3120 0.3066 0.3148 0.3211
0.3230 0.3292 0.3444 0.3605 0.3793
0.3954 0.4141 0.4363 0.4596 0.4829
0.5079 0.5309 0.5529 0.5777 0.5973
0.6171 0.6397 0.6559 0.6768 0.7001
0.7207 0.7420 0.7636 0.7774 0.8002
0.8225 0.8415 0.8627 0.8847 0.9066
0.9184 0.9449 0.9623 0.9832 1.0000
Width:
0.0192 0.0335 0.0491 0.0619 0.0724
0.0902 0.1180 0.1317 0.1713 0.1815
0.2101 0.2399 0.2932 0.3278 0.3991
0.4429 0.4883 0.5087 0.5386 0.5612
0.5827 0.6026 0.6177 0.6294 0.6410
0.6500 0.6628 0.6772 0.6866 0.7038
0.7205 0.7331 0.7553 0.7703 0.7814
0.7961 0.8101 0.8232 0.8468 0.8579
0.8698 0.8857 0.8988 0.9143 0.9220
0.9454 0.9597 0.9687 0.9817 1.0000

Transect T-C159
Area:
0.0009 0.0025 0.0046 0.0072 0.0102
0.0138 0.0177 0.0220 0.0267 0.0317

0.0371 0.0430 0.0493 0.0560 0.0633
0.0712 0.0796 0.0886 0.0985 0.1099
0.1225 0.1363 0.1518 0.1685 0.1863
0.2056 0.2265 0.2484 0.2711 0.2948
0.3200 0.3461 0.3733 0.4022 0.4329
0.4647 0.4981 0.5324 0.5675 0.6034
0.6396 0.6767 0.7145 0.7527 0.7915
0.8311 0.8715 0.9126 0.9544 1.0000
Hrad:
0.0413 0.0764 0.1119 0.1461 0.1800
0.2124 0.2492 0.2965 0.3481 0.3955
0.4376 0.4763 0.5122 0.5445 0.5739
0.6001 0.6244 0.6470 0.6592 0.6640
0.6732 0.6759 0.6756 0.6845 0.6852
0.6834 0.6899 0.7016 0.7111 0.7218
0.7279 0.7400 0.7506 0.7502 0.7595
0.7695 0.7793 0.7968 0.8131 0.8355
0.8585 0.8775 0.8973 0.9223 0.9432
0.9621 0.9839 1.0045 1.0239 1.0000
Width:
0.0267 0.0397 0.0504 0.0607 0.0703
0.0801 0.0878 0.0957 0.1031 0.1109
0.1213 0.1301 0.1389 0.1498 0.1612
0.1740 0.1862 0.1984 0.2235 0.2588
0.2799 0.3114 0.3483 0.3641 0.3955
0.4347 0.4581 0.4744 0.4970 0.5184
0.5486 0.5696 0.5940 0.6382 0.6662
0.6939 0.7231 0.7398 0.7600 0.7700
0.7797 0.7971 0.8135 0.8215 0.8365
0.8550 0.8689 0.8850 0.9144 1.0000

Transect T-C176_1
Area:
0.0006 0.0027 0.0056 0.0091 0.0137
0.0193 0.0260 0.0349 0.0449 0.0555
0.0667 0.0782 0.0907 0.1050 0.1200
0.1358 0.1520 0.1688 0.1860 0.2039
0.2232 0.2441 0.2661 0.2900 0.3145
0.3392 0.3641 0.3891 0.4144 0.4398
0.4654 0.4911 0.5170 0.5431 0.5695
0.5961 0.6230 0.6505 0.6782 0.7061
0.7343 0.7628 0.7915 0.8204 0.8496
0.8790 0.9087 0.9388 0.9692 1.0000
Hrad:
0.0239 0.0513 0.0890 0.1179 0.1397
0.1602 0.1700 0.1809 0.1966 0.2154
0.2361 0.2584 0.2709 0.2796 0.2949
0.3137 0.3347 0.3533 0.3725 0.3907
0.3894 0.4032 0.4065 0.4224 0.4408
0.4644 0.4879 0.5115 0.5347 0.5593
0.5837 0.6078 0.6324 0.6543 0.6761
0.7005 0.7193 0.7374 0.7614 0.7838
0.8055 0.8288 0.8512 0.8744 0.8957
0.9197 0.9388 0.9604 0.9760 1.0000
Width:
0.0426 0.0824 0.1019 0.1337 0.1682
0.1930 0.2646 0.3082 0.3340 0.3525
0.3673 0.3794 0.4440 0.4712 0.4995
0.5171 0.5305 0.5508 0.5686 0.5918
0.6591 0.6861 0.7522 0.7810 0.7975
0.8022 0.8076 0.8133 0.8199 0.8245
0.8295 0.8350 0.8397 0.8488 0.8582
0.8635 0.8775 0.8930 0.8991 0.9076
0.9172 0.9242 0.9325 0.9394 0.9491
0.9547 0.9675 0.9766 0.9946 1.0000

