a division of Englobe

Report for:

VILLAGE OF CREMONA

INFRASTRUCTURE AUDIT

Date: May 1, 2026
Project #: 2490-019-00

Proud of Our Past... Building the Future

www.mpe.ca

Suite 320, 6715 - 8 Street NE
Calgary, AB T2E 7H7
Phone: 403-250-1362
1-800-351-0929

a division of Englobe

Village of Cremona
205 1 Street East
Cremona, AB
T0M 0R0

May 1, 2026
File: N:\2490\019\00\R01

Attention: Karen O'Connor
Chief Administrative Officer

Dear Ms. O'Connor:

Re: Village of Cremona – Infrastructure Audit

We are pleased to submit the above-noted study. We thank you for the opportunity to be of service and to have prepared this report on your behalf. We look forward to assisting you in implementing the recommendations within the report.

Should you have any questions or require additional information, please contact the undersigned at 825-449-9403.

Yours truly,

MPE a division of Englobe

Joshua DeYoung, P.Eng., P.E.
Project Engineer
2026-05-01

JDY/ct

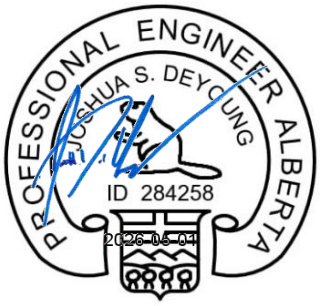
CORPORATE AUTHORIZATION

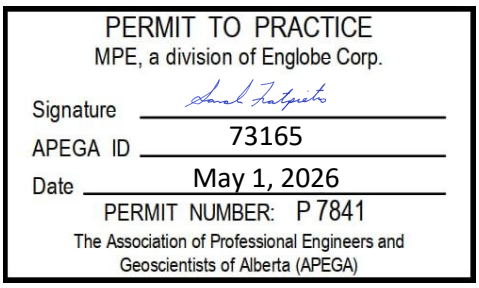
This report has been prepared by MPE a division of Englobe under authorization of the Village of Cremona. The material in this report represents the best judgment of MPE a division of Englobe given the available information. Any use that a third party makes of this report, or reliance on or decisions made based upon it is the responsibility of the third party. MPE a division of Englobe accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions taken based upon this report.

Should any questions arise regarding content of this report, please contact the undersigned.

MPE a division of Englobe

Professional Stamp





Joshua DeYoung, P.Eng., P.E.

Professional Seal

Corporate Permit

EXECUTIVE SUMMARY

The Village of Cremona (Village) Infrastructure Audit provides a comprehensive review of the community's water system, wastewater system, stormwater management, and transportation network. The purpose of this audit is to assess the current condition and capacity of the infrastructure, identify deficiencies, and outline recommendations and cost estimates for upgrades over the next 10 years.

Key Findings

- **Potable Water System:**

  The Village's raw water supply and Water Treatment Plant (WTP) have sufficient capacity to meet projected demands to 2050. Treated water storage meets residential fire flow (FF) requirements but does not fully meet non-residential FF guidelines. The distribution system contains approximately 4,200 m of aging cast iron (CI) mains, which are prone to leaks and nearing the end of their service life. The remaining system consists of polyvinyl chloride (PVC) mains, which are in good condition. FF capacity is limited in certain areas due to pipe size bottlenecks.
- **Wastewater System:**

  The wastewater collection system is in good condition overall, with minimal structural issues identified during close circuit television video (CCTV) inspections. Hydraulic capacity is adequate for current and future flows, and lagoon storage is sufficient for projected growth to 2050 provided the facultative cells are dredged.
- **Stormwater Management:**

  The stormwater system provides basic drainage but has localized capacity and surface erosion issues, particularly near gravel roads and undersized culverts. Improvements are needed to meet modern design standards and guidelines and reduce sedimentation.
- **Transportation Network:**

  Most paved roads are in good condition and require only routine maintenance. Gravel roads provide a lower level of service (LOS) and the Village should consider paving gravel surfaces over time.

Recommendations

- **Water System:**
  Implement a systematic CI water main replacement program over 20-25 years, coordinated with other underground utility and road projects. Monitor FF limitations and consider fire ponds for non-residential areas.
- **Wastewater System:**
  Continue monitoring and maintenance of aging wastewater mains. Maintain lagoon vegetation control and dredging schedule.
- **Stormwater System:**
  Upgrade undersized pipes and culverts, improve catch basin grading, and pave gravel roads to reduce erosion. Incorporate stormwater management standards and guidelines into future development guidelines.
- **Transportation Network:**
  Consider upgrading gravel roads to paved standard as funding allows, prioritize coordination with underground utility replacements, and maintain paved roads through overlays and crack sealing.

Capital Planning

The proposed 10-year capital plan prioritizes coordinated replacement of CI water mains and associated road infrastructure. Approximately, 1,345 m of water main and roadway are recommended for upgrade, representing a replacement of an estimated 33% of the existing CI water distribution system. The total estimated capital cost for these works is **$3.19 million (2026 dollars, excluding GST)**, inclusive of engineering and contingency allowances.

The plan above includes dredging of the wastewater treatment lagoon, with an estimated cost of **$500,000**. While not tied to a specific year, this project should be considered if development occurs, as it directly affects treatment capacity and operational performance.

Projects are deliberately phased with planned off-years between major construction periods to balance fiscal capacity, maintain manageable workloads, and allow for flexibility. Where practical, water main replacements are paired with full road reconstruction to maximize lifecycle value, minimize disruption, and reduce overall unit costs.

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Background 1
1.2 Scope of Work 1
2.0 BACKGROUND 4
2.1 General Description 4
2.2 Population Projections 4
3.0 RAW AND POTABLE WATER SYSTEMS 5
3.1 Water System Overview 5
3.2 Design Criteria – Water Flows 6
3.3 Design Criteria – Pressures 9
3.4 Fire Flow 9
3.5 Design Flows – Future Growth Projection 10
3.6 Raw Water System Assessment 11
3.7 WTP Assessment 12
3.8 Distribution System Assessment 15
3.9 Water System Recommendations and Upgrades 25
3.10 Water System Cost Estimates 27
4.0 WASTEWATER SYSTEM 28
4.1 Wastewater System Overview 28
4.2 Wastewater Collection System Assessment 28
4.3 Wastewater Treatment System – Lagoons 34
4.4 Wastewater System Recommendations and Upgrades 36
4.5 Wastewater System Cost Estimates 39
5.0 STORMWATER SYSTEM OVERVIEW 40
5.1 Existing Conditions 40
5.2 Issues Identified 41
5.3 Recommended Actions 41
5.4 Future Development Guidelines 42
5.5 Maintenance and Monitoring 42
6.0 TRANSPORTATION NETWORK 43
6.1 Roadway Condition 45
6.2 Transportation Network Upgrades 48
6.3 Transportation Network Cost Estimates 49
7.0 CAPITAL PLANNING 51
7.1 Overview 51
7.2 Funding Opportunities 52
8.0 CONCLUSIONS & RECOMMENDATIONS 53
8.1 Potable Water System 53
8.2 Wastewater System 53
8.3 Stormwater Management System 54
8.4 Transportation Network 54

9.0 REFERENCES 55

APPENDICES

Appendix A 2023 Water System Flow Data
Appendix B Water System Asset Ratings
Appendix C Sanitary System Video Logs
Appendix D Sanitary System Asset Ratings
Appendix E 2023 Stormwater Management Plan
Appendix F Transportation Network Inspection Logs

LIST OF TABLES

Table 2.1 – Historic Populations for the Village of Cremona 4
Table 2.2 – Projected Populations for the Village of Cremona 4
Table 3.1 – 2023 Potable Water Flows from WTP Distribution and Truckfill Combined 8
Table 3.2 – 2023 Water Consumption 9
Table 3.3 – Existing and Projected Potable Water Distribution Design Flows 2025 Baseline 11
Table 3.4 – Licensed Raw Water Diversion 11
Table 3.5 – Potable Water Storage Calculation Guidelines ..... **Error! Bookmark not defined.**
Table 3.6 – Existing Distribution System Pipe Materials 15
Table 3.7 – Fire Flow Guidelines Summary 19
Table 3.8 – Existing Water System Pipe Conditions 23
Table 4.1 – Existing Wastewater Gravity Mains Pipe Materials 28
Table 4.2 – Existing Wastewater Collection System Pipe Conditions 32
Table 4.3 – Existing Wastewater Lagoon Volumes (Taking into account Sludge Volume) 35
Table 4.4 – 2050 Required Wastewater Lagoon Volume Capacity 35
Table 4.5 – Available Lagoon Capacity Balance 36
Table 5.1 – Cremona Stormwater Improvement Costs and Priorities 41
Table 6.1 – Road Rating Recommendation 46
Table 6.2 – Road Condition Summary 46
Table 7.1 – Capital Plan – 10 Years 51

LIST OF FIGURES

Figure 1.1 – Location Plan and Study Area 3
Figure 3.1 – Existing Potable Water and Raw Water Material and Sizes 16
Figure 3.2 – Existing Raw Water Mains and Wells Overall Location Plan 17
Figure 3.3 – Existing Potable Water Pressure Zones Location Plan 20
Figure 3.4 – Hydrant Coverage Areas 22
Figure 3.5 – Potable Water and Raw Water Existing Pipe Conditions 24
Figure 3.6 – Potable Water Distribution System Proposed Upgrades 26
Figure 4.1 – Existing Wastewater Materials and Sizes 29
Figure 4.2 – Existing Wastewater Outfall Location Plan 30
Figure 4.3 – Wastewater Existing Pipe Conditions 33
Figure 4.4 – Wastewater System Proposed Upgrades 38
Figure 6.1 – Transportation Network Existing Surfaces 44
Figure 6.2 – Transportation Network Existing Roadway Conditions 47

1.0 INTRODUCTION

1.1 Background

The Village of Cremona (Village) retained MPE a division of Englobe (MPE) to complete an Infrastructure Audit, which includes an assessment of the potable water system, wastewater system, and transportation infrastructure. An overview of the existing stormwater system is also included but is not assessed at a detailed level for capacity or condition.

The purpose of this study is to identify deficiencies and develop plans for corrective action. Upgrades and improvements have been recommended based on the completed assessments and order-of-magnitude cost estimates have been prepared in association with the proposed work.

Figure 1.1 is a location plan of the study area showing the Village extents.

1.2 Scope of Work

In general, the tasks included in this study are the following:

- Collect and review available reports, data, plans, drawings, digital base maps, aerial photos, etc., available from the Village and others.
- Conduct general field inspection and discussion with Village staff to review all infrastructure and gather any anecdotal information that may assist the project.
- Identify land use, future growth areas, and population growth expectations for the Village.
- Potable Water System:
    - Review of raw water supply, water treatment facilities, and potable water reservoir.
    - Review of water distribution system pipe capacity, repair, and replacement history, and condition based on pipe material and installation history.
    - Create a WaterCAD model to reflect recent upgrades/additions and current water usage/demands.
    - Review hydrant locations and utilize the WaterCAD model to determine estimated fire flow (FF) capacities.

- Wastewater System:
  - Review of wastewater collection system pipe capacity, repair and replacement history, and condition based on close circuit television video (CCTV) inspection data collected as part of the infrastructure audit.
  - Review of the wastewater lagoon.
- Stormwater Management System:
  - Summarize the findings from the 2023 *Village of Cremona Regional Stormwater Management Plan – Final Report*.
- Transportation Network:
  - Complete an inspection of the existing road surfaces.
  - Assess the condition of all infrastructure (pavement, gravel roads, etc.).
  - Establish a road condition rating system and rate the condition of each road.
  - Quantify required repair and enhancement work.



a division of Englobe

VILLAGE OF CREMONA			
CREMONA INFRASTRUCTURE AUDIT LOCATION PLAN AND STUDY AREA			
SCALE: 1:5000	DATE: JANUARY 2026	JOB: 2490-019-00	FIGURE: 1.1

2.0 BACKGROUND

2.1 General Description

The Village resides within Mountain View County and is located on Highway 22 and 580, about 40 km north of the Town of Cochrane, Alberta and about 30 km west of the Town of Carstairs, Alberta. The community was incorporated as a Village in 1955.

2.2 Population Projections

Historic population figures were obtained from Statistics Canada (www.statcan.ca). The available census data shows fluctuations in population, with multiple periods of population increase and decrease over the past several decades. The Village does not currently have specific plans for future growth beyond a few infill developments in established areas within Village limits. A 0.5% population growth rate is projected 25 years to 2050 to provide a conservative estimate for the population. The historical population data is presented in ***Table 2.1*** and the projected populations are outlined in ***Table 2.2***. The population does not include truckfill/bulk water users or the sanitary recreational vehicle (RV) trailer dump station. The truckfill is operated by the Village and the trailer dump station is operated by the Cremona Lions Club.

Table 2.1 – Historic Populations for the Village of Cremona

Year	1991	1996	2001	2006	2011	2016	2021
Population	393	380	415	463	457	444	437
Annual Population Change	--	-0.7%	1.8%	2.2%	-0.3%	-0.6%	-0.3%

Table 2.2 – Projected Populations for the Village of Cremona

Projected Growth Rate (%/year)	Projected Population						
0.5%	2021	2025	2030	2035	2040	2045	2050
	437	469	480	493	505	518	531

3.0 RAW AND POTABLE WATER SYSTEMS

The Village operates a robust distribution system designed to meet current domestic and fire protection demands, while maintaining regulatory compliance and operational resilience. The system is comprised of three groundwater supply wells, two observation wells for aquifer monitoring, a centralized water treatment plant (WTP), an above-ground reservoir for storage and pressure stabilization, and an interconnected network of distribution piping that delivers potable water throughout the community. Together, these components function as an integrated system to ensure adequate water quality, quantity, and system redundancy under both normal and peak demand conditions.

3.1 Water System Overview

The Village's existing water system consists of the following main components:

- Raw Water Wells:
  - Well #1. Low-capacity deep bedrock groundwater well. Adjacent to the water treatment plant and connected to the treatment plant by a 25 mm line. Rarely used and provides supplemental raw water.
  - Well #14 (P101) and Well #12 (P102). High-capacity artesian wells with 15 HP pumps located near Little Red Deer River within NW 8-30-4 W5M; delivers sufficient flow for peak demand.
  - Well #11 and Well #13 – Observation Wells located adjacent to Wells #14 and #12.
  - Abandoned Wells – Wells #1, #3, #6, #7, #8, #9 and #10 were decommissioned due to low yield and regulatory changes.
- Raw Water Pipeline:
  - 4 km PVC pipeline – (100 mm and 150 mm) connecting Wells #14 and #12 to the WTP.
  - Control Building – houses flow meter, electrical transformer, and SCADA controls for Wells #14 and #12.
- WTP (built in 1962, upgraded in 2011):
  - Raw Water Low Lift Pumps:
    - 15 HP Supply from Wells #12 and #14 (P201).
    - 15 HP Supply from Potable Water Reservoir (P202).

- Treatment Processes:
  - Biologically Activated Granular Activated Carbon (GAC) Filtration for elevated levels of Ammonia and Manganese installed in 2016.
  - Chlorination: Liquid sodium hypochlorite dosing for disinfection.
- Storage:
  - Above-ground reservoir 2009 upgrade: 1,242 m^3.
  - Clearwell: 73 m^3.
  - Total: 1,315 m^3.
- Distribution Pumps (High Lift Pumps [HLP] 367 and 366):
  - Two 15 HP pumps with Variable Frequency Drives (VFDs).
- Emergency Fire Pump (HLP 368):
  - One 75 HP (70 L/s).
- Emergency Stand-by Diesel Generator:
  - 100 kW.

- Potable Water Distribution:
  - Water mains 150 to 200 mm diameter, CI, and PVC composition.
  - The Village operates a truckfill station for commercial and rural customers.

3.2 Design Criteria – Water Flows

The design flow for each component of the system is typically based on one of the following design flow criteria:

- Average Day Demand (ADD).
- Maximum Day Demand (MDD).
- Peak Hour Demand (PHD).

3.2.1 Average Day Demand (ADD)

ADD is the total annual water usage divided by 365 days per year. The Village provided daily water volume output from the WTP distribution and truckfill for January to October 2023, which is summarized in ***Table 3.1***. Due to data only being available for the above-mentioned months, the ADD is calculated by taking the sum of the daily water volume and dividing by the number of days in which the volumes were

recorded. It is recommended that additional data be documented to provide a more accurate ADD estimate. The monthly average ADD of 306.4 m^3/day was calculated and shown in ***Table 3.2***.

3.2.2 Maximum Day Demand (MDD)

MDD is the maximum water usage in a single day, which is typically on a hot, dry day in summer when yard irrigation is at a maximum. The design of the WTP, transmission mains, and FF supply are typically based on MDD. Based on the 2023 water usage data, the MDD can be as high as 2.6 times the ADD, with the average being around 1.4. This excludes outliers of unusually large flows in the dataset for February to April. High consumption volumes for these months could be due to water main flushing, where water is flushed at high speeds for cleaning purposes of the water main and high usage of the truckfill.

The 2023 average of 1.4 is rounded up to an MDD/ADD ratio of 2.0, which is common for small communities in Alberta. This results in a MDD of 612.8 m^3/day.

3.2.3 Peak Hour Demand (PHD)

PHD is the maximum water usage within a single hour, typically measured on the day the MDD occurs. The distribution pumps and water mains must meet PHD. Hourly data was not available from the Village to calculate the PHD but based on typical flow data reviews for similar Villages, the PHD is typically 2.0 times the MDD.

3.2.4 Design Flow

During January to October 2023, an ADD of 306 m^3/day is calculated and used as the baseline design flow from which future growth is projected. MDD is calculated using a 2.0 MDD/ADD ratio and PHD is calculated using a 2.0 PHD/MDD ratio.

- MDD = 2.0 x ADD.
- PHD = 2.0 x MDD.

3.2.5 Historical Water Flows

The 2023 historical potable water flows from January to October for the WTP distribution and truckfill is shown in ***Table 3.1***. No other data was available from the Village. A more detailed table of the historical design flows including the projected raw water usage is in ***Appendix A***.