Transect T-C176_2
Area:
0.0016 0.0042 0.0078 0.0124 0.0178
0.0238 0.0305 0.0378 0.0464 0.0557
0.0656 0.0761 0.0875 0.0998 0.1126
0.1258 0.1395 0.1537 0.1684 0.1839
0.2002 0.2170 0.2352 0.2546 0.2746
0.2952 0.3164 0.3382 0.3608 0.3840
0.4080 0.4327 0.4580 0.4839 0.5106
0.5384 0.5666 0.5950 0.6238 0.6528
0.6823 0.7123 0.7429 0.7745 0.8075
0.8426 0.8787 0.9164 0.9569 1.0000
Hrad:
0.0400 0.0742 0.1034 0.1487 0.1865
0.2213 0.2541 0.2813 0.3037 0.3286
0.3531 0.3753 0.3946 0.4160 0.4399
0.4642 0.4882 0.5115 0.5319 0.5490
0.5679 0.5875 0.5860 0.6051 0.6247
0.6436 0.6642 0.6818 0.6985 0.7165
0.7335 0.7509 0.7698 0.7887 0.8004
0.8179 0.8416 0.8656 0.8898 0.9117
0.9329 0.9479 0.9711 0.9737 0.9628
0.9758 0.9906 1.0012 0.9907 1.0000
Width:
0.0486 0.0685 0.0913 0.1138 0.1290
0.1431 0.1560 0.1769 0.2020 0.2156
0.2291 0.2465 0.2671 0.2820 0.2926
0.3026 0.3131 0.3243 0.3389 0.3568
0.3726 0.3867 0.4283 0.4426 0.4560
0.4705 0.4828 0.4986 0.5153 0.5303
0.5468 0.5628 0.5767 0.5904 0.6142
0.6299 0.6363 0.6427 0.6492 0.6581
0.6678 0.6844 0.6926 0.7244 0.7784
0.8027 0.8304 0.8681 0.9439 1.0000

Transect T-C37
Area:
0.0003 0.0008 0.0014 0.0021 0.0030
0.0044 0.0084 0.0147 0.0232 0.0336
0.0462 0.0607 0.0766 0.0935 0.1108
0.1286 0.1468 0.1657 0.1855 0.2062
0.2277 0.2500 0.2733 0.2970 0.3210
0.3455 0.3704 0.3957 0.4212 0.4467
0.4724 0.4982 0.5245 0.5510 0.5778
0.6048 0.6320 0.6592 0.6867 0.7144
0.7423 0.7705 0.7988 0.8273 0.8558
0.8844 0.9132 0.9419 0.9709 1.0000
Hrad:
0.0670 0.1490 0.2217 0.2889 0.3209
0.3271 0.2473 0.2093 0.1977 0.1993
0.2042 0.2054 0.2104 0.2298 0.2508
0.2725 0.2950 0.3171 0.3336 0.3456
0.3653 0.3796 0.3927 0.4163 0.4360
0.4541 0.4793 0.4967 0.5216 0.5470
0.5722 0.5939 0.6124 0.6334 0.6565
0.6803 0.7053 0.7303 0.7501 0.7718
0.7929 0.8160 0.8398 0.8638 0.8882
0.9132 0.9386 0.9640 0.9882 1.0000
Width:
0.0156 0.0190 0.0224 0.0258 0.0323
0.0866 0.1734 0.2496 0.3229 0.3862
0.4631 0.5115 0.5656 0.5815 0.5959
0.6106 0.6278 0.6569 0.6894 0.7157
0.7440 0.7809 0.8002 0.8074 0.8226
0.8410 0.8522 0.8635 0.8672 0.8700
0.8732 0.8826 0.8974 0.9077 0.9144
0.9198 0.9229 0.9296 0.9372 0.9451
0.9538 0.9595 0.9641 0.9681 0.9716
0.9744 0.9765 0.9799 0.9858 1.0000

Transect T-C39
Area:
0.0005 0.0014 0.0024 0.0037 0.0056
0.0084 0.0141 0.0231 0.0336 0.0448
0.0565 0.0685 0.0811 0.0944 0.1079
0.1219 0.1362 0.1508 0.1659 0.1813
0.1975 0.2143 0.2318 0.2501 0.2693
0.2913 0.3148 0.3395 0.3648 0.3904
0.4161 0.4423 0.4692 0.4964 0.5240
0.5523 0.5810 0.6105 0.6402 0.6700
0.7004 0.7312 0.7622 0.7933 0.8252
0.8583 0.8918 0.9257 0.9612 1.0000
Hrad:
0.0800 0.1526 0.2150 0.2732 0.2936
0.3098 0.2718 0.2479 0.2468 0.2632
0.2848 0.3110 0.3281 0.3539 0.3803

0.4044 0.4322 0.4536 0.4798 0.5006
0.5177 0.5330 0.5498 0.5655 0.5710
0.5538 0.5577 0.5759 0.5929 0.6170
0.6425 0.6582 0.6798 0.7017 0.7207
0.7432 0.7592 0.7825 0.8067 0.8319
0.8508 0.8726 0.8972 0.9188 0.9358
0.9481 0.9682 0.9870 0.9965 1.0000
Width:
0.0177 0.0233 0.0293 0.0354 0.0635
0.0813 0.1953 0.2529 0.2745 0.2875
0.2985 0.3064 0.3304 0.3375 0.3445
0.3555 0.3602 0.3743 0.3810 0.3943
0.4121 0.4314 0.4486 0.4674 0.5053
0.5764 0.6103 0.6320 0.6396 0.6444
0.6470 0.6689 0.6795 0.6894 0.7055
0.7142 0.7367 0.7433 0.7480 0.7533
0.7688 0.7756 0.7792 0.7886 0.8261
0.8339 0.8453 0.8614 0.9281 1.0000

Transect T-C41
Area:
0.0006 0.0015 0.0027 0.0040 0.0055
0.0073 0.0094 0.0118 0.0147 0.0182
0.0220 0.0263 0.0312 0.0376 0.0467
0.0570 0.0684 0.0804 0.0929 0.1066
0.1226 0.1401 0.1588 0.1782 0.1984
0.2191 0.2406 0.2638 0.2882 0.3136
0.3396 0.3662 0.3940 0.4226 0.4521
0.4829 0.5146 0.5472 0.5803 0.6140
0.6485 0.6836 0.7195 0.7559 0.7931
0.8308 0.8694 0.9096 0.9537 1.0000
Hrad:
0.0909 0.1806 0.2602 0.3327 0.3995
0.4620 0.5095 0.5599 0.6538 0.7264
0.7832 0.8323 0.8590 0.8517 0.7900
0.7581 0.7393 0.7334 0.7354 0.7202
0.7020 0.6970 0.6991 0.7049 0.7162
0.7291 0.7389 0.7341 0.7460 0.7562
0.7731 0.7858 0.7966 0.8118 0.8197
0.8318 0.8481 0.8630 0.8834 0.9032
0.9184 0.9356 0.9541 0.9714 0.9913
1.0121 1.0188 1.0381 1.0082 1.0000
Width:
0.0167 0.0210 0.0254 0.0298 0.0345
0.0394 0.0458 0.0533 0.0660 0.0755
0.0839 0.0916 0.1158 0.1562 0.2015
0.2249 0.2408 0.2535 0.2649 0.3057
0.3508 0.3751 0.3925 0.4094 0.4215
0.4340 0.4530 0.4928 0.5155 0.5302
0.5419 0.5602 0.5821 0.5980 0.6251
0.6463 0.6615 0.6792 0.6894 0.7007
0.7178 0.7321 0.7454 0.7607 0.7725
0.7830 0.8127 0.8791 0.9215 1.0000

Transect T-C46
Area:
0.0005 0.0014 0.0024 0.0036 0.0049
0.0063 0.0078 0.0093 0.0109 0.0126
0.0144 0.0162 0.0182 0.0202 0.0223
0.0274 0.0388 0.0537 0.0698 0.0862
0.1032 0.1209 0.1394 0.1595 0.1806
0.2028 0.2259 0.2505 0.2759 0.3022
0.3292 0.3571 0.3857 0.4153 0.4464
0.4781 0.5111 0.5447 0.5790 0.6142
0.6501 0.6867 0.7242 0.7625 0.8017
0.8411 0.8807 0.9203 0.9601 1.0000
Hrad:
0.0411 0.0881 0.1297 0.1695 0.2187
0.2659 0.3114 0.3553 0.3980 0.4395
0.4786 0.5145 0.5499 0.5848 0.6190
0.5696 0.4527 0.3877 0.3704 0.3742
0.3845 0.3999 0.4185 0.4324 0.4554
0.4772 0.4892 0.5027 0.5225 0.5402
0.5607 0.5823 0.6033 0.6118 0.6327
0.6514 0.6673 0.6914 0.7110 0.7306
0.7534 0.7751 0.7918 0.8130 0.8358
0.8688 0.9020 0.9351 0.9676 1.0000
Width:
0.0190 0.0234 0.0279 0.0320 0.0339
0.0357 0.0376 0.0394 0.0413 0.0432
0.0452 0.0474 0.0496 0.0519 0.0571
0.2217 0.3415 0.4002 0.4071 0.4154
0.4328 0.4487 0.4813 0.5206 0.5382
0.5648 0.5965 0.6256 0.6440 0.6673
0.6870 0.7059 0.7254 0.7644 0.7843
0.8069 0.8337 0.8484 0.8694 0.8906
0.9072 0.9252 0.9501 0.9690 0.9855
0.9878 0.9901 0.9926 0.9963 1.0000

Transect T-C55
Area:
0.0003 0.0008 0.0015 0.0023 0.0032
0.0044 0.0062 0.0094 0.0129 0.0168
0.0223 0.0284 0.0347 0.0412 0.0493
0.0610 0.0739 0.0887 0.1055 0.1241
0.1431 0.1637 0.1879 0.2137 0.2404
0.2675 0.2951 0.3234 0.3524 0.3815
0.4108 0.4403 0.4702 0.5002 0.5304
0.5608 0.5913 0.6219 0.6527 0.6837
0.7148 0.7459 0.7771 0.8084 0.8398
0.8714 0.9032 0.9353 0.9676 1.0000
Hrad:
0.0668 0.1462 0.2155 0.2774 0.3369
0.3678 0.3897 0.3892 0.4092 0.4225
0.4043 0.4146 0.4331 0.4540 0.4387
0.3980 0.3965 0.3845 0.3708 0.3810
0.3955 0.4059 0.4013 0.4095 0.4069
0.4259 0.4454 0.4600 0.4823 0.5058
0.5299 0.5535 0.5761 0.6008 0.6262
0.6513 0.6762 0.7009 0.7258 0.7515
0.7776 0.8039 0.8299 0.8558 0.8815
0.9067 0.9255 0.9502 0.9753 1.0000
Width:
0.0138 0.0182 0.0226 0.0273 0.0320
0.0397 0.0872 0.1017 0.1109 0.1443
0.1841 0.1901 0.1962 0.2041 0.3108
0.3846 0.4278 0.4836 0.5636 0.5796
0.5930 0.7073 0.7723 0.8122 0.8294
0.8412 0.8546 0.8861 0.8944 0.9004
0.9056 0.9128 0.9231 0.9281 0.9318
0.9363 0.9412 0.9467 0.9516 0.9552
0.9576 0.9600 0.9628 0.9658 0.9691
0.9731 0.9871 0.9917 0.9956 1.0000