Table 3.1 – 2023 Potable Water Flows from WTP Distribution and Truckfill Combined

Day	Potable Water Distribution ADD (m^3/day)									
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	383	407	523		541	131		125	341	
2	393	384	241		272	383		10		108
3	389	1180	1242	367	629		78	172		59
4	384			97	215		107	498		136
5	498			448	134	99	146		95	97
6	7	464	538	470		152	84		106	435
7	385	280	268	1175		162	379		99	
8	385	517	506		116	129		86	331	
9	452	258	281		65	456		131		
10	256	1191	1184	404	143		97	183		45
11	506			256	94		58	413	104	127
12	252			521	316	7.5	163		154	84
13	442	535	507	400		136	115		137	277
14	442	322	294	1208		131	340	102	73	
15	442	382	403		133	85		150	382	
16		523	372		113	350		195		151
17	6	1413	1217	305	163		86	137		56
18	503			375	114		72	362	84	104
19	379			508	478	107	132		71	145
20	68		807	395		64	76		141	352
21	68	383	399	1073		136	365	186	89	
22	68	403	296			113		84	319	
23	258	394			71	306		132		117
24	473	1222	1203	548	158		109	203		54
25	329			253	101		188	474	97	110
26	500			559	388	114	143		54	133
27	397	508	376	272		111	124		32	361
28	397	280	393	1300		164	416	77	11	
29	397		389		275	120		9	327	
30	410		398		76	372		95		111
31	290		1357		156		87	112		
Monthly Average	**328**	**581**	**574**	**547**	**216**	**174**	**160**	**179**	**152**	**153**

[1] From Village of Cremona on October 21, 2025. Weekend flow is consolidated on the preceding Friday each month.

Table 3.2 – 2023 Water Consumption

Month	ADD (m^3/day)	Population	Liters per Capita per Day (L/c/d)
January	328	469	699
February	581		1,239
March	574		1,224
April	547		1,166
May	216		461
June	174		371
July	160		341
August	179		382
September	152		324
October	153		326
Monthly Average	**306.4**		**653**

The Village's water demand is above a typical average of 400 L/cap/day in other communities in Southern Alberta. This is likely due to the truckfill that is not metered separately. Therefore, for the remainder of the study 400 L/c/d will be used for the distribution system capacity assessment, as this is typical for a community of the Village's size.

3.3 Design Criteria – Pressures

The distribution system is evaluated based on the following guidelines of minimum pressure in the system:

- 150 kPa (22 psi) during MDD plus FF based on the Alberta Environment and Protected Areas (AEPA) municipal design standards and guidelines (see References).
- 300 kPa (44 psi) based on Rocky View County 2025 Servicing Standards.

3.4 Fire Flow

The Fire Underwriters Survey (FUS) specifies a Basic Fire Flow (BFF) to determine the relative fire risk level for each community. The BFF is typically selected as an adequate level of service (LOS) for the vast majority (90%) of risks in an area. The FUS uses a fifth highest Required Fire Flow (RFF) in a community as a

rule-of-thumb to assess the adequacy of public fire protection. This method provides a reasonable FF for most structure fires without being overly conservative. The RFF is calculated as follows:

$$RFF = 220C\sqrt{A}$$

RFF	=	Required Fire Flow in Litres per minute
C	=	Construction Coefficient (related to type of building construction)
A	=	Total Effective Floor Area of the Building in square meters

The Cremona School has the largest RFF. The RFF is calculated for a period of two hours with a construction coefficient assumption of 1.0 (Type IV-C Mass Timber Construction). The calculation result is 272 L/s, assuming no fire sprinklers are in place. The Cremona Ag Society Community Arena has the second largest RFF at 172 L/s.

According to the National Building Code of Canada, Alberta Edition (NBCA 2019), the minimum residential piped water supply rate guideline is 3,800 L/min (63 L/s). This is used as the minimum FF for the Village for the hydraulic modelling of the distribution system. Additional FF for the non-residential areas (commercial, industrial, and institutional) could be supplied by fire storage ponds. The water supply for fire protection is a LOS decision to be made by the municipality. It is recommended the Village review and adopt a minimum FF standard.

3.5 Design Flows – Future Growth Projection

The 0.5% population growth rate corresponds with an annual design flow increase of 0.5%. The 2023 existing ADD is projected at 0.5% to a 2025 baseline, and for 25 years to 2050. These estimated design flows, which are used for the existing capacity assessment of the WTP and potable water distribution system, are summarized in ***Table 3.3***.

Table 3.3 – Existing and Projected Potable Water Distribution Design Flows 2025 Baseline

Scenario	Population	ADD (m^3/day)	ADD (L/cap/day)	MDD (m^3/day)	MDD (L/s)	PHD (L/s)
2025 Existing Base Year	469	309	660	618	7.2	14.3
2030 5-Year Projection	480	317	660	634	7.3	14.7
2035 10-Year Projection	493	325	660	650	7.5	15
2050 25-Year Projection	531	350	660	700	8.1	16.2

[1] MDD = 2.0 x ADD.
[2] PHD = 2.0 x MDD.

3.6 Raw Water System Assessment

The Village relies on groundwater as its raw water source. The system currently operates with two active wells, Wells #14 and #12, located near the Little Red Deer River. The Village indicated the well pumps and motors at Wells #12 and #14 were replaced with new units in 2024. The Village did not have specifications available for the new pumps. The previous pumps that were installed in 2012 had a design flow of 5.6 L/s at 85 m for each pump, matching the 5.6 L/s capacity of each WTP train. Historically, several wells were abandoned due to low yield and regulatory changes. The Active and Abandoned licensed well information are listed in ***Table 3.4***.

Table 3.4 – Licensed Raw Water Diversion

Well No.	License No.	Year Licensed	Annual Licensed Diversion (m^3)	Max. Pump Rate/Licensed Max. Flow (m^3/day)
1	9889*	1987	9,870	32.7
12	00081245-00-00	2001	99,098	410
14	00381588-00-00	2016	97,272	538
Total for Active Wells			**206,240**	**980.7**
Capacity of Current Diversion 1,488 people				
6**	9887	1987	17,270	n/a
7**	9888	1979	7,400	n/a
8**	9890	1979	29,600	n/a
9**	13924	1985	25,900	n/a
3**	15290	1977	7,400	n/a

** Well #1 is a backup well that is rarely used providing supplemental raw water as needed.*
***Abandoned.*

The Village maintains licenses for approximately 206,240 m^3/year (980.7 m^3/day ADD), which is adequate for current consumption but will require review if population approaches 1,500 residents.

3.7 WTP Assessment

3.7.1 Water Treatment Process

The WTP was constructed in 1962. Various components and upgrades over the years are listed in **Section 3.1**. The 2016 upgrade was designed by Procesco for a total flow capacity of 5.6 L/s (484 m^3/day) for each of the two trains at a maximum design pressure of 100 psi.

With a single train operating, the months of February to April in 2023 exceeded the train capacity by 13 to 20%. Presumably two trains producing a combined 11.2 L/s (968 m^3/day) were intermittently required to keep up with demand during these months. A single train has adequate capacity to service beyond the 350 m^3/day ADD 2050 25-Year design flow. Two trains operating simultaneously are required to service the 700 m^3/day MDD 25-Year design flow.

3.7.2 Current Treatment Approach

The following summarizes the primary components of the existing treatment system:

- Manganese and Ammonia Management: Elevated manganese and ammonia levels, historically controlled through sequestration, are now addressed through physical removal via Biologically Activated GAC Filtration. In 2016, the Village added a manganese and ammonia filtration system.
- Reservoir Improvements: The treated water reservoir was upgraded in 2009, supporting domestic demand and fire protection.
- Disinfection: Chlorination is the primary treatment method, using liquid sodium hypochlorite delivered via automated dosing pumps. Chlorine residuals are maintained in accordance with AEPA standards and guidelines.

3.7.3 Distribution and Fire Pumps

The design capacity of the pumps at the WTP located in a small building after the treated water reservoir are listed below:

- Distribution pumps: 2 x 15 HP, each (PHD).
- Standby emergency fire pump: 75 HP, 70 L/s at 35 m (MDD+FF).

The distribution pump specifications were not available. Based on the pump power and head, a maximum flow capacity of around 12-14 L/s for each pump is estimated based on typical pump efficiency ratings. Based on this estimate, a single duty pump may be approaching capacity during estimated PHD flow of 14.3 L/s for 2025 (from ***Table 3.3***). The distribution pumps may require upgrade to meet the future 2050 PHD of 16.2 L/s. Further review is recommended to confirm the pump capacity, including any pump specification records at the Village and field flow testing.

The emergency pump capacity of 70 L/s is adequate to supply the MDD+FF for a minimum FF of 63 L/s to all areas of the Village while maintaining minimum pressure. Upgrades to the fire pump, pump header, and water mains would be required to supply non-residential FF of 272 L/s. However, it is common for small Villages in Alberta to have fire pumps sized only for residential FFs. Some Villages install a dry hydrant at a storm pond to supply non-residential FF.

The FUS includes a guideline of a single fire pump being adequate for smaller communities with less than 25,000 population. This considers that the low probability of a serious fire occurring when a single fire pump might be out of service, given the relative infrequency of a serious fire occurring at a given time in a smaller community. Therefore, a single fire pump is considered adequate for the Village.

3.7.4 Treated Water Storage

The treated water reservoir was replaced in 2009 to provide a larger storage volume. The above-ground steel reservoir and buried concrete clearwell were cleaned in 2015. The videos from the cleaning observed the reservoirs to be in good condition.

According to AEPA's Standards and Guidelines for Municipal Waterworks (2012, revised 2021), a guideline for a community where potable water supply is limited to the MDD provides the following formula for storage volume:

S = A + B + (the greater of C or D)

Where: **S** = Total Storage Requirement (m^3)

A = Fire Storage (m^3), Flowrate x Duration

B = Equalization Storage (m^3), equal to 25% of projected MDD

C = Emergency Storage (m^3), equal to 15% of projected ADD

D = Disinfection Contact Time (T_{10}) Storage to meet C_t Requirements

Table 3.5 summarizes the calculation results following the AEPA guideline. The fire storage is calculated for both the residential and non-residential FF.

Table 3.5 – Potable Water Storage Calculation Guidelines

	A Fire (m^3)	B Equal. (m^3)	C Emerg. (m^3)	D C_t (m^3)	S Total (m^3)
63 L/s Residential Fire Flow					
2025 Existing Base Year	454	155	46	57	**666**
2050 25-Year (1% Growth)	454	175	53	65	**694**
172 L/s Non-residential Fire Flow					
2025 Existing Base Year	1,239	155	46	57	**1,451**
2050 25-Year (1% Growth)	1,239	175	53	65	**1,479**

[1] Volumes based on design flows including truckfill and distribution combined.

The treated water storage consists of one above ground storage tank and a concrete clearwell with the following volumes:

Above Ground Storage Tank (2008)	1,242 m^3
Concrete Clearwell	73 m^3
Total	**1,315 m^3**

Compared with the existing clearwell volume of 1,315 m^3, the guideline indicates the existing volume is adequate to 2050 for residential FF. If non-residential FF is supplied from the WTP, an additional 136 m^3

would be required for the existing 2025 design flows to meet the guideline and an additional 164 m^3 would be needed for 2050 to meet the 25-year guideline.

The Village could consider an option to use a storage pond to supply FF for non-residential development, in collaboration with the local fire protection services. A fire pond near industrial/commercial areas may reduce or eliminate the need for non-residential FF capacity.

3.8 Distribution System Assessment

3.8.1 Distribution System Condition Assessment

The existing potable water distribution system pipe diameters and materials are shown in ***Figure 3.1*** and raw water system in ***Figure 3.2***. The distribution system is made up of pipes that range in diameter from 150 mm to 200 mm. According to available record information and Village personnel information, most of the Village's potable water system consists of CI pipe, and some PVC in newer areas of the Village.

Table 3.6 provides a summary of total pipe lengths within the Village based on available information.

Table 3.6 – Existing Distribution System Pipe Materials

Pipe Type	Length of Pipe	
	(m)	(%)
CI	4,194	77%
PVC	1,279	23%
Total Pipe Length	**5,473**	**100%**

More than 70% of the Village's distribution system is comprised of CI pipe, which is susceptible to corrosion over time. Village staff have reported many leaks and repairs over the past several years. These leaks typically occur during the spring thaw from March to April on steeper streets and are usually pinhole leaks in the CI pipe. This information, along with the assumed age of the CI pipe, suggest that the distribution system is in poor condition. The ages of the water distribution system pipes can be found in ***Appendix B***.



LEGEND

- EXISTING POTABLE WATER LINE
- EXISTING RAW WATER LINE
- EXISTING WATER FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING RAW WATER WELL

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
EXISTING POTABLE WATER AND RAW WATER MATERIALS AND SIZES

SCALE:	DATE:	JOB:	FIGURE:
1:5000	JANUARY 2026	2490-019-00	3.1



SITE PLAN - WELLS 11 TO 14

LEGEND

— — — — EXISTING POTABLE WATER LINE

Ⓦ EXISTING RAW WATER WELL

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
EXISTING RAW WATER MAINS AND WELLS
OVERALL LOCATION PLAN

SCALE:	1:15 000	DATE:	JANUARY 2026	JOB:	2490-019-00	FIGURE:	3.2

CI water mains typically have an expected lifespan of 50 to 75 years. The lifespan of this pipe material will vary depending on the quality of water being transported, ground subsurface conditions, and level of past disturbance. The CI mains within the Village are assumed to have been installed in or before 1962, making many sections at or beyond their anticipated service life. Older CI pipes are prone to internal tuberculation and external corrosion, which can reduce hydraulic efficiency and increase the risk of breaks. Tuberculation is the formation of iron-oxide protrusions inside the pipe caused by bacterial corrosion and water chemistry. This reduces the inside diameter of the pipe over time, increasing velocity and reducing the pipe capacity.

Based on the age of the CI pipes, it is recommended that they be replaced over the next 25 years. To do this, the Village would need to complete approximately 168 m of water main replacement every year.

As an alternative to pipe replacements by traditional open-cut methods, advancements in trenchless technologies allow for cured-in place pipe (CIPP) lining or pipe bursting to be utilized on water mains. This is an excellent alternative to pipe replacements where adjacent utilities are not in need of repair, the water main is below a paved surface, and capacity upgrades are not required. Replacements using alternative pipe replacement methods should be reviewed during preliminary engineering of projects. All cost estimates included in this report assume traditional open excavation methods.

PVC pipe is expected to have a lifespan of 50+ years depending on if properly installed and maintained. This estimate is based on the best available performance data, as PVC has not been in service long enough to directly confirm its full projected lifespan. There are no recommendations to replace portions of the PVC pipe unless there are maintenance or capacity concerns.

3.8.2 Distribution System Hydraulic Capacity Assessment – Modelling Results

A hydraulic analysis of the Village's distribution system was completed using Bentley WaterCAD computer modelling software. The hydraulic model was created based on pipe size and pipe material information provided by the Village.

Scenarios were developed in the model for both current and future populations and for the various demands placed on the system (e.g. PHD and MDD plus FF demand) for existing and 25-year development scenarios. The hydraulic analysis was used to determine if the existing infrastructure can provide the

required LOS standards and guidelines. If the LOS standards and guidelines were not met, modifications to the model were made to determine upgrade alternatives based on the condition assessment. ***Figure 3.3*** shows the existing distribution system pressure map, with ranges from 55 to 85 psi at ADD.

3.8.2.1 Available Fire Flow

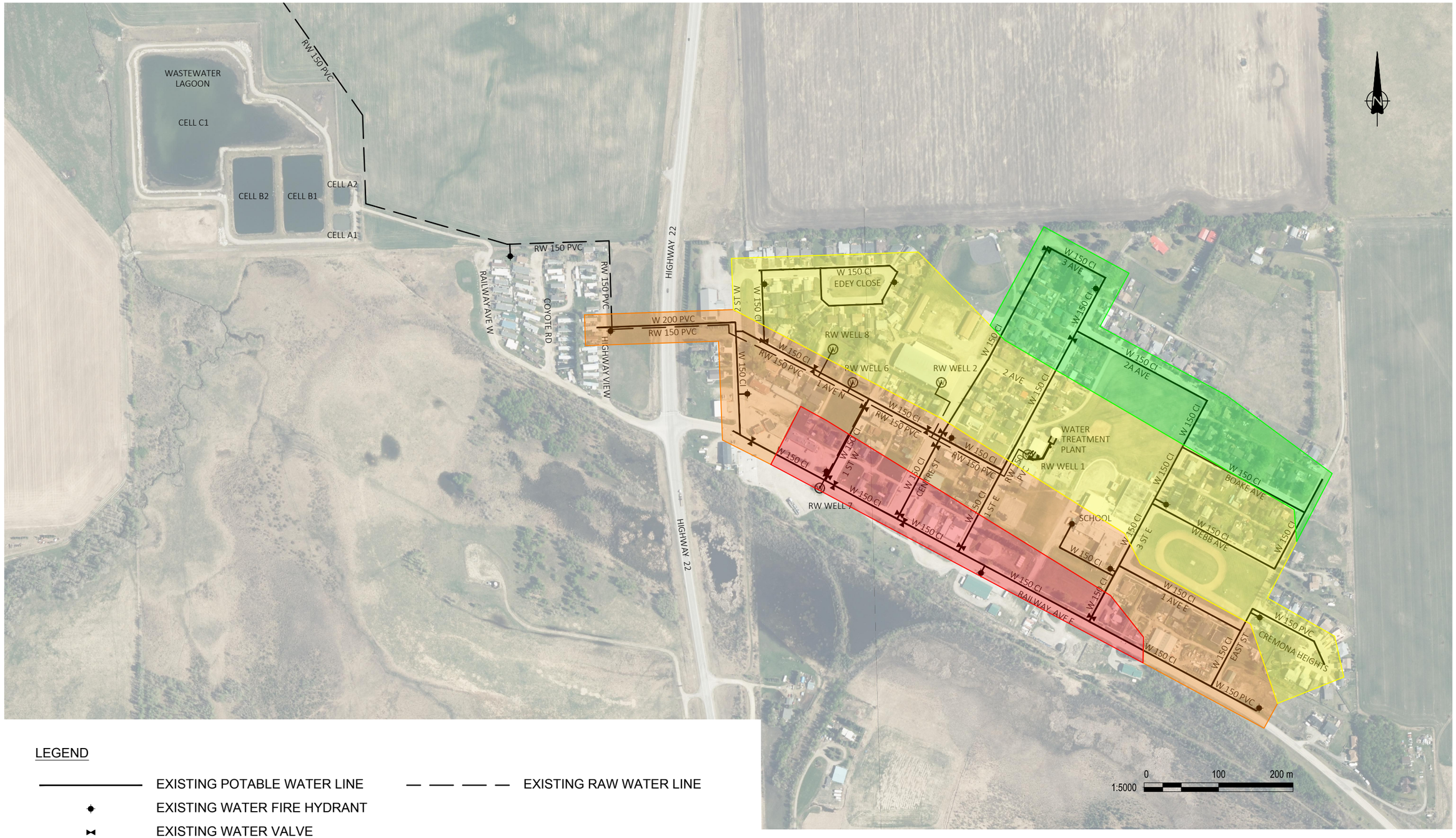
The recommended FF was run in conjunction with the MDD flows. ***Table 3.7*** summarizes the minimum recommended FF values identified.