Transect T-C62
Area:
0.0009 0.0022 0.0036 0.0053 0.0072
0.0093 0.0116 0.0140 0.0166 0.0194
0.0224 0.0256 0.0289 0.0324 0.0361
0.0400 0.0442 0.0486 0.0535 0.0590
0.0656 0.0746 0.0853 0.0995 0.1171
0.1357 0.1551 0.1751 0.1960 0.2178
0.2404 0.2639 0.2890 0.3156 0.3430
0.3717 0.4036 0.4401 0.4812 0.5248
0.5693 0.6145 0.6603 0.7067 0.7538
0.8015 0.8501 0.8994 0.9494 1.0000
Hrad:
0.0527 0.1088 0.1592 0.2059 0.2501
0.2951 0.3388 0.3812 0.4226 0.4630
0.5149 0.5726 0.6330 0.6896 0.7429
0.7917 0.8365 0.8772 0.9081 0.9278
0.9319 0.9060 0.8704 0.8130 0.7657
0.7445 0.7361 0.7367 0.7411 0.7497
0.7604 0.7703 0.7702 0.7841 0.8006
0.8143 0.8223 0.8184 0.8180 0.7485
0.7685 0.7924 0.8171 0.8421 0.8681
0.8928 0.9174 0.9437 0.9704 1.0000
Width:
0.0231 0.0271 0.0311 0.0351 0.0392
0.0427 0.0462 0.0498 0.0533 0.0568
0.0604 0.0639 0.0674 0.0710 0.0745
0.0795 0.0845 0.0904 0.1013 0.1175

```
            0.1560     0.1855     0.2379     0.3133     0.3594
            0.3734     0.3881     0.4019     0.4193     0.4361
            0.4536     0.4748     0.5110     0.5308     0.5495
            0.5889     0.6701     0.7635     0.8362     0.8675
            0.8831     0.8945     0.9065     0.9193     0.9317
            0.9468     0.9627     0.9765     0.9902     1.0000

Transect T-C68
Area:
            0.0005     0.0016     0.0030     0.0047     0.0068
            0.0092     0.0130     0.0181     0.0242     0.0317
            0.0406     0.0507     0.0618     0.0748     0.0885
            0.1027     0.1174     0.1325     0.1485     0.1652
            0.1825     0.2003     0.2184     0.2369     0.2558
            0.2751     0.2948     0.3148     0.3352     0.3560
            0.3771     0.3989     0.4212     0.4443     0.4681
            0.4924     0.5172     0.5427     0.5692     0.5991
            0.6335     0.6693     0.7063     0.7441     0.7830
            0.8229     0.8640     0.9072     0.9527     1.0000
Hrad:
            0.0568     0.1338     0.2009     0.2542     0.3030
            0.3575     0.3699     0.3850     0.4112     0.4277
            0.4408     0.4543     0.4598     0.4698     0.4868
            0.5072     0.5297     0.5524     0.5718     0.5930
            0.6150     0.6385     0.6621     0.6859     0.7098
            0.7339     0.7578     0.7815     0.8055     0.8296
            0.8511     0.8713     0.8901     0.9058     0.9256
            0.9460     0.9646     0.9787     0.9917     0.9931
            0.9511     0.9580     0.9665     0.9783     0.9846
            0.9960     1.0003     1.0005     0.9988     1.0000
Width:
            0.0197     0.0255     0.0313     0.0386     0.0467
            0.0554     0.0933     0.1160     0.1380     0.1745
            0.1936     0.2187     0.2533     0.2753     0.2888
            0.2980     0.3069     0.3180     0.3384     0.3516
            0.3621     0.3697     0.3779     0.3860     0.3939
            0.4014     0.4091     0.4171     0.4244     0.4314
            0.4419     0.4540     0.4677     0.4855     0.4962
            0.5058     0.5178     0.5361     0.5556     0.6665
            0.7251     0.7509     0.7728     0.7869     0.8153
            0.8314     0.8651     0.9088     0.9579     1.0000

Transect T-C75
Area:
            0.0006     0.0016     0.0030     0.0047     0.0067
            0.0089     0.0113     0.0141     0.0171     0.0205
            0.0260     0.0328     0.0414     0.0520     0.0657
            0.0817     0.0985     0.1162     0.1346     0.1533
            0.1728     0.1931     0.2140     0.2354     0.2571
            0.2793     0.3018     0.3248     0.3485     0.3726
            0.3971     0.4220     0.4471     0.4726     0.4985
            0.5250     0.5522     0.5799     0.6082     0.6374
            0.6685     0.7025     0.7381     0.7741     0.8104
            0.8471     0.8842     0.9216     0.9601     1.0000
Hrad:
            0.0361     0.0767     0.1142     0.1493     0.1859
            0.2211     0.2536     0.2932     0.3456     0.3883
            0.3911     0.3881     0.3821     0.3711     0.3533
            0.3511     0.3646     0.3761     0.3970     0.4204
            0.4361     0.4579     0.4811     0.5067     0.5337
            0.5589     0.5858     0.6088     0.6293     0.6565
            0.6832     0.7106     0.7376     0.7638     0.7852
            0.8078     0.8242     0.8467     0.8637     0.8842
            0.8984     0.8718     0.8881     0.9108     0.9345
            0.9573     0.9806     0.9901     0.9966     1.0000
Width:
            0.0219     0.0306     0.0378     0.0452     0.0513
            0.0574     0.0638     0.0705     0.0766     0.1131
            0.1530     0.1906     0.2279     0.3019     0.3718
            0.4091     0.4181     0.4468     0.4563     0.4655
            0.4925     0.5080     0.5216     0.5316     0.5398
            0.5509     0.5598     0.5736     0.5906     0.5989
            0.6077     0.6155     0.6238     0.6326     0.6463
            0.6586     0.6774     0.6897     0.7077     0.7321
            0.8049     0.8683     0.8826     0.8914     0.8994
            0.9085     0.9175     0.9405     0.9678     1.0000

Transect T-C91
Area:
            0.0007     0.0019     0.0043     0.0072     0.0106
            0.0145     0.0189     0.0244     0.0312     0.0391
            0.0476     0.0569     0.0673     0.0788     0.0917
            0.1059     0.1211     0.1369     0.1534     0.1709
            0.1900     0.2102     0.2309     0.2523     0.2743
            0.2969     0.3200     0.3434     0.3674     0.3922
            0.4175     0.4436     0.4707     0.4984     0.5267
            0.5556     0.5850     0.6148     0.6451     0.6759
            0.7070     0.7386     0.7705     0.8025     0.8347
            0.8672     0.9001     0.9332     0.9665     1.0000
Hrad:
            0.0376     0.0515     0.0893     0.1273     0.1601
            0.1884     0.2110     0.2279     0.2362     0.2525
            0.2695     0.2811     0.2940     0.3073     0.3110
            0.3260     0.3397     0.3592     0.3723     0.3832
            0.3910     0.4085     0.4308     0.4459     0.4667
            0.4858     0.5088     0.5302     0.5481     0.5666
            0.5833     0.5971     0.6118     0.6305     0.6495
            0.6676     0.6901     0.7114     0.7297     0.7542
            0.7774     0.7993     0.8251     0.8514     0.8774
            0.9012     0.9228     0.9487     0.9751     1.0000
Width:
            0.0273     0.0573     0.0784     0.0937     0.1080
            0.1250     0.1503     0.1776     0.2244     0.2434
            0.2623     0.2968     0.3256     0.3569     0.4065
            0.4319     0.4618     0.4772     0.5077     0.5445
            0.5899     0.6105     0.6217     0.6484     0.6634
            0.6817     0.6924     0.7056     0.7250     0.7437
            0.7649     0.7910     0.8160     0.8335     0.8504
            0.8686     0.8798     0.8932     0.9124     0.9209
            0.9315     0.9446     0.9506     0.9557     0.9613
            0.9704     0.9829     0.9884     0.9931     1.0000


***************
Analysis Options
***************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... MODIFIED_GREEN_AMPT
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 09/20/2024 00:00:00
Ending Date .............. 09/21/2024 16:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:05:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
Head Tolerance ........... 0.001500 m


*************************         Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......        71.311       119.255
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........        54.573        91.265
Surface Runoff ...........        16.756        28.022
Final Storage ............         0.034         0.058
Continuity Error (%) .....        -0.074
```