Table 3.7 – Fire Flow Guidelines Summary

Land Use and Building Size	Minimum Required Fire Flow (L/s)
Residential Areas	63
Second Largest Non-Residential Building	172

A Bentley WaterCAD water model was created to simulate theoretical flow in the distribution system. The model indicates the existing distribution system should be able to supply the minimum 63 L/s FF with adequate residual pressure above 22 psi (150 kPa). Pipe velocity exceeding a 3.0 m/s maximum velocity guideline was noted at the following single feed branches without looping: a 150 mm diameter main along Edey Close, a 150 mm main along East Street, and a 200 mm crossing under Highway 22. During 63 L/s FF plus MDD scenarios, where the velocities can reach up to 3.5 m/s. High velocities can add stress to older pipes. Hydrants at these locations should be opened and closed slowly to minimize potential pressure surges.

Hydrant testing conducted by the Village last year indicates that actual hydrant flow rates are in the range of 28 to 32 L/s throughout the Village. These flows were determined from the WTP flow meter. The FFs observed during the field tests are about half of capacity measured in the model. The reduced FF available may be due to tuberculation.



LEGEND

- EXISTING POTABLE WATER LINE
- EXISTING RAW WATER LINE
- EXISTING WATER FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING RAW WATER WELL
- 80-85 PSI PRESSURE ZONE
- 79-70 PSI PRESSURE ZONE
- 69-60 PSI PRESSURE ZONE
- 59-55 PSI PRESSURE ZONE

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
EXISTING POTABLE WATER PRESSURE ZONES
LOCATION PLAN

SCALE:	1:5000	DATE:	JANUARY 2026	JOB:	2490-019-00	FIGURE:	3.3

3.8.2.2 Hydrant Coverage

A hydrant spacing study was performed. A hydrant spacing guideline of 150 m is adopted, based on the City of Calgary Development guidelines. The existing hydrant spacing does an adequate job of adhering to the City of Calgary's standards and guidelines as can be seen in ***Figure 3.4***.

It is recommended that the Village monitor water quality at the end of the Cremona Heights cul-de-sac, and incorporate a flushing hydrant if required, should results show stagnant water. Cremona Heights has adequate coverage from the hydrant on Railway Avenue and the hydrant at the beginning of Cremona Heights.



LEGEND

PROP HYDRANT COVERAGE AREAS (150m RADIUS)

1:5000 0 100 200 m

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
HYDRANT COVERAGE AREAS

SCALE:	DATE:	JOB:	FIGURE:
1:5000	JANUARY 2026	2490-019-00	3.4

3.8.3 Water Distribution System Condition Assessment

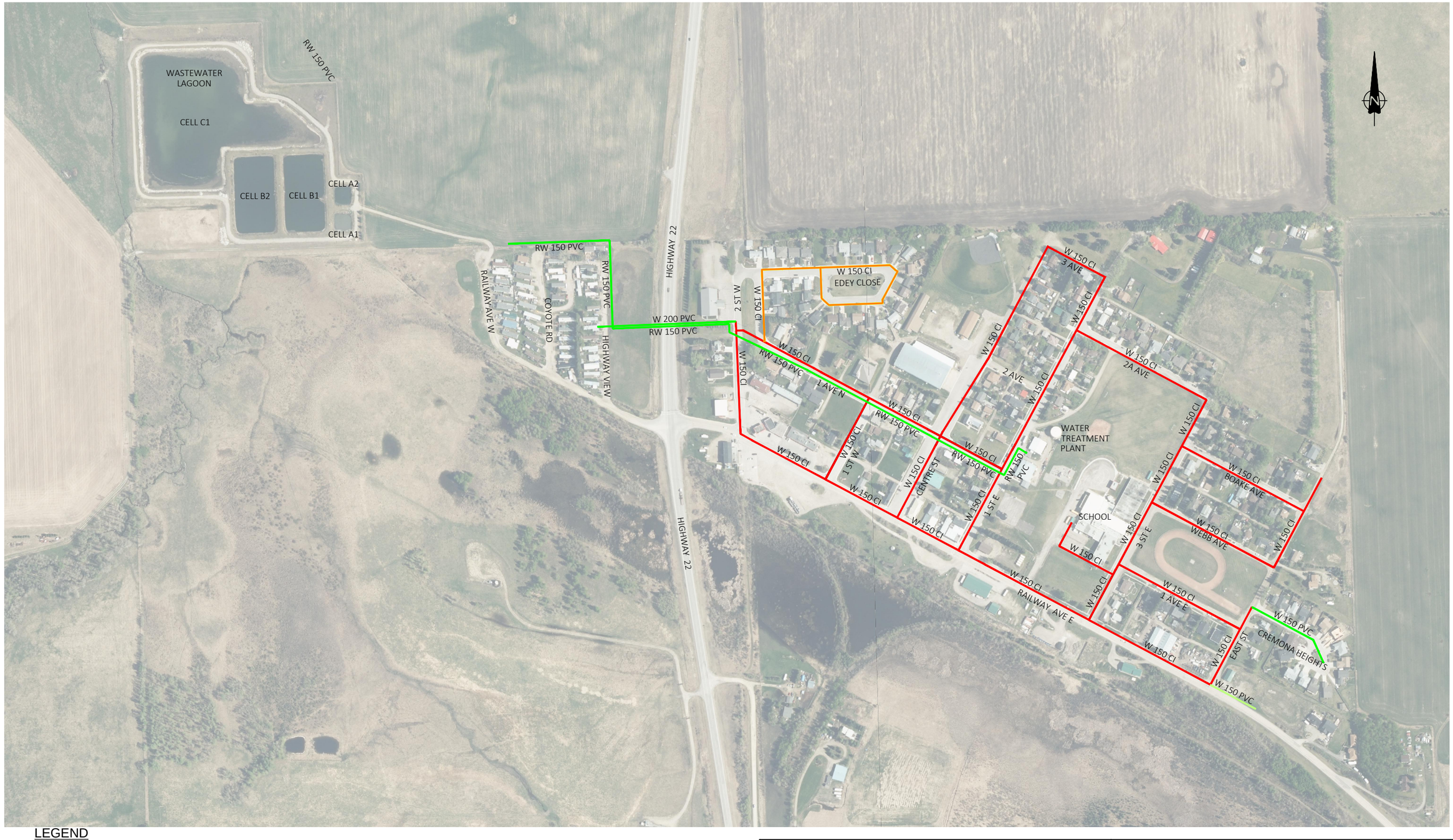
Each section of the water system was reviewed and given a rating (1-5) that was determined based on the material, age, and break history. Detailed water system asset ratings can be found in ***Appendix B***.

The condition ratings of the pipes are summarized in ***Table 3.8***.

Table 3.8 – Existing Water System Pipe Conditions

Pipe Condition	Length of Pipe	
	(m)	(%)
1 (New)	1,209	22%
2 (Low Deterioration)	70	1%
3 (Minor Deterioration)	0	0%
4 (Moderate Deterioration)	491	9%
5 (Beyond Life Expectancy)	3,733	68%
Total Pipe Length	**5,473**	**100%**

In general, mains with a rating of "5" indicate that the main segment has passed its life expectancy or will likely fail within the next five years. Mains with a rating of "4" have moderate deterioration or will likely fail within the next five to 20 years. Mains with a rating of "3" have minor defects or will not likely fail for at least 20 years or in the foreseeable future. Failure is defined as any time a break occurs resulting in shutdown of the main. ***Figure 3.5*** shows the results of the condition assessments.



LEGEND

- 1- NEW / EXCELLENT CONDITION
- 2 - LOW DETERIORATION
- 3 - MINOR DETERIORATION
- 4 - MODERATE DETERIORATION
- 5 - BEYOND LIFE EXPECTANCY

1:5000 0 100 200 m

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
POTABLE WATER AND RAW WATER
EXISTING PIPE CONDITIONS

SCALE:	1:5000	DATE:	JANUARY 2026	JOB:	2490-019-00	FIGURE:	3.5

3.9 Water System Recommendations and Upgrades

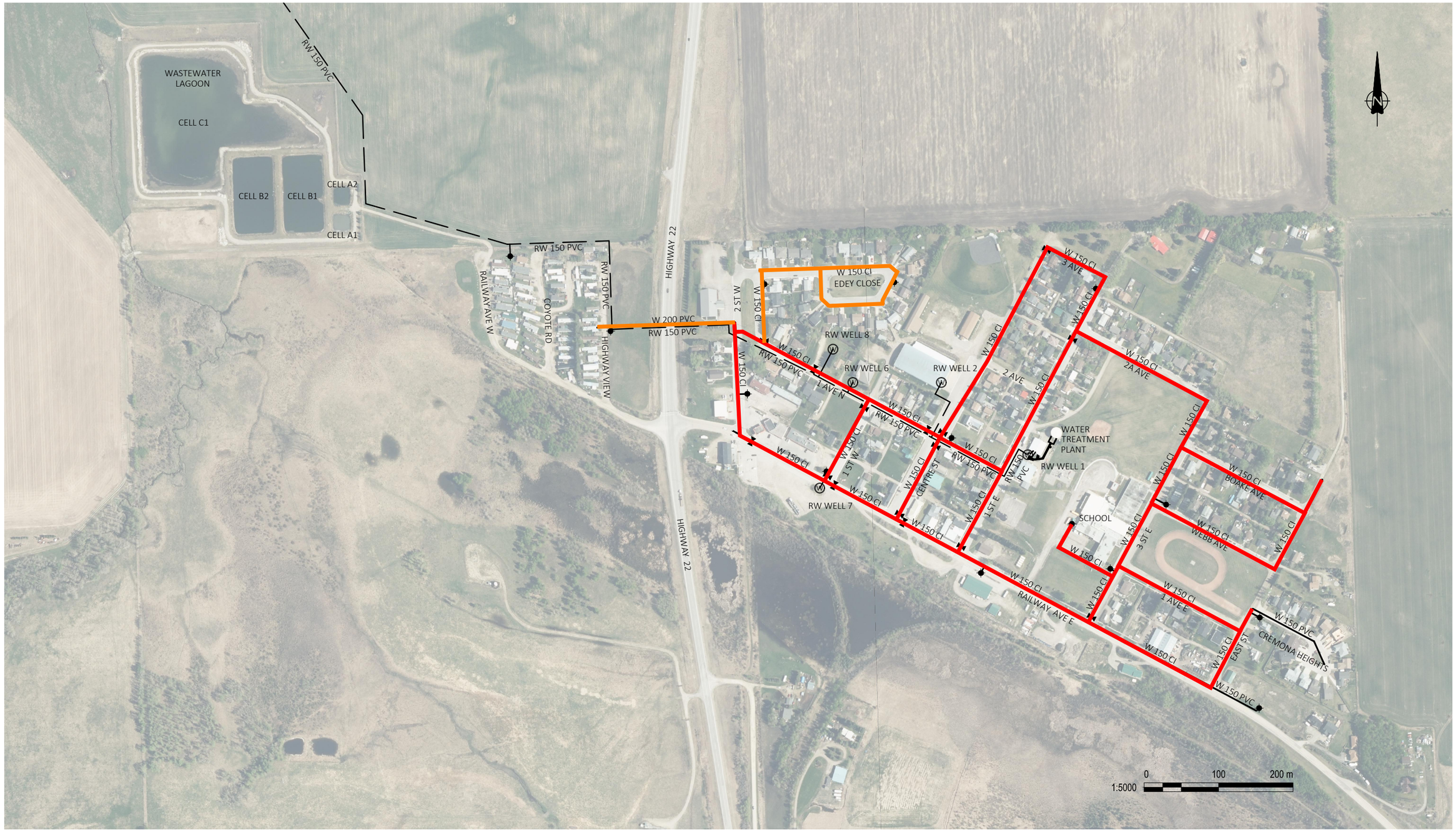
Based on the assessment of the Village's potable water system, MPE has prepared the following recommendations for each of the reviewed components.

3.9.1 Potable Water Distribution System

The following upgrades are recommended within the distribution system to improve available FFs and increase the capabilities of servicing future growth. ***Figure 3.6*** provides an overview of the recommended upgrades.

The following projects are recommended based on the evaluations described in **Section 3** and discussions with the Village:

- Annual Fire hydrant flushing program.
- Water leak repairs, as needed.
- Replacement of CI pipe with 150 mm diameter PVC.



LEGEND

- EXISTING POTABLE WATER LINE
- EXISTING WATER FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING RAW WATER WELL
- EXISTING RAW WATER LINE
- CAST IRON WATER MAIN TO BE REPLACED WITH 150 mm DIA PVC
- WATER MAIN TO BE MONITORED

MPE a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
POTABLE WATER DISTRIBUTION SYSTEM
PROPOSED UPGRADES

SCALE:	1:5000	DATE:	JANUARY 2026	JOB:	2490-019-00	FIGURE:	3.6

3.10 Water System Cost Estimates

To maintain system reliability and reduce the risk of failures, it is recommended that the Village replace all existing CI water mains over the next 20 to 25 years or sooner as funding allows. The current CI network is approximately 4,200 m in length and represents the oldest portion of the potable water distribution system. Until the CI pipe is replaced, the Village can expect occasional leaks and breaks requiring repairs and increased maintenance costs.

The replacement program should be carried out systematically and coordinated with other infrastructure upgrades, such as sanitary sewer, storm sewer, and/or road reconstruction projects. This approach minimizes disruption and optimizes cost efficiency by combining projects.

Estimated Systematic CI Water Main Replacement Costs

Unit Cost:

- Water main replacement cost (open-cut construction, excludes road reconstruction): $1,100/m
- Water main replacement cost including engineering and contingencies: $1,500/m

Total Replacement Cost:

$$4{,}200 \text{ m} \times \$1{,}500/\text{m} = \$6{,}300{,}000$$

If projects are phased annually, the Village should expect to budget **$250,000 to $315,000 per year for water main replacement**, depending on the aggressiveness of the replacement schedule. The Village should also expect to increase the amount budgeted to keep up with inflation and the rising price of construction. Please note that this estimate excludes road reconstruction. The cost of road construction should be budgeted along with the water main replacement projects.

4.0 WASTEWATER SYSTEM

4.1 Wastewater System Overview

The Village's existing wastewater system consists of the following main components:

- 200 mm diameter gravity collection mains to a Lagoon.
- Lagoon cells:
  - 2 x Anaerobic cells, 2 x Facultative cells, and 1 x Storage cell.
  - Total Active Storage: approximately 22,700 m^3.
  - Storage Cell discharges to the Little Red Deer River during approved periods (spring or fall) and/or to the irrigation pivot.

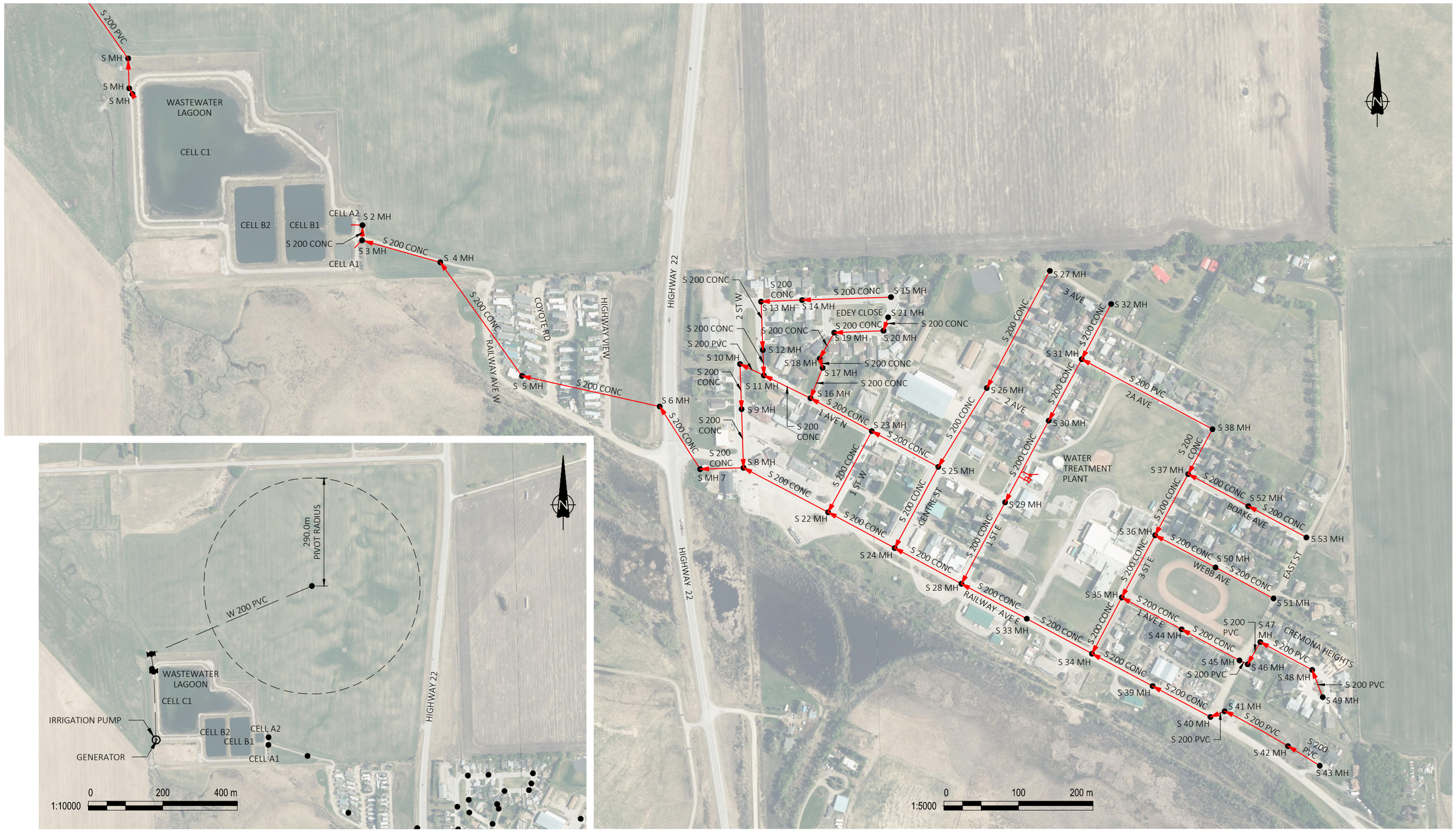
4.2 Wastewater Collection System Assessment

Most of the mains in the Village are reinforced concrete pipe (RCP), with a smaller amount of PVC. The Village has installed PVC in newer areas and has replaced some portions of the older RCP. The existing wastewater collection system pipe sizes and materials are shown in ***Figure 4.1*** and system outfall location in ***Figure 4.2***. ***Figure 4.1*** is based on information provided by the Village and video inspections.

The existing pipe materials for the gravity mains within the Village as summarized in ***Table 4.1***.