**************************	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
**************************	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	16.756	167.565
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	16.743	167.428
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.010	0.103
Continuity Error (%)	0.021	

****
Highest Continuity Errors
****
Node N-E3 (-2.54%)
Node N-E2 (2.40%)
Node N-E5 (2.22%)
Node N-W5 (-1.86%)
Node N-W4 (1.07%)

****
Time-Step Critical Elements
****
None

****
Highest Flow Instability Indexes
****
All links are stable.

****
Most Frequent Nonconverging Nodes
****
Convergence obtained at all time steps.

****
Routing Time Step Summary
****
Minimum Time Step	:	3.50 sec
Average Time Step	:	5.00 sec
Maximum Time Step	:	5.00 sec
% of Time in Steady State	:	0.00
Average Iterations per Step	:	2.00
% of Steps Not Converging	:	0.00
Time Step Frequencies	:	
5.000 - 3.155 sec	:	100.00 %
3.155 - 1.991 sec	:	0.00 %
1.991 - 1.256 sec	:	0.00 %
1.256 - 0.792 sec	:	0.00 %
0.792 - 0.500 sec	:	0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S-E1	119.26	0.00	0.00	110.16	10.12	0.99	9.08	3.74	2.30	0.076
S-E2	119.26	0.00	0.00	97.25	5.20	17.86	22.02	11.55	1.98	0.185
S-E3	119.26	0.00	0.00	71.49	5.18	43.66	47.80	10.35	1.54	0.401
S-E4	119.26	0.00	0.00	67.34	5.34	47.73	52.00	16.19	3.11	0.436
S-E5	119.26	0.00	0.00	77.06	0.08	42.22	42.28	8.33	1.19	0.355
S-E6	119.26	0.00	0.00	75.98	1.21	42.37	43.34	7.97	1.11	0.363
S-E7	119.26	0.00	0.00	77.24	3.94	38.89	42.04	12.38	1.48	0.352
S-M1	119.26	0.00	0.00	117.75	1.30	0.49	1.53	0.32	0.19	0.013
S-M2	119.26	0.00	0.00	108.22	6.75	5.66	11.06	1.77	0.70	0.093
S-M3	119.26	0.00	0.00	111.34	8.67	0.97	7.91	1.34	0.81	0.066
S-M4	119.26	0.00	0.00	110.22	10.02	0.99	9.00	0.78	0.46	0.075
S-W1	119.26	0.00	0.00	94.25	5.04	20.99	25.02	5.76	0.94	0.210
S-W10	119.26	0.00	0.00	73.21	1.70	44.76	46.13	22.24	3.47	0.387
S-W11	119.26	0.00	0.00	72.78	10.74	37.87	46.46	19.31	2.69	0.390
S-W2	119.26	0.00	0.00	115.97	3.78	0.29	3.31	0.71	0.46	0.028
S-W3	119.26	0.00	0.00	117.99	0.81	0.64	1.28	0.34	0.19	0.011
S-W4	119.26	0.00	0.00	116.48	1.46	1.63	2.79	1.96	0.76	0.023
S-W5	119.26	0.00	0.00	65.05	3.06	51.95	54.39	5.17	1.31	0.456
S-W6	119.26	0.00	0.00	69.20	4.06	46.88	50.13	5.55	0.99	0.420
S-W7	119.26	0.00	0.00	64.25	8.94	47.92	55.07	6.94	1.42	0.462
S-W8	119.26	0.00	0.00	73.76	2.22	43.79	45.56	12.87	1.91	0.382
S-W9	119.26	0.00	0.00	78.58	4.00	37.49	40.69	12.01	1.38	0.341

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
N-E1	JUNCTION	0.11	0.49	271.46	0 10:44	0.49
N-E2	JUNCTION	0.12	0.71	275.72	0 10:29	0.71
N-E3	JUNCTION	0.05	0.33	280.54	0 09:40	0.33
N-E4	JUNCTION	0.05	0.51	283.50	0 09:18	0.51
N-E5	JUNCTION	0.04	0.28	283.65	0 09:19	0.28
N-E6	JUNCTION	0.03	0.24	285.90	0 08:51	0.24
N-M1	JUNCTION	0.17	0.73	269.93	0 10:52	0.73
N-M2	JUNCTION	0.22	0.93	270.13	0 10:42	0.93
N-M3	JUNCTION	0.22	1.20	270.90	0 10:31	1.20
N-W1	JUNCTION	0.12	0.79	271.52	0 09:53	0.79
N-W2	JUNCTION	0.13	0.83	273.38	0 09:48	0.83
N-W3	JUNCTION	0.12	0.80	273.97	0 09:43	0.80
N-W4	JUNCTION	0.11	0.87	278.11	0 09:35	0.87
N-W5	JUNCTION	0.03	0.33	278.77	0 09:04	0.33
N-W6	JUNCTION	0.03	0.23	279.08	0 08:51	0.23
N-W7	JUNCTION	0.06	0.44	280.46	0 09:11	0.44
N-W8	JUNCTION	0.04	0.37	282.68	0 08:53	0.37
N-W9	JUNCTION	0.04	0.34	283.37	0 08:34	0.34
OF1	OUTFALL	0.08	0.31	268.39	0 10:52	0.31

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
N-E1	JUNCTION	2.295	4.943	0 10:30	3.74	70.6	-0.281
N-E2	JUNCTION	1.984	7.251	0 09:33	11.5	68.5	2.462
N-E3	JUNCTION	1.536	6.545	0 09:21	10.3	55.5	-2.479
N-E4	JUNCTION	3.111	5.517	0 09:07	16.2	44.7	-0.917
N-E5	JUNCTION	1.187	3.827	0 08:52	8.33	29.2	2.266
N-E6	JUNCTION	2.589	2.589	0 08:50	20.4	20.4	-2.442
N-M1	JUNCTION	0.697	12.656	0 10:40	1.77	167	0.050
N-M2	JUNCTION	0.807	12.739	0 10:34	1.34	165	0.044
N-M3	JUNCTION	0.456	13.262	0 10:11	0.781	164	0.208
N-W1	JUNCTION	1.299	9.543	0 09:48	6.47	92.7	-0.236
N-W2	JUNCTION	0.192	9.066	0 09:43	0.337	86.5	0.254
N-W3	JUNCTION	0.000	9.118	0 09:37	0	86.1	-0.015
N-W4	JUNCTION	3.006	11.186	0 09:03	12.7	87.1	1.084
N-W5	JUNCTION	1.425	3.220	0 08:45	6.94	19.9	-1.826
N-W6	JUNCTION	1.911	1.911	0 08:45	12.9	12.9	-0.512
N-W7	JUNCTION	1.382	7.035	0 08:53	12	53.8	-0.664
N-W8	JUNCTION	3.468	5.949	0 08:40	22.2	41.7	-0.145
N-W9	JUNCTION	2.686	2.686	0 08:25	19.3	19.3	-0.939
OF1	OUTFALL	0.189	12.476	0 10:52	0.321	167	0.000

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	99.81	1.165	12.476	167.427
System	99.81	1.165	12.476	167.427

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C-E1	CHANNEL	4.868	0 10:44	0.51	0.09	0.74
C-E2	CHANNEL	4.906	0 10:31	1.01	0.11	0.48
C-E3	CHANNEL	6.090	0 09:40	0.33	0.08	0.59
C-E4	CHANNEL	5.422	0 09:25	0.67	0.12	0.45
C-E5	CHANNEL	3.362	0 09:20	0.26	0.09	0.57
C-E6	CHANNEL	2.646	0 08:52	0.37	0.05	0.36
C-M1	CHANNEL	12.474	0 10:52	0.37	0.21	0.50
C-M2	CHANNEL	12.647	0 10:40	0.41	0.37	0.33
C-M3	CHANNEL	12.726	0 10:34	0.58	0.15	0.46
C-W1	CHANNEL	9.504	0 09:53	0.84	0.01	0.28
C-W2	CHANNEL	9.044	0 09:50	0.83	0.05	0.28
C-W3	CHANNEL	9.063	0 09:43	0.78	0.04	0.33
C-W4	CHANNEL	9.118	0 09:37	1.38	0.05	0.41
C-W5	CHANNEL	2.825	0 09:04	0.26	0.03	0.36
C-W6	CHANNEL	1.896	0 08:51	0.33	0.02	0.23
C-W7	CHANNEL	6.539	0 09:11	0.46	0.05	0.48
C-W8	CHANNEL	5.657	0 08:53	0.66	0.11	0.46
C-W9	CHANNEL	2.668	0 08:37	0.43	0.11	0.45

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C-E1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.89	0.00
C-E2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.87	0.00
C-E3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C-E4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.66	0.00
C-E5	1.00	0.00	0.03	0.00	0.97	0.00	0.00	0.00	0.58	0.00
C-E6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.78	0.00
C-M1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.00
C-M2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C-M3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.82	0.00
C-W1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.89	0.00
C-W2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.22	0.00
C-W3	1.00	0.00	0.04	0.00	0.96	0.00	0.00	0.00	0.87	0.00
C-W4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.72	0.00
C-W5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C-W6	1.00	0.00	0.00	0.00	0.74	0.26	0.00	0.00	0.26	0.00
C-W7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.83	0.00
C-W8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.88	0.00
C-W9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.57	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C-E1	0.01	0.01	2.16	0.01	0.01

Analysis begun on: Tue Feb 3 13:38:37 2026
Analysis ended on: Tue Feb 3 13:38:38 2026
Total elapsed time: 00:00:01

APPENDIX C

Hydraulic Analysis Results

HEC-RAS Plan: EC

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
3W	12215	250 year	9.54	270.97	273.18		273.18	0.000037	0.28	100.29	106.20	0.06
3W	12215	SA	10.60	270.97	273.19		273.19	0.000044	0.31	101.76	106.89	0.07
3W	12179	250 year	9.54	270.35	273.18	271.42	273.18	0.000020	0.22	145.45	158.12	0.04
3W	12179	SA	10.60	270.35	273.19	271.44	273.19	0.000024	0.24	147.58	159.48	0.05
3W	12153	250 year	9.54	270.19	273.18	271.49	273.18	0.000027	0.27	97.95	183.28	0.05
3W	12153	SA	10.60	270.19	273.19	271.57	273.19	0.000032	0.30	99.57	183.57	0.06
3W	12135		Culvert									
3W	12118	250 year	9.54	270.25	271.33	271.33	271.83	0.012452	3.16	3.02	28.37	1.00
3W	12118	SA	10.60	270.25	271.40	271.40	271.94	0.012054	3.26	3.25	43.62	1.00
3W	12095	250 year	9.54	269.77	270.94	270.94	271.28	0.014718	2.60	3.75	6.41	0.98
3W	12095	SA	10.60	269.77	270.99	270.99	271.35	0.014307	2.68	4.10	6.96	0.97
3W	12032	250 year	9.54	269.43	270.86		270.89	0.001150	0.88	19.96	91.74	0.30
3W	12032	SA	10.60	269.43	270.92		270.95	0.000936	0.82	25.36	93.34	0.27
3E	12594	250 year	4.94	271.80	272.57	272.38	272.67	0.004454	1.43	3.82	9.35	0.56
3E	12594	SA	5.94	271.80	272.69	272.44	272.79	0.003543	1.42	4.78	11.68	0.52
3E	12528	250 year	4.94	271.18	272.43	272.01	272.48	0.001736	1.00	5.35	18.16	0.35
3E	12528	SA	5.94	271.18	272.59	272.07	272.64	0.001387	1.00	6.75	23.03	0.32
3E	12509	250 year	4.94	271.13	272.43	271.76	272.45	0.000643	0.68	7.32	35.98	0.22
3E	12509	SA	5.94	271.13	272.58	271.82	272.61	0.000558	0.70	8.55	42.25	0.21
3E	12491		Culvert									
3E	12474	250 year	4.94	271.10	272.10	271.82	272.20	0.003876	1.42	4.04	20.51	0.50
3E	12474	SA	5.94	271.10	272.18	271.91	272.29	0.003850	1.51	4.75	23.65	0.50
3E	12459	250 year	4.94	271.05	271.99	271.81	272.12	0.005507	1.66	3.46	8.33	0.61
3E	12459	SA	5.94	271.05	272.07	271.88	272.21	0.005261	1.74	4.18	9.21	0.61
3E	12382	250 year	4.94	270.59	271.75		271.84	0.002379	1.31	4.79	9.00	0.43
3E	12382	SA	5.94	270.59	271.78		271.90	0.003081	1.52	5.07	10.14	0.49
3E	12306	250 year	4.94	270.63	271.68		271.70	0.000987	0.82	14.13	89.99	0.28
3E	12306	SA	5.94	270.63	271.70		271.72	0.001145	0.89	15.97	91.07	0.30
3E	12289	250 year	4.94	270.32	271.57	271.57	271.65	0.003892	1.56	7.59	70.95	0.51
3E	12289	SA	5.94	270.32	271.61	271.61	271.68	0.003401	1.50	11.15	94.41	0.48
3E	12283		Culvert									
3E	12277	250 year	4.94	270.32	271.34	271.23	271.54	0.007897	2.02	2.60	17.43	0.74
3E	12277	SA	5.94	270.32	271.47	271.43	271.57	0.004024	1.60	6.62	32.57	0.54
3E	12259	250 year	4.94	270.22	271.27	271.08	271.40	0.004691	1.63	3.61	50.97	0.58
3E	12259	SA	5.94	270.22	271.30	271.15	271.46	0.006081	1.89	3.76	53.06	0.66
3E	12224	250 year	4.94	270.01	271.12	271.12	271.18	0.006351	1.69	8.47	60.96	0.57
3E	12224	SA	5.94	270.01	271.14	271.14	271.21	0.006562	1.75	9.92	67.10	0.58
3E	12188	250 year	4.94	269.78	271.06		271.07	0.001093	0.74	17.13	77.03	0.25
3E	12188	SA	5.94	269.78	271.11		271.11	0.000964	0.72	20.67	81.35	0.24
3E	12144	250 year	4.94	269.87	271.05		271.05	0.000157	0.36	31.63	95.33	0.11
3E	12144	SA	5.94	269.87	271.10		271.10	0.000168	0.38	35.87	100.12	0.12
3E	12090	250 year	4.94	269.92	271.04	270.62	271.05	0.000182	0.40	30.42	83.68	0.12
3E	12090	SA	5.94	269.92	271.08	270.66	271.09	0.000210	0.44	34.10	96.94	0.13
3E	12059	250 year	4.94	269.65	271.04	270.41	271.04	0.000203	0.42	26.48	77.70	0.13
3E	12059	SA	5.94	269.65	271.08	270.47	271.08	0.000223	0.45	29.76	80.26	0.14
3E	12053		Culvert									
3E	12046	250 year	4.94	269.65	270.83	270.32	270.88	0.001235	0.96	5.23	57.48	0.31
3E	12046	SA	5.94	269.65	270.90	270.38	270.91	0.000493	0.63	18.52	62.58	0.20