Table 4.1 – Existing Wastewater Gravity Mains Pipe Materials

Pipe Type	Length of Pipe	
	(m)	(%)
Concrete	4,095.8	87.8%
PVC	567.0	12.2%
Total Pipe Length	**4,662.8**	**100%**



IRRIGATION PIVOT SITE PLAN

LEGEND

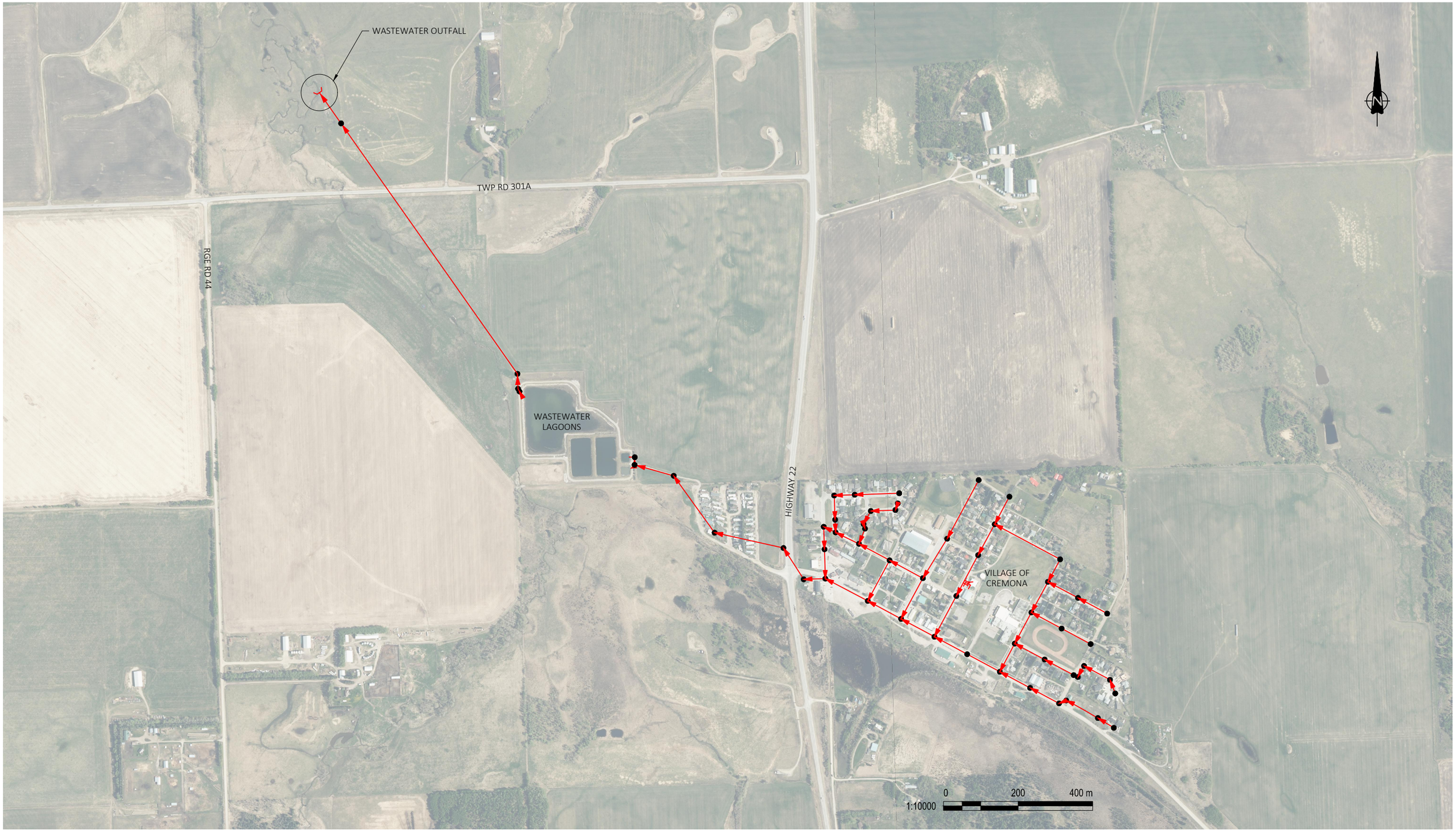
- EXISTING WASTEWATER LINE
- EXISTING WASTEWATER MANHOLE
- FLOW DIRECTION ARROW

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
EXISTING WASTEWATER
MATERIALS AND SIZES

SCALE:	1:5000	DATE:	JANUARY 2026	JOB:	2490-019-00	FIGURE:	4.1



LEGEND

- EXISTING WASTEWATER LINE
- EXISTING WASTEWATER MANHOLE
- FLOW DIRECTION ARROW

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
EXISTING WASTEWATER OUTFALL
LOCATION PLAN

SCALE:	1:10 000	DATE:	JANUARY 2026	JOB:	2490-019-00	FIGURE:	4.2

4.2.1 Wastewater Collection System Condition Assessment

CCTV videos were completed by Calgary Sewer Scope as part of this condition assessment. The videos were reviewed to identify defects to the pipe's structural integrity (sags, holes, cracks, etc.) and operational defects (grease build-up, root encrustation, etc.). From these videos, MPE was able to determine that the system is primarily RCP with some sections of PVC. Generally, the wastewater collection system is in "good" or "fair" condition with minimal structural damage, mainly minor cracks.

RCP typically lasts 50 to 75 years, but its longevity can be significantly reduced in aggressive or highly corrosive soils, where acidic, wet, or sulfate-rich environments can deteriorate concrete and reinforcing steel. In contrast, PVC pipe is highly resistant to corrosion and chemical attack, giving it a typical lifespan of 50+ years when properly installed. This estimate is based on the best available performance data, as PVC has not been in service long enough to directly confirm its full projected lifespan. PVC generally maintains hydraulic performance over time, while RCP may experience cracking, joint separation, or internal corrosion depending on soil conditions and flow characteristics.

Each section of the sanitary system that was inspected was reviewed and given a rating (1-5) that was determined based on the age and conditions viewed in the CCTV videos, as well as the remarks noted by the camera operators. The CCTV video logs can be found in ***Appendix C***. Detailed sanitary system asset ratings can be found in ***Appendix D***.

The pipe condition ratings is summarized in ***Table 4.2***.

Table 4.2 – Existing Wastewater Collection System Pipe Conditions

Pipe Condition	Length of Pipe	
	(m)	(%)
1 (New)	164.6	3.5%
2 (Low Deterioration)	639.8	13.7%
3 (Minor Deterioration)	2,622.4	56.3%
4 (Moderate Deterioration)	1,235.9	26.5%
5 (Beyond Life Expectancy)	0	0.0%
Total Pipe Length	**4,662.8**	**100%**

In the sections of piping that show a condition of "3-4", point repairs to reset pipe alignments where joint offsets have occurred are recommended, followed by lining with CIPP to return the piping to "1-2" conditions. Ensuring the condition of these pipes does not fall into complete deterioration will prevent more problematic issues further into the future.

In general, mains with a rating of "5" indicate that the main segment has met or exceeded its life expectancy or will likely fail within the next five years. Mains with a rating of "4" have moderate to severe defects or will likely fail within the next five to 20 years. Mains with a rating of "3" have minor defects or will not likely fail for at least 20 years or in the foreseeable future. ***Figure 4.3*** shows the results of the condition assessments. The video inspections and digital copies of the reports are submitted separately.



LEGEND

- 1- NEW / EXCELLENT CONDITION
- 2 - LOW DETERIORATION
- 3 - MINOR DETERIORATION
- 4 - MODERATE DETERIORATION
- 5 - BEYOND LIFE EXPECTANCY

1:5000 0 100 200 m

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
WASTEWATER
EXISTING PIPE CONDITIONS

SCALE:	1:5000	DATE:	JANUARY 2026	JOB:	2490-019-00	FIGURE:	4.3

4.2.2 Wastewater Collection System Capacity Assessment

An assessment of the Village's wastewater collection system was completed using available record drawings, pipe diameters, and slopes to estimate hydraulic capacity. The purpose of this assessment was to determine whether the existing system can accommodate current and projected flows under normal and wet weather conditions.

The analysis focused on the trunk main extending from Railway Avenue through the trailer court to the wastewater lagoon, as this segment represents the limiting section of the system. Using Manning's equation and the documented slopes and pipe sizes, the following design flows were calculated:

- Trunk Main Diameter: 200 mm.
- Limiting Slope: 0.0033 (as per record drawings).
- Calculated Capacity: 18.84 L/s.
- Equivalent Average Day Flow: 407,000 L/day (25% of full day capacity).

Based on a per-capita sewage generation rate of 360 L/p/d (90% of the assumed water usage), the trunk main can theoretically service approximately 1,130 people, indicating that the system has adequate hydraulic capacity.

It is important to note that this assessment does not account for infiltration and inflow (I/I), which could significantly reduce available capacity during wet weather events.

4.3 Wastewater Treatment System – Lagoons

The Village's wastewater treatment system consists of a conventional wastewater lagoon to treat and store the collected wastewater. The lagoon was constructed in the 1960s and consists of two anaerobic cells, two facultative cells, and one storage cell. The collection system flows by gravity into the anaerobic cells. The storage cell is discharged to the Little Red Deer River during approved periods in the spring or fall when needed, but primary discharge is to the irrigation pivot, added in 2006. The volume capacity of each of the cells is outlined in ***Table 4.3***. The volume of each cell is from a sludge survey in 2022.

Table 4.3 – Existing Wastewater Lagoon Volumes (Taking into Account Sludge Volume)

Lagoon Component	Cell Number	Estimated Active Volume (m^3)
Anaerobic Cell	Cell A1	367
Anaerobic Cell	Cell A2	309
Facultative Cell	Cell B1	4,235
Facultative Cell	Cell B2	5,226
Storage Cell	Cell C1	12,601
Total	**-**	**22,738**

The required capacity of the lagoon is based on the 2050 average daily design flow, according to AEPA municipal standards and guidelines, which is presented in ***Table 4.4***.

Table 4.4 – 2050 Required Wastewater Lagoon Volume Capacity

Cell	No. of Cells Required	2050 Average Day Flow (m^3/day)	Required Capacity Each Cell (days)	Required Storage Capacity Each Cell (m^3)
Anaerobic	2	212*	2	424
Facultative	1 minimum		60	12,720
Storage + Irrigation Pivot	1 minimum		212**	44,944

**2050 Average Day Flow was estimated at 90% of the assumed ADD of 400 l/c/d explained in Section 3.2 and 2050 projected population shown in Figure 2.2.*

*** 7 months for the irrigation pivot instead of the normal 12-month requirement per the 2013 Alberta Standards and Guidelines for Municipal Waterworks, Wastewater and storm Drainage Systems Part 3.*

Table 4.5 presents the 2050 available wastewater lagoon capacity balance.

Table 4.5 – Available Lagoon Capacity Balance

Cell	Existing Active Storage Capacity (m^3)	Required Storage Capacity (m^3)	Excess Storage Capacity (m^3)
Anaerobic – Each of two Cells	676	424	252
Facultative	9,461	12,720 (16,892 if dredged)	-3,259 (7,431 if dredged)
Storage + Irrigation Pivot	49,500	44,944	4,556

The wastewater lagoon has sufficient capacity to accommodate the projected development to 2050 except for the two facultative cells. The facultative cells have a 3,259 m^3 storage shortfall compared to the 2050 projections. According to the 2022 sludge survey, the facultative cells have a 53% and 48% capacity loss due to sludge. Therefore, if the facultative cells are dredged, they are expected to then have adequate capacity to meet the projected 2050 ADD flows. The estimated volume of the facultative cells after future dredging is indicated in ***Table 4.5***.

Each lagoon component could accommodate the following additional average day flow capacity beyond the 2050 projected flow from the Village:

- 126 m^3/day Anaerobic Cells.
- Estimated 70 m^3/day Facultative Cell (if dredged).
- 21 m^3/day Storage Cell.

4.4 Wastewater System Recommendations and Upgrades

4.4.1 Collection System Upgrades

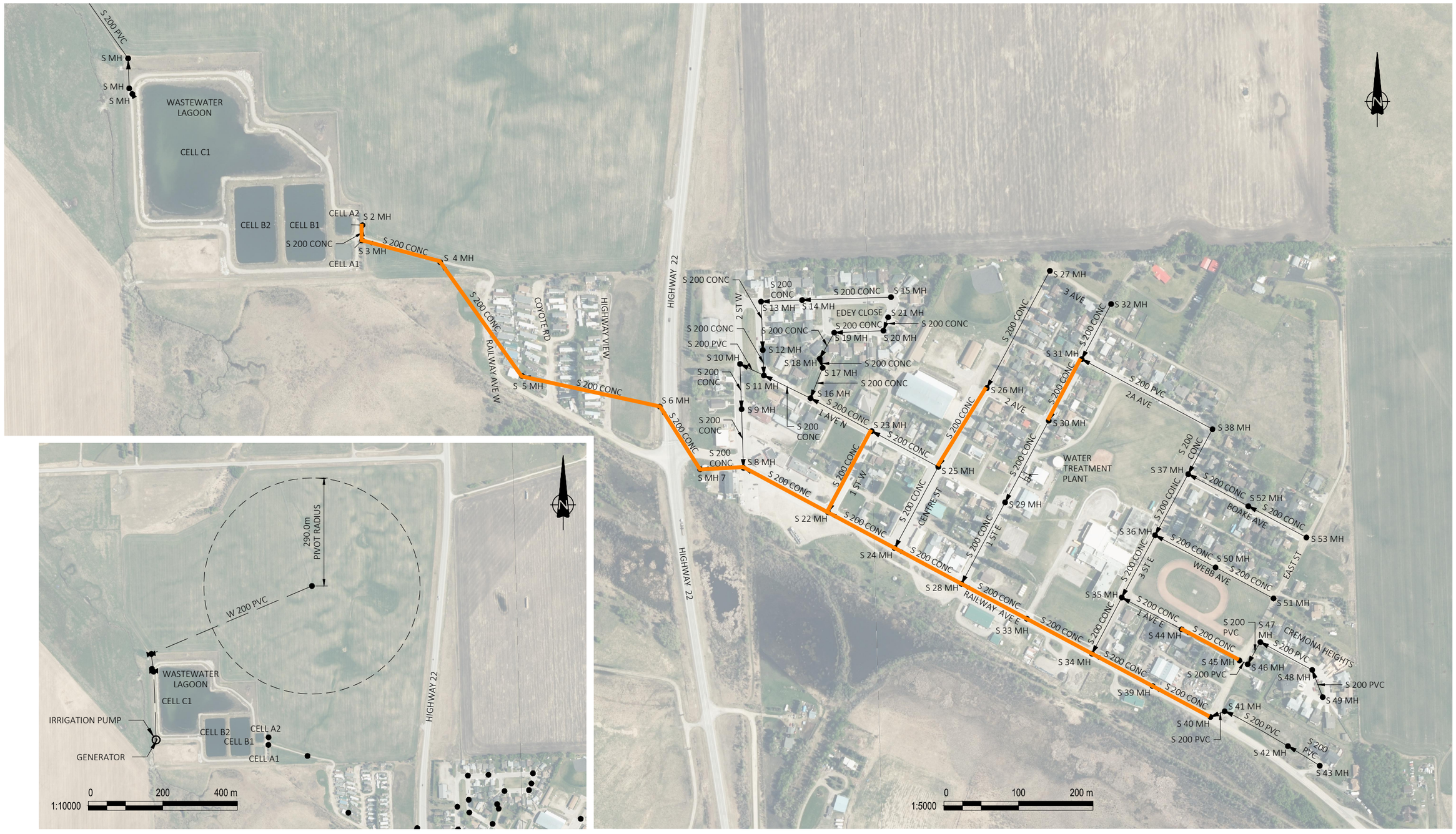
The proposed upgrades and recommendations for the wastewater collection system are divided into the following categories:

- Operation and Maintenance (O&M).
- Lagoon Dredging (last dredging was approximately 20+ years).
- Point Repairs.
- Monitoring of aging sections of the collection system.

Figure 4.4 shows the recommended upgrades for the wastewater collection system. Additional details related to each improvement are provided in the following subsections, as well as in ***Appendix D*** and the video inspection logs in ***Appendix C***.

4.4.1.1 Operation and Maintenance

It is recommended that the Village further develop a flushing/cleaning program to include regular root and mineral cutting. This will help ensure that the mains and manholes are able to continue to provide unobstructed flow.



IRRIGATION PIVOT SITE PLAN

LEGEND

- EXISTING WASTEWATER LINE
- EXISTING WASTEWATER MANHOLE
- FLOW DIRECTION ARROW
- EXISTING CONCRETE SANITARY TO BE MONITORED

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
WASTEWATER SYSTEM
PROPOSED UPGRADES

SCALE:	1:5000	DATE:	JANUARY 2026	JOB:	2490-019-00	FIGURE:	4.4

4.5 Wastewater System Cost Estimates

The Village's sanitary sewer system is currently in good condition, with minimal issues identified during recent video inspections. MPE recommends that the Village continue to monitor the condition of the wastewater mains and prioritize replacement only where deficiencies are observed or where coordination with other infrastructure projects provides cost efficiencies.

Priority Project

One section to consider for future funding is the reinforced concrete sanitary sewer main running from the Village to the wastewater treatment lagoon, starting from the intersection of Railway Avenue and 2 Street West. This segment is the backbone of the collection system and carries the highest flows. Minor issues were noted during inspections, but immediate replacement is not required. Instead, this work should be scheduled in conjunction with a future water main or road replacement project to minimize disruption and cost. At the time of replacement, a review of potential oversize of the main for the future flows should be considered.

Estimated Costs

For budgeting purposes, the following information is provided:

Unit Cost:

- Pipe replacement cost (open-cut construction, excludes road reconstruction costs): $900/m.
- Including engineering and contingencies: $1,250/m.

At this time, MPE recommends continued monitoring as this will help determine the timing of future work and avoid unnecessary early replacement.

5.0 STORMWATER SYSTEM OVERVIEW

The following section provides a summary of key findings and recommendations from the *Village of Cremona Regional Stormwater Management Plan – Final Report (2023)* prepared by MPE, found in ***Appendix E***. This summary consolidates the study's analysis of existing stormwater infrastructure, identified deficiencies, and proposed improvements, along with guidance for future development and maintenance. It is intended to inform decision-making and serve as a reference for planning and implementing stormwater management strategies within the Village.

5.1 Existing Conditions

The Village's stormwater system consists of underground storm sewers, culverts, catch basins, curb and gutter systems, and surface drainage features, such as ditches and swales.

General Condition: Infrastructure is rated average to good, but several deficiencies exist:

- Undersized pipes and culverts leading to frequent roadway overtopping.
- Limited ponding allowances at catch basins reducing capture efficiency.
- Erosion of gravel roads causing sediment build-up in downstream infrastructure.

Critical Problem Areas:

- **1 Street West near 1 Avenue:** The west side of 1 Street West has a grassed ditch system that experiences erosion along the road edge as stormwater flows enter the ditch. This creates a safety hazard for pedestrians and vehicles.
- **Centre Street north of the Community Arena:** Several gravel patches and strips near the Cremona Community Arena erode during rainfall events. This causes sediment to accumulate in the downstream culverts, causing capacity issues resulting in frequent maintenance to clear the culvert.
- **3 Street East near 1 Avenue:** Gravel roadway with curb and gutter still experiences erosion at edges before flow enters the gutter. This causes stormwater to overtop into private driveways and into properties. Additionally, this causes sediment build-up at the southern-most catch basin.
- **East Street near 1 Avenue:** A series of small culverts under driveways and gravel road erode, causing sediment build-up in culverts and catch basins.

5.2 Issues Identified

The primary issues are summarized as follows:

- **Capacity Limitations**: Several culverts and pipes provide a LOS below the acceptable 1:10-year standard.
- **Erosion Concerns**: Gravel roads and roadside ditches are eroding, creating safety hazards, and sedimentation.
- **Maintenance Gaps**: Sediment accumulation in catch basins and culverts reduces conveyance capacity.

5.3 Recommended Actions

5.3.1 Immediate Upgrades

The following immediate upgrades are recommended:

- **Pipe and Culvert Upsizing**: Upgrade infrastructure with LOS below 1:5-year return period.
- **Catch Basin Improvements**: Add or replace inlets and regrade surrounding areas to allow ponding.
- **Road Reconstruction**: Pave gravel roads and install curb/gutter systems to reduce erosion.

5.3.2 Priority Projects

Implementation should proceed from downstream to upstream to prevent flooding during phased upgrades.

Table 5.1 – Cremona Stormwater Improvement Costs and Priorities

Catchment	Location	Cost	Priority
East	N/A	$585,000	High
Central East	3 Street East	$415,000	High
Central East	1 Street East	$330,000	Medium
Central East	Centre Street	$195,000	Medium
Regional Catchments	Township Road 300	$25,000	Medium
Central West	N/A	$165,000	Low
Central East	2A Avenue	$3,000	Low
Total		**$1,718,000**	**-**

[1] Note: Costs in 2023 Regional Stormwater Management Plan/adjusted for inflation to 2026 Dollars.

5.4 Future Development Guidelines

The following guidelines are recommended to support sustainable future development, manage stormwater effectively, and ensure alignment with regulatory and environmental objectives:

- Flow Control: Limit 1:100-year storm flows to the lesser of pre-development rates or 4.8 L/s/ha.
- Infrastructure Separation: Avoid combining runoff from new developments with existing systems.
- Design Standards and Guidelines:
  - Paved roads with curb and gutter.
  - Safe overland flow paths within public Right-of-Way (ROW).
  - Building elevations at least 0.3 m above 1:100-year flood levels.
- Environmental Considerations:
  - Retain wetlands per Alberta Wetland Policy.
  - Incorporate Low Impact Development (LID) practices, such as bioswales, rain gardens, and permeable pavements.
- Policy Integration:
  - Include stormwater management principles in Village bylaws and development standards and guidelines.

5.5 Maintenance and Monitoring

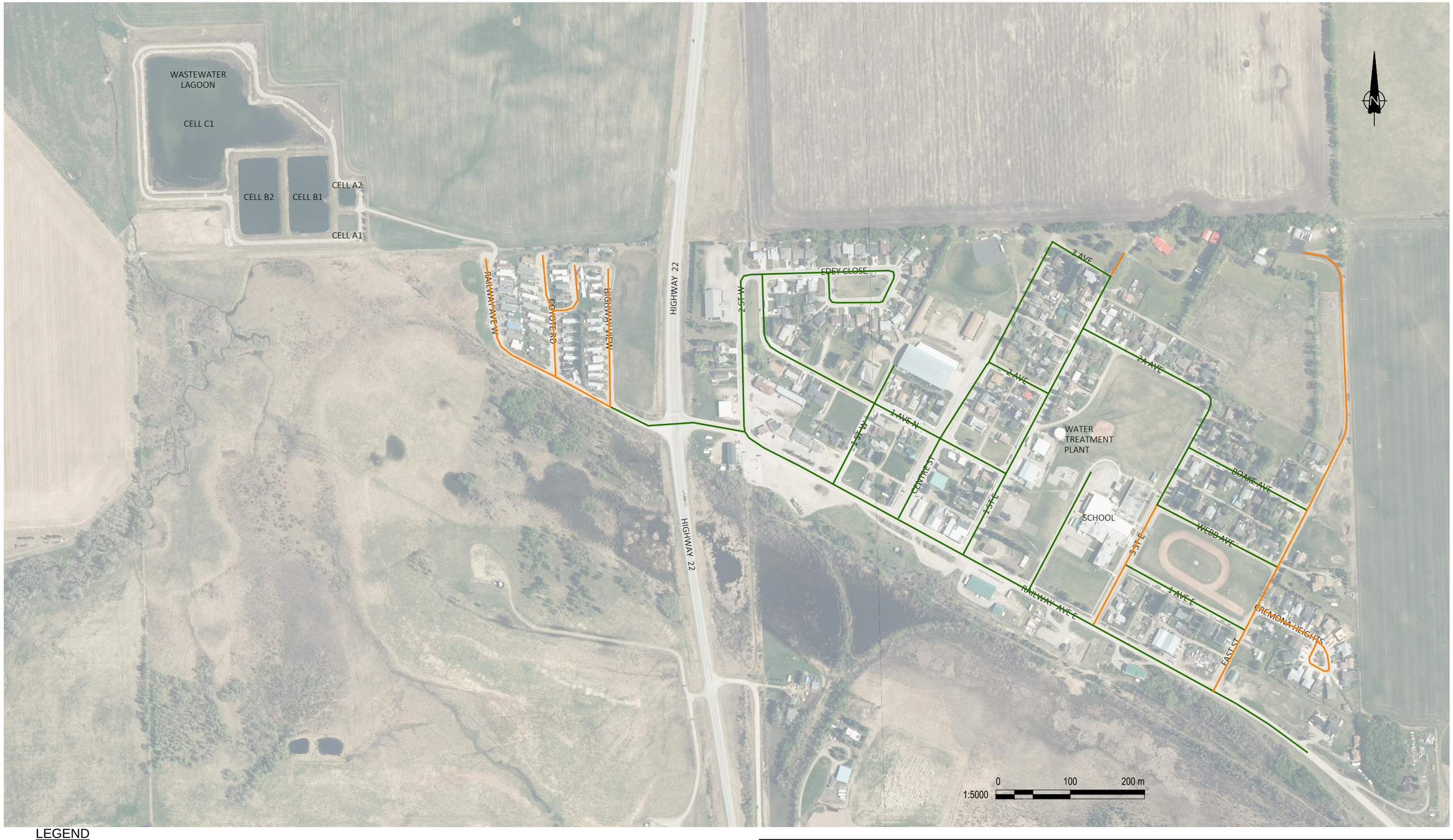
The following maintenance and monitoring measures are recommended to preserve system performance and mitigate ongoing operational issues:

- Routine Inspections: Catch basins, culverts, and outfalls inspected and cleared spring and fall.
- Erosion Control: Regular repairs to ditches and roadside areas to prevent sedimentation.

6.0 TRANSPORTATION NETWORK

The road network within the Village generally consists of asphalt paved roads typically with concrete curb and gutter, gravel roads with and without curb and gutter, monolithic sidewalk/curb and gutter or separate sidewalk/curb and gutter. Existing road types are shown on ***Figure 6.1***.

A visual site survey of the roads was undertaken by MPE in October 2025. The inspection includes all roads throughout the Village. Highway 22 was not included in this inspection, as it is under provincial jurisdiction. A condition rating is assigned to each section of road. The condition rating is based on the visual appearance and defects. The condition ratings give a general indication of work required to bring each road to an established standard. These ratings can be used to prioritize repairs.



LEGEND

- Asphalt
- Gravel

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
ROAD TYPE

SCALE:	1:5000	DATE:	JANUARY 2026	JOB:	2490-019-00	FIGURE:	6.1

6.1 Roadway Condition

As previously mentioned, a visual site survey of all the roads within the Village was undertaken. The work involved visual inspections only, no detailed testing or sampling has been completed as part of this Study. The inspection forms for each section of road that was inspected are included in ***Appendix F***.

The inspection results from the visual site survey were used to determine the "Roadway Condition" rating value for each section of the roadway. Each type of defect is given a severity rating from light to severe. These asphalt paving defects include:

1) Transverse Cracks: *cracks that are perpendicular to the pavement's centerline.*
2) Longitudinal Cracks: *cracks that are parallel with pavement centerline.*
3) Alligator Cracks: *interconnected cracks forming a series of small blocks.*
4) Shrinkage Cracks: *interconnected cracks that divide pavement into large rectangular pieces.*
5) Rutting: *channeled depressions in the wheel-tracks.*
6) Corrugations: *ripples across asphalt pavement surface.*
7) Raveling*: the separation of aggregate particles in a pavement surface.*
8) Shoving/Pushing*: the formation of ripples across the pavement.*
9) Potholes*: bowl shaped depressions in the pavement's surface.*
10) Excess Asphalt*: when asphalt overlaps and spills onto curb and gutter.*
11) Polished Aggregate*: when aggregate extends above the asphalt binder.*
12) Deficient Drainage*: ponding water seen on asphalt surface.*
13) Overall Riding Quality*: a measure of quality when driving over the pavement surface.*

Each defect is assigned a value from 1 to 10, 1 being the best physical condition and 10 being the worst. These scores are weighted depending on the severity of the defect and then tallied to provide a score out of 99. ***Table 6.1*** outlines the recommendations for each condition rating.

Table 6.1 – Road Rating Recommendation

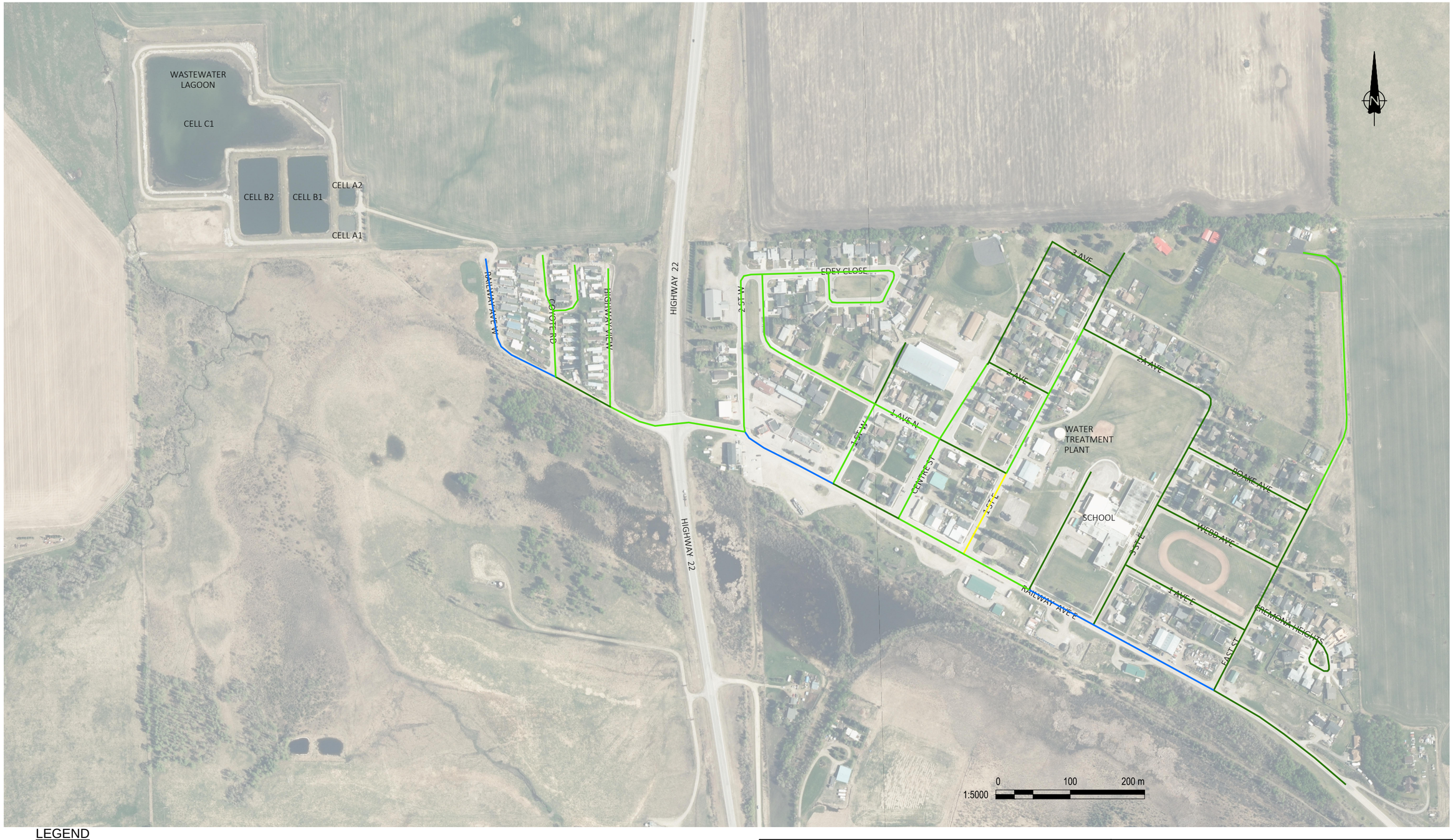
Rating	Recommendation
96-100: Good	Roadway is in good condition, no resurfacing required.
90-95	Minimal cracking, no resurfacing required.
85-89: Fair	Light to moderate cracking, isolated rutting.
72-84	Moderate cracking, potholes throughout roadway, rutting seen in multiple locations, polished aggregate, resurfacing recommended within 10 to 15 years.
68-71: Poor	Roadway is poor, severe cracking, multiple potholes, rutting, pushing and shoving seen throughout roadway. Resurfacing recommended within the next five years.

Table 6.2 shows the road condition summary for all roads in the Village excluding highways that fall under provincial jurisdiction.

Table 6.2 – Road Condition Summary

Rating	Total Approximate Length (metres)	Percentage
96-100: Good	2,413	42%
90-95	3,011	52%
85-89: Fair	227	4%
72-84	118	2%
68-71: Poor	-	0%
Total	**5,769**	**100%**

Figure 6.2 illustrates the condition ratings for each road on a map.



LEGEND

0-20	86-90
21-50	91-95
51-85	96-100

a division of Englobe

VILLAGE OF CREMONA

CREMONA INFRASTRUCTURE AUDIT
ROAD CONDITION - OVERALL

SCALE:	DATE:	JOB:	FIGURE:
1:5000	JANUARY 2026	2490-019-00	6.2

6.1.1 Road Upgrade Standards and Guidelines

It is recommended that the Village maintain its system of predominantly paved roads by overlaying the existing asphalt if required and rebuilding the road structure if the road is sufficiently degraded or if water/wastewater replacements are required. No major changes to road surfaces are required, such as upgrading gravel roads to a paved standard.

The following assumptions have been made to calculate the quantities, costs, and upgrading:

- Rebuilds of residential paved road structure include:
  - 300 mm thick sub-base (pit-run) gravel.
  - 50 mm thick base (crushed) gravel.
  - 90 mm thick asphalt paving.
  - Road coring excavation sufficient to install the above structure.

The above assumptions are for estimating purposes only and have been used to determine quantities to which typical unit rates have been applied. Each section of road would require proper geotechnical soils investigation and engineering analysis to confirm the actual design and refine the costs.

6.2 Transportation Network Upgrades

From the completed assessment, the following recommendations were made for the roadways, and concrete curb and gutters located throughout the Village. Recommended upgrades and capital planning are discussed in the following section.

6.2.1 Paved Road Recommendations

It is recommended that paved roads which received a “poor” condition rating are reconstructed as funds become available. Estimated reconstruction costs pre linear metre are provided in **Section 6.3**.

For roads that received a “fair” or better condition rating, regular maintenance was determined to be sufficient to maintain the structure and longevity of the road over the next 25 years and reconstruction is only required if the replacement of underground utilities is to take place. Regular maintenance was assumed to include crack sealing, surface coats, and spot repairs, and is not included in the estimated costs provided.

Detailed cost estimates are recommended at specific sites prior to construction to ensure all project needs are addressed.

6.2.2 Gravel Road Recommendations

Should the Village choose to upgrade existing gravel roads to a paved road standard when funding is available or when coordinated with underground infrastructure projects, improvements to the road network would result. Upgrading the gravel roads in the future will increase the LOS provided by this portion of the network. Gravel roadways with existing curb and gutter appear to be in good condition. However, without a ditch system they will likely have a reduced lifespan. The Village may consider paving these sections of roadway to maximize the road lifespan. It is also advised that gravel roads, which received a "failed" to "poor" condition rating are reconstructed as funds become available. Estimated reconstruction costs per linear metre are summarized in **Section 6.3**.

In the meantime, it is recommended that the Village should increase proper gravel road maintenance including grading, dust suppression, and adding granular materials displaced due to compaction and erosion. The Village may consider this sufficient to maintain a suitable LOS until such time that the upgrades can be completed.

6.2.3 Other Recommendations

No assessments were completed outside of the Village boundaries, which includes the Alberta Transportation (AT) highway intersection. Future developments within the community may trigger the need for intersection analysis. AT currently deems any intersection improvements necessary to support developments are the responsibility of the community. Often the community will pass the intersection development costs on to the developer or utilize offsite levies to fund these improvements.

6.3 Transportation Network Cost Estimates

Most roads are in good condition and require only routine maintenance (crack sealing, surface coats, spot repairs). Reconstruction is recommended for roads rated poor or where underground utility replacement is planned.

Priority Project

The Village's transportation network includes several gravel roads that provide lower service levels and reduced life cycles compared to paved roads. Upgrading these gravel roads to a paved standard is identified as a priority project to improve durability, reduce maintenance costs, and enhance overall road safety and accessibility. These upgrades should be scheduled in conjunction with underground utility replacements or other capital works to minimize disruption and optimize cost efficiency.

Estimated Costs

For budgeting purposes, the following estimates are provided:

- Full Reconstruction of Asphalt Roads: Typical cost: $450–$500 per linear m (including excavation, granular base, asphalt, curb and gutter, and contingencies).
- Gravel Road Upgrades to Asphalt Standard: Estimated cost: $400–$450 per linear m.
- 50 mm Asphalt Overlay (Maintenance Option): Estimated cost: $35–$45 per m^2.

It is recommended to continue monitoring and maintenance of the roads and combine any proposed roadway reconstruction projects with water main, sanitary sewer, or storm sewer replacement projects.