HEC-RAS Plan: EC (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
3E	12013	250 year	4.94	269.18	270.83		270.84	0.000340	0.59	16.67	74.03	0.17
3E	12013	SA	5.94	269.18	270.89		270.90	0.000324	0.60	21.38	76.55	0.16
3M	11033	250 year	12.47	269.16	270.68		270.75	0.001966	1.42	21.17	64.44	0.40
3M	11033	SA	14.63	269.16	270.74		270.82	0.001975	1.47	25.41	68.15	0.41
3M	10857	250 year	12.47	268.92	270.15	270.06	270.28	0.004349	1.83	14.85	42.89	0.59
3M	10857	SA	14.63	268.92	270.21	270.11	270.35	0.004380	1.92	17.66	46.58	0.59
3M	10790	250 year	12.47	268.81	269.89		269.97	0.004001	1.58	19.69	55.66	0.55
3M	10790	SA	14.63	268.81	269.92		270.02	0.004566	1.73	21.52	58.23	0.59
3M	10725	250 year	12.47	268.70	269.80	269.60	269.81	0.001364	0.91	48.40	135.92	0.32
3M	10725	SA	14.63	268.70	269.80	269.61	269.82	0.001878	1.07	48.40	135.92	0.37

APPENDIX D

Floodplain Mapsheet

Drawing FPM:
Existing Floodplain Map

15117 Medway Road,
Middlesex Centre, Ontario

Project #: 25-1266

0 50 100 m

Legend

- 1.0m LIDAR Contours
- Subject Property Limits
- River Reaches
- Cross Sections
- Watercourse Crossing
- Flow Direction
- 250-year Regulatory Floodplain
- 100 HEC-RAS Section #
- 100 Existing Regulatory Flood Elevation (m)

LICENSED PROFESSIONAL ENGINEER
25-1266
JUNE 3 2026
E. I. PAI
100518618
PROVINCE OF ONTARIO

DEM Source: LIDAR DTM Lake Erie 2016-2018 Package I and M (Converted from CGVD2013 to CGVD28)

Basemap Image: Google Maps 2026

Greck

June 2026

Drawing FPM:
Existing Floodplain Map

15117 Medway Road,
Middlesex Centre, Ontario

Project #: 25-1266

0 50 100 m

Legend

- 1.0m LIDAR Contours
- Subject Property Limits
- River Reaches
- Cross Sections
- Watercourse Crossing
- Flow Direction
- 250-year Regulatory Floodplain
- 100 HEC-RAS Section #
- 100 Existing Regulatory Flood Elevation (m)

LICENSED PROFESSIONAL ENGINEER
25-1266
JUNE 3 2026
E. I. PAI
100518618
PROVINCE OF ONTARIO

DEM Source: LIDAR DTM Lake Erie 2016-2018 Package I and M (Converted from CGVD2013 to CGVD28)

Basemap Image: Google Maps 2026

Greck

June 2026