7.0 CAPITAL PLANNING

7.1 Overview

Table 7.1 outlines a suggested capital plan for the next 10-years for the infrastructure upgrades identified in this report. This plan is a useful tool for the Village to reference on an ongoing basis. It is also intended for use as a discussion tool when prioritizing projects and for forecasting annual and upcoming expenditures. The capital plan is intended to be a "living" document that is updated regularly as situations change and projects are completed.

The following costs include Contingencies and Engineering and exclude GST. All costs are in 2026 dollars.

Table 7.1: Capital Plan – 10 Years

Priority	Infrastructure Project	Length	Cost Estimate	Estimated Timeline
1	Upgrade Water and Road 3 Street East (Railway Avenue to Boake Avenue)	200 m	$400,000*	2027
2028 no planned work				
2	Upgrade Water and Road 1 Avenue East (3 Street to East Street)	185 m	$370,000	2029
2030 no planned work				
3	Upgrade Water and Road East Street (Railway Avenue to North End)	320 m	$640,000	2031
4	Dredge Wastewater Treatment Lagoons**	-	$500,000	2032
5	Upgrade Water and Road Webb Avenue (3 Street to East Street)	185 m	$370,000	2033
2034 no planned work				
6	Upgrade Water and Road Boake Avenue (3 Street to East Street)	185 m	$370,000	2035
2036 no planned work				
7	Upgrade Water and Road 2A Avenue (1 Street East to 3 Street East) + 3 Street East (Boake Avenue to 2 Avenue)	270 m	$540,000	2037
	TOTAL	**1,345 m**	**$3,190,000**	

**Potential for funding from Mountain View County due to proximity to the school.*
***Project can be done at any point in the next 6 years but should be done promptly if development occurs.*

The projects listed above show the start of a systematic replacement of the CI water main in the Village amounting to around 33% of the CI in the system. The projects above are a suggestion and the limits, order, and location can be updated by the Village based on changes in condition or priorities.

The Village should continue to budget for maintenance of the existing roads and utilities.

MPE is prepared to continue assisting the Village with further capital planning and seeking funding opportunities for applicable projects.

7.2 Funding Opportunities

The Government of Alberta and Government of Canada offer several avenues to assist smaller municipalities with funding infrastructure projects. Below is a summary of some of the available funding programs:

- Alberta Municipal Water/Wastewater Partnership (AMWWP):
  - The AMWWP program was launched in 1991 and provides cost-shared funding to eligible municipalities to help build municipal facilities for water supply and treatment, and wastewater treatment and disposal.
  - Eligible projects can receive up to 75% of project costs.
  - Eligible projects could include upgrades to the wastewater trunk main replacement, lift station upgrades, lagoon upgrades, and upgrades relative to the potable water supply system.
- Strategic Transportation Infrastructure Program (STIP):
  - The STIP program provides funding to municipalities under four funding streams: Community Airport Program, Local Road Bridge Program, Resource Road Program, and Local Municipal Initiatives.
- Municipal Asset Management Program (MAMP):
  - MAMP is offered by the Federation of Canadian Municipalities and is focused on improving asset management practices.
  - Eligible projects could include the video inspections of remaining wastewater mains throughout the Village.
  - The program will cover 80% of eligible expenses up to a maximum of $50,000.
- Alberta Community Partnership (ACP):
  - The program is available for communities looking to partner and develop regional land use plans and service delivery frameworks.
  - Funding is available for 100% of eligible costs up to a maximum of $200,000.

8.0 CONCLUSIONS & RECOMMENDATIONS

8.1 Potable Water System

The Village's potable water system is generally adequate for current and projected demands to 2050, but aging infrastructure and FF limitations require attention. Key conclusions include:

- Raw water supply and treatment capacity are sufficient for projected growth.
- Treated water storage meets residential FF requirements but does not fully meet non-residential FF guidelines.
- The distribution system contains a significant amount of CI pipe, much of which is at or beyond its expected service life, resulting in frequent leaks and maintenance.
- Hydraulic modelling indicates that while domestic service is adequate, FF capacity is limited in certain areas.

Recommendations:

- Implement a systematic CI water main replacement program over the next 20-25 years, coordinated with other underground utility and road projects.
- Continue hydrant maintenance and flushing programs.
- Complete video inspections of treated water reservoirs to confirm condition.
- Monitor bottlenecks at Edey Close and Highway 22 crossing. If issues occur consider upsizing these mains in conjunction with the CI replacement program.
- Investigate the capacity of the distribution pumps further and determine if upgrades are needed.

8.2 Wastewater System

The wastewater collection system is in good condition overall, with minimal structural issues identified during CCTV inspections. Hydraulic capacity of the wastewater lagoon is adequate for current and future flows provided the facultative cells be dredged to accommodate 2050 projections.

Recommendations:

- Continue routine monitoring and maintenance of mains.
- Maintain lagoon vegetation control and plan for periodic dredging.
- Dredge the lagoon.

8.3 Stormwater Management System

The stormwater system provides basic drainage but has localized capacity and erosion issues, particularly near gravel roads and older culverts.

Recommendations:

- Upgrade undersized pipes and culverts to meet 1:10-year design standards and guidelines.
- Improve catch basin grading and add inlets where needed.
- Transition gravel roads to paved surfaces with curb and gutter to reduce erosion and sedimentation.
- Incorporate stormwater management requirements into future development standards and guidelines, including detention facilities and LID practices.
- Maintain routine inspections and sediment removal from catch basins and culverts.

8.4 Transportation Network

The road network is in generally good condition, with most paved roads requiring only routine maintenance. Gravel roads provide a lower LOS and should be upgraded over time.

Recommendations:

- Upgrade gravel roads to paved standard as funding allows, prioritizing coordination with underground utility replacements.
- Continue regular maintenance (crack sealing, overlays) on paved roads rated “fair” or better.
- Schedule reconstruction of any roads rated “poor” after utility upgrades.
- Maintain sidewalks and curb/gutter structures; reconstruct only where condition warrants.

9.0 REFERENCES

Alberta Environment and Protected Areas. *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm* Drainage *Systems*. Drinking Water Branch, Environmental Policy Branch, Environmental Assurance Division. March 2013.

G5 Group of Municipalities, *Central Peace Regional Water System Strategy,* prepared by Associated Engineering, June 2018.

Design Manual, Aquatera Utilities Inc., 2020.

Sanitary Wastewater Lagoon Improvements Design Report, prepared by Helix for the Village of Cremona, December 2020.

Water Supply for Public Fire Protection, Fire Underwriters Survey, 2020.

APPENDIX A

2023 Water System Flow Data

AQUATECH
CANADIAN WATER SERVICES INC.

Cremona Waterworks System
Registration No. 579-02-01
January 2023

Cremona Waterworks System
Registration No. 579-02-01
January 2023

Date	Raw Water					Raw Water Wells				12% Sodium Hypochlorite		Treated Water					Distribution Pumphouse						CT Disinfection						Bacteriological Sampling							Operator
	Volume	Turbidity	Manganese	pH	Temp	Well 12 Volume	Well 14 Volume	Well 12 Depth	Well 14 Depth	Used	Dose	Volume	Manganese	Turbidity	pH	Temp	Distribution Volume	Bulk Fill Volume	Manganese	Turbidity	pH	Temp	Min. Cl2	Qpeak	Min. Res Volume	CT Achieved	CT Required	CT Ratio	Raw Sample ID	Pumphouse Sample ID	Distribution Sample ID	Sampling Location	Cl2	Manganese	Turbidity	
	m3	NTU	mg/L		°C	m3	m3	m	m	kg	mg/L	m3	mg/L	NTU		°C	m3	m3	mg/L	NTU		°C	mg/L										mg/L	mg/L	NTU	
1							70										383	0					0.99	0.5319	1014	188.72	8	23.59								
2	280	0.09	0.290	7.42	6.7	283		6.7	9.7	4.3	1.84	237	0.025	0.07	7.23	8.4	393	0	0.021	0.07	7.17	6.8	0.97	0.5458	964	171.31	8	21.41				Shop	0.44	0.025	0.07	JM
3	24	0.08	0.278	7.44	5.8		24	6.2	8.5	0.5	2.50	16	0.025	0.07	7.33	6.8	389	0	0.023	0.07	7.18	6.3	0.97	0.5403	1022	183.49	8	22.94				Iron Mountain	0.82	0.025	0.06	JM
4	168	0.08	0.289	7.42	6.2	170		6.5	9.6	3.6	2.57	154	0.017	0.07	7.25	8.8	384	0	0.005	0.07	7.15	6.6	1.02	0.5333	1008	192.78	8	24.10	2192648	2192650	2192649	Petro Canada	0.81	0.012	0.07	JM
5	139	0.07	0.286	7.39	5.8	141		6.7	9.2	3.1	2.68	117	0.016	0.10	7.44	6.5	498	0	0.014	0.06	7.18	6.8	1.02	0.6917	1045	154.11	8	19.26				Fire Hall	0.66	0.023	0.08	SS/JM
6	416	0.13	0.296	7.37	5.5	1	139	6.3	9.2	7.9	2.28	369	0.024	0.09	7.37	6.5	384.66	0	0.028	0.08	7.14	6.4	1.04	0.5343	1032	200.89	8	25.11				FCSS	0.74	0.02	0.10	SS
7						140											384.66	0					1.06	0.5343	986	195.63	8	24.45								
8						94	46										384.66	0					1.07	0.5343	981	196.48	8	24.56								
9	104	0.11	0.290	7.42	5.7		105	6.6	9.0	1.9	2.19	93	0.020	0.05	7.32	7.3	452	0	0.018	0.08	7.17	6.4	1.06	0.6278	1057	178.47	8	22.31				Bumper 2 Bumper	0.92	0.016	0.11	SS
10	132	0.12	0.295	7.45	5.5		133	6.3	9.3	3	2.73	122	0.014	0.10	7.34	6	256	0	0.015	0.08	7.18	6.2	1.05	0.3556	1020	301.22	8	37.65				KC Foods	0.89	0.018	0.13	SS
11	103	0.09	0.296	7.48	5.3		105	6.5	9.0	2.6	3.03	85	0.014	0.09	7.37	6.9	506	0	0.015	0.07	7.14	6.6	1.06	0.7028	1069	161.24	8	20.15		2192647	2192646	FCSS	0.84	0.019	0.08	SS
12	138	0.08	0.289	7.44	5.1	140		6.4	9.3	2.6	2.26	135	0.013	0.06	7.3	6.2	252	0	0.013	0.08	7.17	6.4	1.03	0.3500	1011	297.52	8	37.19				Fire Hall	0.8	0.016	0.12	SS
13	503	0.07	0.282	7.55	5.1		169	6.3	9.1	8	1.91	454	0.014	0.05	7.37	6.2	441.66	0	0.015	0.07	7.17	6.6	1.02	0.6134	1067	177.42	8	22.18				Iron Mountain	0.86	0.011	0.07	SS
14						169											441.66	0					1.05	0.6134	1028	175.97	8	22.00								
15							169										441.66	0					1.10	0.6134	974	174.66	8	21.83								
16	0	0.09	0.281	7.54	5.4			6.0	8.3			0	0.014	0.19	7.39	5.9	249	0	0.013	0.1	7.14	6.3	1.14	0.3458	988	325.68	8	40.71				Petro Canada	0.84	0.010	0.12	SS
17	75	0.10	0.282	7.48	5.1	75	2	6.4	9.4	1	1.60	65	0.010	0.08	7.41	5.6	377	0	0.010	0.1	7.11	6.3	1.17	0.5236	1061	237.08	8	29.63				Fire Hall	0.75	0.007	0.14	SS
18	115	0.08	0.283	7.47	5.2		118	6.9	9.6	3.2	3.34	107	0.008	0.08	7.33	6	503	0.447	0.003	0.07	7.13	6.5	1.20	0.6992	1039	178.31	8	22.29		2192645	2192644	Gym	0.93	0.010	0.07	SS
19	151	0.12	0.277	7.51	4.9		152	6.8	9.3	1.6	1.27	135	0.009	0.08	7.35	6.1	379	0	0.009	0.06	7.17	6.2	1.20	0.5264	1014	231.16	8	28.89				Bue & Bairn	0.83	0.008	0.08	SS
20	397	0.07	0.284	7.60	4.9	134		6.7	9.2	5.8	1.75	349	0.006	0.10	7.39	6.2	67.66	0	0.012	0.08	7.12	5.9	1.22	0.0940	1055	1369.66	8	171.21				FCSS	0.96	0.012	0.10	SS
21							134										67.66	0					1.22	0.0940	992	1287.87	8	160.98								
22						134											67.66	0					1.20	0.0940	964	1231.00	8	153.88								
23	54	0.09	0.282	7.5	5.0	96		6.3	9.2	1.3	2.89	88	0.012	0.09	7.9	5.8	258	0	0.010	0.1	7.11	8.3	1.19	0.3583	1049	348.37	8	43.55				Fire Hall	0.7	0.007	0.12	SS
24	101	0.08	0.279	7.46	4.7		102	6.7	9.0	1.3	1.54	89	0.009	0.10	7.35	6.5	473	0	0.008	0.07	7.12	8.3	1.15	0.6569	1049	183.63	8	22.95				FCSS	0.86	0.011	0.06	SS
25	173	0.06	0.287	7.59	4.9	175		6.2	8.9	2.9	2.01	159	0.008	0.05	7.47	5.7	329	0	0.009	0.07	7.12	8	1.16	0.4569	1001	254.11	8	31.76		2192643	2192642	Neiland's Lounge	0.75	0.009	0.09	SS
26	74	0.07	0.278	7.44	4.8		75	6.6	9.2	0.8	1.30	58	0.010	0.06	7.38	5.7	500	4.11	0.012	0.08	7.33	7.9	1.13	0.7002	1046	168.82	8	21.10				Iron Mountain	0.94	0.012	0.07	SS
27	479	0.06	0.280	7.45	4.9	162		6.3	9.2	7.4	1.85	435	0.017	0.05	7.38	5.5	397.33	0	0.014	0.06	7.31	8.2	1.13	0.5518	979	200.47	8	25.06				Gym	0.96	0.010	0.06	SS
28							162										397.33	0					1.17	0.5518	994	210.74	8	26.34								
29						162											397.33	0					1.17	0.5518	980	207.77	8	25.97								
30	125	0.07	0.289	7.46	4.6		126	6.5	8.9	1.9	1.82	114	0.008	0.04	7.39	5.7	410	0	0.012	0.08	7.32	8.0	1.17	0.5694	1050	215.74	8	26.97				Petro Canada	1.05	0.012	0.09	SS
31	182	0.06	0.279	7.49	4.8	183		6.2	9.0	2.4	1.58	150	0.003	0.08	7.36	5.6	290	0	0.005	0.06	7.30	8.4	1.19	0.4028	1043	308.15	8	38.52				Fire Hall	1.10	0.005	0.09	SS
TOTAL	3933					2259	1831			67.1		3531					11154.93	4.557																		
MIN	0	0.06	0.277	7.37	4.6	1	2	6	8.3	0.5	1.27	0	0.003	0.04	7.23	5.5	67.66	0.000	0.003	0.06	7.11	5.9	0.97	0.0940	964	154.11	8	19.26					0.44	0.005	0.06	
MAX	503	0.13	0.296	7.60	6.7	283	169	6.9	9.7	8	3.34	454	0.025	0.19	7.9	8.8	506	4.110	0.028	0.1	7.33	8.4	1.22	0.7028	1069	1369.66	8	171.21					1.10	0.025	0.14	
AVG	178.77	0.09	0.285	7.47	5.27	141.19	107.71	6.46	9.14	3.20	2.14	160.50	0.013	0.08	7.38	6.36	359.84	0.147	0.013	0.08	7.18	6.97	1.11	0.5000	1018.77	319.63	8.00	39.95					0.84	0.01	0.09	

AQUATECH
CANADIAN WATER SERVICES INC.

Cremona Waterworks System
Registration No. 579-02-01
February 2023

Cremona Waterworks System
Registration No. 579-02-01
February 2023

Date	Raw Water					Raw Water Wells				12% Sodium Hypochlorite		Treated Water				Distribution Pumphouse						CT Disinfection						Bacteriological Sampling						Operator
	Volume	Turbidity	Manganese	pH	Temp	Well 12 Volume	Well 14 Volume	Well 12 Depth	Well 14 Depth	Used	Dose	Volume	Manganese	Turbidity	pH	Temp	Distribution Volume	Bulk Fill Volume	Manganese	Turbidity	pH	Temp	Min. Cl2	Qpeak	Min. Res Volume	CT Achieved	CT Required	CT Ratio	Raw Sample ID	Pump House Sample ID	Distribution Sample ID	Sampling Location	Cl2	Manganese	Turbidity	
	m3	NTU	mg/L		°C	m3	m3	m	m	kg	mg/L	m3	mg/L	NTU		°C	m3	m3	mg/L	NTU		°C	mg/L										mg/L	mg/L	NTU	
1	10	0.13	0.284	7.51	4.9		10	6.2	8.4	0.2	2.40	10	0.017	0.06	7.38	5.6	407	0	0.014	0.08	7.28	7.8	1.20	0.5653	1042	221.20	8	27.65	2192641	2192639	2192640	Iron Mountain	1.05	0.010	0.06	SS
2	225	0.07	0.282	7.57	4.9	230		6.5	9.5	2.8	1.49	186	0.013	0.06	7.49	5.8	384	0	0.012	0.05	7.33	7.3	1.22	0.5333	1004	229.67	8	28.71				Petro Can	0.94	0.010	0.07	SS
3	305	0.12	0.281	7.48	4.9		102.66	6.4	8.8	4.8	1.89	272	0.013	0.05	7.32	5.5	1180	0.174	0.016	0.06	7.17	8.6	1.20	0.5462	1048	230.25	8	28.78				Gym	1.04	0.008	0.07	SS
4			.			102.66																	1.21	0.5462	968	214.44	8	26.81								
5							102.66																1.25	0.5462	996	227.94	8	28.49								
6	252	0.08	0.276	7.44	4.4	255		6.4	9.3	3.9	1.86	225	0.010	0.08	7.35	5.4	464	2.675	0.021	0.09	7.42	9.4	1.20	0.6482	998	184.77	8	23.10				Credit Union	1.13	0.008	0.09	SS
7	100	0.08	0.282	7.48	4.6		102	6.6	9.0	1.5	1.80	84	0.010	0.04	7.38	5.8	280	0	0.011	0.07	7.31	7.3	1.20	0.3889	1050	324.00	8	40.50				Fire Hall	0.73	0.009	0.13	SS
8	156	0.05	0.278	7.58	4.5		157	6.5	9.0	2.8	2.15	146	0.014	0.05	7.39	5.4	517	35.389	0.010	0.06	7.31	8.3	1.12	0.7672	1005	146.71	8	18.34		2192638	2192637	FCSS	1.09	0.012	0.05	SS
9	175	0.09	0.278	7.5	4.7	177		6.5	8.9	2.2	1.51	156	0.010	0.06	7.34	5.6	258	0	0.009	0.08	7.28	7.6	1.15	0.3583	982	315.15	8	39.39				Bumper to Bumper	1.08	0.007	0.08	SS
10	281	0.09	0.281	7.55	4.8		95	6.1	8.4	4.1	1.75	244	0.009	0.06	7.43	5.6	1191	10.66	0.009	0.06	7.33	7.6	1.14	0.5563	1028	210.66	8	26.33				Gym	1.06	0.005	0.08	SS
11						95																	1.15	0.5563	980	202.59	8	25.32								
12							95																1.15	0.5563	1025	211.89	8	26.49					.			
13	204	0.14	0.277	7.54	4.6	207		6.4	9.4	3.7	2.18	185	0.006	0.06	7.4	5.4	535	0	0.005	0.08	7.37	7.3	1.13	0.7431	1000	152.07	8	19.01				Fire Hall	0.76	0.006	0.12	SS
14	206	0.07	0.275	7.49	4.7		207	6.7	9.2	2.4	1.40	189	0.005	0.05	7.37	6.1	322	0	0.008	0.09	7.38	8.2	1.10	0.4472	1016	249.90	8	31.24				Iron Mountain	1.15	0.005	0.10	SS
15	38	0.08	0.290	7.4	5	40		5.9	8.6	0.2	0.63	30	0.003	0.07	7.41	5.8	382	2.653	0.011	0.08	7.26	7.6	1.11	0.5342	1037	215.46	8	26.93		2192636	2192635	Petro Can	1.03	0.010	0.09	SS
16	193	0.13	0.275	7.51	4.5		196	6.3	8.6	2.7	1.68	180	0.004	0.08	7.37	5.4	523	1.065	0.008	0.09	7.34	8.0	1.10	0.7279	1019	154.00	8	19.25				Gym	1.00	0.007	0.09	SS
17	354	0.07	0.275	7.37	4.4	89.5		6.1	8.9	5.0	1.69	310	0.003	0.07	7.32	5.6	1413	2.271	0.006	0.08	7.33	7.4	1.10	0.4914	1020	228.33	8	28.54				Neilons	0.84	0.006	0.08	SS
18							89.5																1.09	0.4914	1016	225.36	8	28.17								
19						89.5																	1.09	0.4914	982	217.82	8	27.23								
20							89.5																1.08	0.4914	1016	223.30	8	27.91								
21	221	0.05	0.277	7.51	4.1	223		6.5	9.6	2.9	1.57	212	0.010	0.05	7.36	5.1	383	0	0.007	0.06	7.32	6.8	1.07	0.5319	972	195.52	8	24.44				Petro Can	1.06	0.008	0.07	SS
22	42	0.08	0.282	7.52	4.4		43	6.6	9.0	0.4	1.14	34	0.011	0.07	7.41	5.4	403	0	0.014	0.08	7.37	6.7	1.07	0.5597	1050	200.72	8	25.09		2192634	2192633	Gym	1.00	0.007	0.07	SS
23	230	0.08	0.276	7.57	4.4	234		6.6	9.7	3.8	1.98	222	0.011	0.06	7.41	5.3	394	0	0.011	0.07	7.32	8.7	1.08	0.5472	1018	200.91	8	25.11				Iron Mountain	1.01	0.008	0.06	SS
24	315	0.09	0.276	7.5	3.9		106	6.3	8.6	5.5	2.10	290	0.019	0.07	7.46	5.5	1222	0	0.008	0.07	7.36	6.5	1.08	0.5657	1035	197.60	8	24.70				FCSS	1.00	0.010	0.06	SS
25						106																	1.10	0.5657	981	190.75	8	23.84								
26							106																1.09	0.5657	989	190.56	8	23.82								
27	169	0.07	0.272	7.58	4.4	171		6.0	8.8	2.9	2.06	166	0.009	0.05	7.43	5.2	508	25.206	0.013	0.06	7.37	6	1.10	0.7406	968	143.78	8	17.97				Fire Hall	1.11	0.012	0.07	SS
28	201	0.10	0.295	7.47	4.5		203	6.9	9.5	2.4	1.43	168	0.016	0.16	7.39	7.0	280	12.554	0.013	0.10	7.3	4.7	1.10	0.4063	997	269.91	8	33.74				Gym	1.02	0.006	0.09	JM
29																																				
30																																				
31																																				
TOTAL	3677					2019.66	1704.32			54.2		3309					11046	92.647																		
MIN	10	0.05	0.272	7.37	3.9	40	10	5.9	8.4	0.2	0.63	10	0.003	0.04	7.32	5.1	258	0.000	0.005	0.05	7.17	4.7	1.07	0.3583	968	143.78	8	17.97					0.73	0.005	0.05	
MAX	354	0.14	0.295	7.58	5	255	207	6.9	9.7	5.5	2.4	310	0.019	0.16	7.49	7.0	1413	35.389	0.021	0.10	7.42	9.4	1.25	0.7672	1050	324.00	8	40.50					1.15	0.012	0.13	
AVG	193.53	0.09	0.280	7.50	4.56	155.36	113.62	6.39	9.01	2.85	1.72	174.16	0.010	0.07	7.39	5.61	581.37	4.876	0.011	0.07	7.32	7.46	1.13	0.5525	1008.64	213.40	8	26.68					1.01	0.008	0.08	

AQUATECH
CANADIAN WATER SERVICES INC.

Cremona Waterworks System
Registration No. 579-02-01
March 2023

Cremona Waterworks System
Registration No. 579-02-01
March 2023

Date	Raw Water					Raw Water Wells				12% Sodium Hypochlorite		Treated Water					Distribution Pumphouse						CT Disinfection						Bacteriological Sampling							Operator
	Volume	Turbidity	Manganese	pH	Temp	Well 12 Volume	Well 14 Volume	Well 12 Depth	Well 14 Depth	Used	Dose	Volume	Manganese	Turbidity	pH	Temp	Distribution Volume	Bulk Fill Volume	Manganese	Turbidity	pH	Temp	Min. Cl2	Qpeak	Min. Res Volume	CT Achieved	CT Required	CT Ratio	Raw Sample ID	Pump House Sample ID	Distribution Sample ID	Sampling Location	Cl2	Manganese	Turbidity	
	m3	NTU	mg/L		°C	m3	m3	m	m	L	mg/L	m3	mg/L	NTU		°C	m3	m3	mg/L	NTU		°C	mg/L										mg/L	mg/L	NTU	
1	72	0.09	0.277	7.61	6.5	74		5.7	8.3	2.6	5.07	71	0.011	0.05	7.47	5.4	523	1.149	0.009	0.07	7.33	7.6	1.11	0.7280	1024	156.14	8	19.52		2192632		FCSS	1.10	0.015	0.1	SS
2	162	0.10	0.277	7.51	3.4		163	6.9	9.5	2.5	2.17	149	0.005	0.07	7.43	5.4	241	0	0.012	0.06	7.35	7.5	1.09	0.3347	990	322.39	8	40.30				Neilands	0.97	0.012	0.09	SS
3	322	0.08	0.299	7.36	4.6	108.66		6.3	9	5.0	2.18	290	0.019	0.06	7.29	8.6	1242	0	0.012	0.10	7.29	5.6	1.08	0.5750	1028	193.09	8	24.14				Petro Canada	1.00	0.008	0.1	JM
4							108.66																1.08	0.5750	948	178.06	8	22.26								
5						108.66																	1.06	0.5700	1006	187.08	8	23.39								
6	292	0.08	0.280	7.41	3.8		295	6.2	9.1	5.5	2.64	258	0.010	0.06	7.28	4.9	538	1.484	0.009	0.09	7.32	7.5	1.09	0.7493	983	143.00	8	17.87				Petro Canada	0.94	0.011	0.08	SS
7	75	0.09	0.277	7.48	4.3	76		6.0	8.7	1.0	1.87	67	0.007	0.08	7.36	4.8	268	0	0.008	0.08	7.34	7.4	1.09	0.3722	1038	303.96	8	38.00				Blue & Bairn	1.05	0.005	0.09	SS
8	66	0.10	0.281	7.41	4.2	68		6.1	8.9	1.0	2.13	58	0.008	0.05	7.32	5.2	506	1.566	0.007	0.08	7.25	7.6	1.11	0.7050	1054	165.96	8	20.75	2192629		2192627	Gym	1.00	0.003	0.08	SS
9	216	0.07	0.278	7.46	4	218		6.4	9.3	4.0	2.60	206	0.009	0.06	7.41	5.0	281	0	0.015	0.07	7.27	7.2	1.09	0.3903	959	267.84	8	33.48				Bumper to Bumper	1.05	0.012	0.08	SS
10	275	0.06	0.282	7.44	4.3	93		5.8	8.3	4.0	2.04	243	0.004	0.10	7.35	5.2	1184	1.202	0.007	0.06	7.30	7.5	1.09	0.5477	1014	201.80	8	25.23		1616912		Fire Hall	0.94	0.003	0.1	SS
11							93																1.08	0.5477	980	193.24	8	24.16								
12						93																	1.08	0.5477	1015	200.15	8	25.02								
13	253	0.10	0.298	7.40	4.3		256	6.9	9.6	4.0	2.22	230	0.014	0.07	7.30	7.0	507	2.508	0.010	0.08	7.27	4.8	1.07	0.7077	972	146.97	8	18.37				Petro Canada	1.02	0.014	0.09	JM
14	84	0.13	0.281	7.42	3.7	88		6.4	9.2	1.5	2.51	77	0.012	0.08	7.32	6.9	294	0	0.013	0.10	7.22	5.1	1.07	0.4083	1059	277.50	8	34.69				Office	0.92	0.024	0.1	CH
15	176	0.07	0.274	7.43	4		178	6.9	9.5	2.5	1.99	150	0.021	0.07	7.36	4.9	403	7.759	0.017	0.07	7.28	7.0	1.07	0.5705	1029	192.99	8	24.12		2192625	2192626	Petro Canada	0.60	0.012	0.11	CH
16	56	0.07	0.268	7.39	3.7	56		6.7	9.3	1.5	3.76	55	0.015	0.08	7.30	5.9	372	0	0.009	0.09	7.33	6.0	1.07	0.5167	1049	217.24	8	27.16				Fire Hall	1.04	0.011	0.14	CH
17	524	0.12	0.292	7.42	3.8		177	6.9	9.5	8.0	2.14	466	0.011	0.06	7.28	8.2	1217	26.989	0.007	0.07	7.35	7.2	1.06	0.5759	1030	189.58	8	23.70				Gym	0.96	0.009	0.06	JM
18						177																	1.05	0.5759	992	180.86	8	22.61								
19		.					178																1.08	0.5759	981	183.97	8	23.00						.		
20	319	0.08	0.309	7.49	4	323		6.0	8.8	6.0	2.64	278	0.022	0.08	7.48	5.3	807	79.824	0.018	0.06	7.33	6.6	1.06	1.2317	1022	87.95	8	10.99				Iron Mountain	0.92	0.023	0.1	SS
21	322	0.08	0.297	7.49	4.2		324	5.9	8.2	5.5	2.40	297	0.018	0.05	7.41	5.3	399	0	0.016	0.08	7.32	7.9	1.08	0.5542	783	152.60	8	19.07				School	1.00	0.027	0.12	JM
22	230	0.09	0.298	7.49	4.5	233		5.3	7.7	3.5	2.14	216	0.030	0.06	7.30	5.5	296	0	0.030	0.08	7.24	8.1	1.10	0.4111	845	226.09	8	28.26				Credit Union	1.06	0.030	0.06	SS
23	0	0.07	0.271	7.49	4.8			5.6	7.7			0	0.017	0.05	7.35	5.3	262	4.014	0.012	0.07	7.28	7.4	1.11	0.3695	1019	306.14	8	38.27		2192621	2192620	Fire Hall	0.95	0.021	0.09	SS
24	452	0.06	0.278	7.49	4.1	152		6.2	9	7.6	2.36	400	0.019	0.05	7.36	4.8	1203	0	0.016	0.05	7.26	7.6	1.13	0.5569	1017	206.36	8	25.79				Gym	1.01	0.016	0.08	SS
25							152																1.12	0.5569	1018	204.73	8	25.59								
26						152																	1.11	0.5569	1021	203.50	8	25.44								
27	42	0.08	0.292	7.44	4.5		43	6.6	9	1.0	3.34	35	0.017	0.08	7.35	5.5	376	0	0.014	0.08	7.40	7.4	1.10	0.5222	1049	220.96	8	27.62				Petro Canada	1.03	0.025	0.08	JM
28	201	0.07	0.285	7.54	3.3		204	6.9	9.6	2.5	1.75	181	0.012	0.08	7.47	7.3	393	0	0.018	0.06	7.39	6.8	1.12	0.5458	1003	205.81	8	25.73				School	0.90	0.025	0.08	JM
29	48	0.07	0.306	7.54	3.9	48		6.3	9.2	1.0	2.93	39	0.026	0.06	7.43	5.5	389	39.086	0.017	0.08	7.42	7.1	1.12	0.5946	1049	197.60	8	24.70		2192619	2192618	Gym	0.94	0.035	0.08	JM
30	302	0.09	0.272	7.52	3.2		306	7.0	9.6	4.5	2.09	265	0.015	0.09	7.44	6.0	398	213.120	0.023	0.09	7.41	6.0	1.13	0.8488	873	116.22	8	14.53				FCSS	0.89	0.019	0.09	JM
31	1044	0.09	0.273	7.53	4.9	352		5.7	8.2	16.0	2.15	974	0.020	0.07	7.41	5.5	1357	767.331	0.019	0.09	7.38	5.8	1.12	2.9505	824	31.28	8	3.91				Fire Hall	0.86	0.013	0.15	JM
TOTAL	5533					2068.32	2477.66			90.7		5005					13456	1146.032																		
MIN	0	0.06	0.268	7.36	3.2	48	43	5.3	7.7	1.0	1.75	0	0.004	0.05	7.28	4.8	241	0.000	0.007	0.05	7.22	4.8	1.05	0.3347	783	31.28	8	3.91					0.60	0.003	0.06	
MAX	1044	0.13	0.309	7.61	6.5	352	324	7.0	9.6	16.0	5.07	974	0.030	0.10	7.48	8.6	1357	767.331	0.030	0.10	7.42	8.1	1.13	2.9505	1059	322.39	8	40.30					1.10	0.035	0.15	
AVG	240.57	0.08	0.285	7.47	4.17	142.37	190.59	6.29	8.92	4.12	2.51	217.61	0.015	0.07	7.37	5.80	585.04	49.827	0.014	0.08	7.32	6.90	1.09	0.6539	989.48	195.52	8.00	24.44					0.96	0.016	0.09	

AQUATECH
CANADIAN WATER SERVICES INC.

Cremona Waterworks System

Registration No. 579-02-01

April 2023

Cremona Waterworks System

Registration No. 579-02-01

April 2023

Date	Raw Water					Raw Water Wells				12% Sodium Hypochlorite		Treated Water				Distribution Pumphouse						CT Disinfection						Bacteriological Sampling							Operator
	Volume	Turbidity	Manganese	pH	Temp	Well 12 Volume	Well 14 Volume	Well 12 Depth	Well 14 Depth	Used	Dose	Volume	Manganese	Turbidity	pH	Temp	Distribution Volume	Bulk Fill Volume	Manganese	Turbidity	pH	Temp	Min. Cl2	Qpeak	Min. Res Volume	CT Achieved	CT Required	CT Ratio	Raw Sample ID	Pump House Sample ID	Distribution Sample ID	Sampling Location	Cl2	Manganese	Turbidity	
	m3	NTU	mg/L		°C	m3	m3	m	m	kg	mg/L	m3	mg/L	NTU		°C	m3	m3	mg/L	NTU		°C	mg/L										mg/L	mg/L	NTU	
1							352																1.14	0.9834	775.5	89.90	8	11.24								
2						353																	1.18	0.9834	718.6	86.23	8	10.78								
3	283	0.10	0.280	7.61	4.5	287		5.2	7.6	4.5	2.23	254	0.029	0.06	7.52	5.4	367		0.023	0.10	7.41	7.5	1.29	0.509722	678.8	171.79	8	21.47				Fire Hall	0.73	0.036	0.08	SS
4	201	0.14	0.281	7.56	4.5		203	5.6	7.6	3.5	2.44	196	0.028	0.05	7.45	5.1	97		0.018	0.06	7.37	8.2	1.22	0.4125	769.8	227.67	8	28.46				Petro Can	1.11	0.035	0.09	SS
5	233	0.06	0.276	7.55	4.5		236	5.4	7.5	3	1.81	221	0.031	0.10	7.45	5.5	448		0.031	0.06	7.45	7.3	1.19	0.622222	917.7	175.51	8	21.94	2192613	2192614	2192616	School	1.10	0.025	0.07	JM
6	73	0.10	0.293	7.53	3.8	74		6.0	8.7	1	1.92	56	0.032	0.11	7.43	5.5	470		0.012	0.08	7.34	6.9	1.18	0.652778	1022.1	184.76	8	23.10				Gym	0.79	0.017	0.07	JM
7	425	0.12	0.283	7.89	3.9		143	6.2	8.7	5.5	1.82	383	0.010	0.06	7.75	4.7	1175	1.172	0.018	0.05	7.43	7.2	1.16	0.7212	980.7	157.74	8	19.72				Gym	1.11	0.009	0.10	SS
8						143																	1.14	0.7212	1001.8	158.35	8	19.79								
9							144																1.13	0.7212	939.8	147.25	8	18.41								
10	60	0.09	0.276	7.91	3.8	59		6.1	8.8	0.5	1.17	56	0.020	0.05	7.81	4.6	404		0.023	0.07	7.71	7.3	1.11	0.561111	1052.8	208.27	8	26.03				Fire Hall	0.76	0.012	0.20	SS
11	174	0.07	0.284	7.81	3.2		177	7.0	9.6	3.5	2.82	155	0.023	0.07	7.71	8.4	256		0.018	0.07	7.69	7.6	1.09	0.355556	1030.9	316.04	8	39.50				Shop	1.20	0.022	0.06	JM
12	62	0.07	0.272	7.77	3.9	63		6.5	9.0	0.5	1.13	47	0.013	0.05	7.73	5.7	521		0.014	0.09	7.71	7.1	1.10	0.723611	1036.5	157.56	8	19.70		2192611		Petro Can	0.40	0.014	0.12	CH
13	167	0.07	0.262	7.82	3.9		168	6.7	9.1	2	1.68	159	0.010	0.06	7.72	4.7	400	1.148	0.026	0.10	7.70	6.9	1.11	0.55715	983	195.84	8	24.48				Blue & Bairn	0.99	0.014	0.06	JM
14	450	0.05	0.264	7.78	3.5	152		6.5	9.5	6	1.87	396	0.014	0.08	7.77	6.9	1208		0.016	0.07	7.72	7.0	1.09	0.5592	1040.1	202.74	8	25.34				Gym	0.97	0.011	0.06	JM
15							152																1.08	3.0000	1033.2	37.20	8	4.65								
16						152																	1.07	0.5592	996.3	190.64	8	23.83								
17	139	0.05	0.266	7.94	4.1		141	6.3	8.6	2.5	2.53	121	0.015	0.06	7.83	5.4	305		0.009	0.06	7.73	7.2	1.06	0.4236	985.6	246.63	8	30.83				Gym	1.02	0.011	0.06	SS
18	76	0.06	0.267	7.87	3.8	77		6.2	9.0	0.5	0.92	61	0.010	0.06	7.81	4.5	375		0.019	0.06	7.75	8.0	1.06	0.5208	1066.2	216.99	8	27.12				Iron Mountain	0.91	0.016	0.09	SS
19	111	0.06	0.269	7.96	3.4		112	6.8	9.4	1.5	1.90	96	0.015	0.06	7.79	4.5	508	15.399	0.018	0.06	7.73	7.7	1.08	0.7269	1048.5	155.77	8	19.47		2192610	2192609	Bumper to Bumper	1.02	0.012	0.08	SS
20	162	0.09	0.264	7.87	3.4	165		6.7	9.8	2	1.73	150	0.012	0.06	7.73	8.1	395	0.249	0.011	0.09	7.72	6.6	1.05	0.5490	999.3	191.14	8	23.89				Petro Can	1.00	0.012	0.07	JM
21	383	0.10	0.273	7.85	3.7		129	6.9	9.3	6	2.20	348	0.009	0.08	7.83	6.9	1073		0.013	0.10	7.71	7.0	1.04	0.4967	1021.8	213.95	8	26.74				Fire Hall	0.90	0.014	0.09	JM
22						129																	1.01	0.4967	1007.3	204.83	8	25.60								
23							129																0.98	3.0000	985.5	32.19	8	4.02								
24	46	0.05	0.267	7.87	3.7		46	6.3	8.6	0.5	1.53	36	0.007	0.04	7.8	4.8	548	3.526	0.013	0.08	7.77	8.0	1.00	0.7660	1037.7	135.47	8	16.93				Gym	1.00	0.010	0.10	SS
25	207	0.10	0.271	7.99	3.3		209	6.9	9.4	3	2.03	185	0.025	0.07	7.82	5.0	253		0.012	0.09	7.81	8.2	1.04	0.3514	950.9	281.44	8	35.18				Blue & Bairn	0.99	0.010	0.07	SS
26	151	0.07	0.268	7.97	4.0		154	6.1	8.3	2.5	2.32	139	0.016	0.06	7.82	5.2	559		0.007	0.08	7.71	7.1	1.03	0.7764	1026.6	136.19	8	17.02		2192607	2192608	FCSS	0.97	0.014	0.11	SS
27	107	0.09	0.277	7.97	3.9		107	6.2	8.5	3	3.94	97	0.023	0.08	7.85	5.3	272		0.026	0.08	7.75	7.6	1.06	0.3778	1002.5	281.29	8	35.16				Fire Hall	0.90	0.022	0.11	SS
28	316	0.06	0.264	7.84	3.8		160	6.7	9.3	3.5	1.56	285	0.021	0.08	7.82	5.8	1300	8.194	0.015	0.07	7.78	7.4	1.09	0.6056	1061.8	191.11	8	23.89				Petro	1.05	0.014	0.08	CH
29																							1.13	0.6056	981.5	183.14	8	22.89								
30																							1.08	0.6056	986.9	176.00	8	22.00								
31																																				
TOTAL	3826					1654	2762			55		3441					10934	29.688																		
MIN	46	0.05	0.262	7.53	3.2	59	46	5.2	7.5	0.5	0.92	36	0.007	0.04	7.43	4.5	97	0.249	0.007	0.05	7.34	6.6	0.98	0.3514	678.8	32.19	8	4.02					0.40	0.009	0.06	
MAX	450	0.14	0.293	7.99	4.5	353	352	7.0	9.8	6	3.94	396	0.032	0.11	7.85	8.4	1300	15.399	0.031	0.10	7.81	8.2	1.29	3.0000	1066.2	316.04	8	39.50					1.20	0.036	0.20	
AVG	191.30	0.08	0.273	7.82	3.83	150.36	162.47	6.32	8.82	2.75	1.98	172.05	0.018	0.07	7.72	5.60	546.70	4.948	0.017	0.08	7.65	7.39	1.10	0.7649	971.32	178.45	8	22.31					0.95	0.017	0.09	

AQUATECH
CANADIAN WATER SERVICES INC.

Cremona Waterworks System
Registration No. 579-02-01
May 2023

Cremona Waterworks System
Registration No. 579-02-01
May 2023

Date	Raw Water					Raw Water Wells				12% Sodium Hypochlorite		Treated Water				Distribution Pumphouse						CT Disinfection						Bacteriological Sampling						Operator
	Volume	Turbidity	Manganese	pH	Temp	Well 12 Volume	Well 14 Volume	Well 12 Depth	Well 14 Depth	Used	Dose	Volume	Manganese	Turbidity	pH	Temp	Distribution Volume	Bulk Fill Volume	Manganese	Turbidity	pH	Temp	Min. Cl2	Qpeak	Min. Res Volume	CT Achieved	CT Required	CT Ratio	Raw Sample ID	Pump House Sample ID	Distribution Sample ID	Sampling Location	Cl2	Manganese	Turbidity	
	m3	NTU	mg/L		°C	m3	m3	m	m	L	mg/L	m3	mg/L	NTU		°C	m3	m3	mg/L	NTU		°C	mg/L										mg/L	mg/L	NTU	
1	246	0.10	0.274	7.84	3.8	259		6.1	8.9	3.5	2.00	219	0.027	0.08	7.82	4.6	541	0	0.026	0.09	7.74	7.4	1.06	0.7513	957.0	135.02	8	16.88				Fire Hall	1.00	0.023	0.08	CH
2	129	0.06	0.267	7.53	3.5		121	6.3	8.7	2	2.18	113	0.027	0.05	7.42	4.8	272	1.066	0.020	0.08	7.46	7.8	1.06	0.3792	1056.1	295.22	8	36.90				Fire Hall	0.96	0.009	0.09	SS
3	119	0.06	0.273	7.50	3.9	121		6.1	8.9	2.5	2.95	75	0.024	0.06	7.40	5.0	629	0.063	0.020	0.06	7.39	8.0	1.08	0.8736	1067.6	131.98	8	16.50	2192604	2192605	2192606	Neilons	0.83	0.026	0.08	SS
4	138	0.08	0.270	7.48	3.9		140	6.7	9.3	2.5	2.54	136	0.018	0.06	7.30	4.7	215	0	0.019	0.06	7.34	7.7	1.11	0.2986	1000.4	371.88	8	46.49				Petro Can	1.08	0.034	0.07	JM
5	361	0.06	0.271	7.50	3.9	121		6.2	9.0	6	2.33	313	0.021	0.06	7.40	5.8	134	0	0.024	0.07	7.33	7.8	1.10	0.6208	1009.0	178.79	8	22.35				FCSS	1.06	0.022	0.06	JM
6							121																1.09	0.6208	981.0	172.24	8	21.53								
7						121																	1.11	0.6208	1007.0	180.05	8	22.51								
8	143	0.08	0.272	7.55	4.7		145	6.3	8.8	2.5	2.45	131	0.018	0.05	7.41	5.0	116	0	0.015	0.07	7.41	9.2	1.19	0.1611	985.3	727.81	8	90.98				Blue & Bairn	1.19	0.015	0.06	JM
9	158	0.08	0.267	7.47	3.9	160		6.3	9.2	2.5	2.22	138	0.012	0.04	7.39	4.8	65	0	0.014	0.09	7.42	9.0	1.09	0.4344	1033.6	259.35	8	32.42				Gym	1.14	0.016	0.08	SS
10	62	0.08	0.273	7.52	3.9		63	6.3	8.7	1	2.26	55	0.018	0.08	7.39	4.9	143	0	0.023	0.09	7.36	8.2	1.19	0.4776	1038.4	258.73	8	32.34		2192603	2192602	Iron Mountain	1.16	0.023	0.12	SS
11	137	0.06	0.264	7.48	4.1	138		6.3	9.1	2.5	2.56	134	0.015	0.06	7.39	4.8	94	0	0.022	0.10	7.41	9.1	1.09	0.3624	984.1	295.99	8	37.00				Credit Union	1.16	0.015	0.11	SS
12	400	0.08	0.269	7.38	3.7		135	6.9	9.5	7	2.46	358	0.013	0.07	7.39	7.0	316	0	0.018	0.11	7.41	8.0	1.17	0.4368	1051.4	281.63	8	35.20				Petro Can	0.77	0.018	0.13	CH
13						136																	1.02	0.2796	1005.6	366.85	8	45.86								
14							136																1.15	0.2802	982.5	403.24	8	50.40								
15	60	0.06	0.263	7.39	3.8	60		6.2	9.0	1.5	3.51	53	0.022	0.07	7.40	7.2	133	0	0.015	0.13	7.42	7.8	1.15	0.6894	1026.8	171.28	8	21.41				Fire Hall	0.93	0.018	0.15	CH
16	239	0.06	0.276	7.42	4.6	241		6.6	9.6	3.5	2.06	217	0.026	0.05	7.38	6.8	113	0	0.013	0.07	7.42	8.5	1.15	0.5310	995.9	215.68	8	26.96				Gym	1.12	0.017	0.06	JM
17	94	0.06	0.268	7.49	4.4		95	6.5	8.8	1.5	2.24	79	0.022	0.07	7.41	6.4	163	0	0.014	0.06	7.48	6.9	1.16	0.4092	1015.8	287.96	8	35.99		2017701	2017700	FCSS	1.19	0.017	0.09	JM
18	241	0.12	0.263	7.51	5.5		245	6.4	8.8	3	1.75	215	0.015	0.06	7.44	4.9	114	22.971	0.006	0.12	7.44	8.2	1.13	4.0800	981.4	27.18	8	3.40				Neilons	1.07	0.009	0.12	JM
19	542	0.08	0.268	7.55	4.8	137		6.1	8.8	10	2.59	483	0.022	0.08	7.39	6.2	478	39.88	0.014	0.05	7.41	7.4	1.14	0.6324	1044.0	188.20	8	23.52				Blue & Bairn	1.18	0.019	0.1	JM
20							137																1.13	0.6288	985.5	177.10	8	22.14								
21							137																1.11	0.2784	1009.7	402.57	8	50.32								
22						137																	1.10	0.3156	973.8	339.41	8	42.43								
23	92	0.12	0.269	7.45	4.6		93	6.2	8.5	0.5	0.76	91	0.023	0.06	7.38	5.6	71	0	0.017	0.08	7.38	8.2	1.11	0.6546	1042.6	176.79	8	22.10				School	1.16	0.011	0.06	JM
24	85	0.06	0.274	7.49	5	86		6.3	9.2	0.7	1.16	67	0.029	0.07	7.39	6.4	158	6.83	0.020	0.09	7.46	9.0	1.08	0.3888	1054.1	292.81	8	36.60		2017699	2192601	Fire Hall	1.03	0.022	0.09	JM
25	253	0.09	0.274	7.47	5.2		256	6.9	9.5	3.8	2.11	235	0.014	0.07	7.33	8.6	101	0	0.017	0.10	7.36	7.7	1.10	0.1140	954.0	920.53	8	115.07				Petro Can	1.10	0.022	0.06	JM
26	340	0.06	0.272	7.56	4.8	114		5.9	8.2	5.5	2.27	298	0.024	0.05	7.43	5.4	388	1.102	0.022	0.07	7.61	7.7	1.08	0.3954	1019.5	278.47	8	34.81				Gym	1.06	0.023	0.06	SS
27							114																1.08	0.3588	982.2	295.65	8	36.96								
28						115																	1.07	0.8604	999.3	124.27	8	15.53								
29	201	0.08	0.275	7.57	4.8		204	6.3	8.6	3	2.10	191	0.021	0.05	7.44	5.5	275	35.31	0.021	0.07	7.42	8.2	1.08	0.8604	985.0	123.64	8	15.46				Iron Mountain	1.13	0.021	0.05	SS
30	193	0.06	0.271	7.56	4.8	196		6.1	8.8	3.5	2.55	178	0.016	0.05	7.38	5.7	76	0	0.020	0.06	7.49	9.0	1.18	0.6408	994.6	183.15	8	22.89				Petro Can	1.07	0.018	0.05	SS
31	88	0.08	0.265	7.47	5.2		89	5.8	8.1	2	3.19	79	0.016	0.07	7.40	6.0	156	8.426	0.011	0.12	7.36	9.2	1.15	0.636	1012.1	183.01	8	22.88		2261299	2261300	Gym	1.09	0.006	0.09	JM
TOTAL	4321					2142	2142			70.5		3858					4751	115.648																	
MIN	60	0.06	0.263	7.38	3.5	60	63	5.8	8.1	0.5	0.76	53	0.012	0.04	7.3	4.6	65	0.000	0.006	0.05	7.33	6.9	1.02	0.1140	954.0	27.18	8	3.40					0.77	0.006	0.05	
MAX	542	0.12	0.276	7.84	5.5	259	256	6.9	9.6	10	3.51	483	0.029	0.08	7.82	8.6	629	39.880	0.026	0.13	7.74	9.2	1.19	4.0800	1067.6	920.53	8	115.07					1.19	0.034	0.15	
AVG	196.41	0.08	0.270	7.51	4.40	142.80	139.44	6.31	8.91	3.20	2.28	175.36	0.020	0.06	7.41	5.73	215.95	5.257	0.018	0.08	7.43	8.18	1.11	0.6152	1007.59	272.47	8.00	34.06					1.07	0.018	0.08	

AQUATECH
CANADIAN WATER SERVICES INC.

Cremona Waterworks System
Registration No. 579-02-01
June 2023

Cremona Waterworks System
Registration No. 579-02-01
June 2023

Date	Raw Water					Raw Water Wells				12% Sodium Hypochlorite		Treated Water				Distribution Pumphouse						CT Disinfection						Bacteriological Sampling						Operator
	Volume	Turbidity	Manganese	pH	Temp	Well 12 Volume	Well 14 Volume	Well 12 Depth	Well 14 Depth	Used	Dose	Volume	Manganese	Turbidity	pH	Temp	Distribution Volume	Bulk Fill Volume	Manganese	Turbidity	pH	Temp	Min. Cl2	Qpeak	Min. Res Volume	CT Achieved	CT Required	CT Ratio	Raw Sample ID	Pump House Sample ID	Distribution Sample ID	Sampling Location	Cl2	Manganese	Turbidity	
	m3	NTU	mg/L		°C	m3	m3	m	m	L	mg/L	m3	mg/L	NTU		°C	m3	m3	mg/L	NTU		°C	mg/L										mg/L	mg/L	NTU	
1	181	0.40	0.274	7.45	5.2	184		5.9	8.6	3	2.33	155	0.022	0.08	7.40	5.9	131	6.499	0.012	0.09	7.43	8.6	1.19	0.6348	983.3	184.33	8	23.04				School	1.13	0.016	0.07	JM
2	558	0.15	0.276	7.48	5.2		188	6.4	8.8	9.5	2.39	518	0.025	0.08	7.37	6.9	383	32.441	0.019	0.07	7.42	9.0	1.18	0.6282	1005.8	188.93	8	23.62				FCSS	1.21	0.013	0.07	JM
3						188																	1.12	3.0000	943.7	35.23	8	4.40								
4							188																1.22	0.6012	1009.4	204.83	8	25.60								
5	193	0.07	0.274	7.49	5.5	195		6.0	8.8	3.5	2.55	175	0.025	0.08	7.37	6.7	99	24.103	0.020	0.08	7.42	8.8	1.18	0.6552	1008.7	181.66	8	22.71				Petro Can	1.21	0.013	0.08	JM
6	90	0.10	0.268	7.54	6.1		92	6.2	8.6	1.5	2.34	77	0.021	0.06	7.41	6.9	152	19.191	0.019	0.12	7.46	8.8	1.27	0.6474	993.2	194.84	8	24.35				Gym	1.11	0.010	0.07	JM
7	283	0.07	0.261	7.45	7.2	287		6.3	8.7	4.5	2.23	271	0.022	0.08	7.41	6.5	162	19.493	0.011	0.09	7.43	9.9	1.30	0.6474	955.6	191.89	8	23.99	2261298	2261297	2261296	Fire Hall	1.22	0.018	0.09	JM
8	143	0.09	0.273	7.46	6.7		147	6.2	8.5	2.5	2.45	120	0.017	0.19	7.44	7.3	129	22.339	0.014	0.07	7.44	9.8	1.28	0.6372	981.9	197.24	8	24.66				Shop	1.48	.019*	0.14	JM
9	615	0.09	0.269	7.44	5.4	206		5.6	8.2	9.5	2.17	518	0.010	0.06	7.41	6.1	456	23.792	0.014	0.09	7.38	8.1	1.29	1.2066	1015.8	108.60	8	13.58				Petro Can	1.23	0.020	0.09	CH
10							206																1.30	0.6048	981.8	211.04	8	26.38								
11						207																	1.26	0.6048	996.5	207.60	8	25.95								
12	179	0.07	0.269	7.63	5.6	1	182	5.7	8.4	3.5	2.75	166	0.012	0.05	7.44	7.5	135	40.436	0.016	0.09	7.45	9.6	1.26	0.6870	1063.4	195.03	8	24.38				Petro Can	1.15	0.015	0.09	SS
13	198	0.10	0.267	7.55	7.3		201	6.3	8.6	3	2.13	168	0.013	0.07	7.36	8.1	136	10.287	0.016	0.07	7.40	9.5	1.26	0.6468	1051	204.74	8	25.59				Gym	1.09	0.005	0.07	JM
14	65	0.09	0.261	7.47	7.2		65	6.3	8.7	0.5	1.08	99	0.017	0.06	7.36	8.1	131	12.408	0.008	0.07	7.44	10.2	1.23	0.6258	1044.1	205.22	6	34.20		2261295	2261294	School	1.10	0.010	0.08	JM
15	178	0.08	0.261	7.47	5.9		181	6.6	9.0	4	3.16	175	0.010	0.06	7.37	7.6	85	10.281	0.009	0.07	7.42	9.2	1.20	0.6432	989.6	184.63	8	23.08				Fire Hall	1.09	0.004	0.07	JM
16	303	0.07	0.270	7.54	6.7	102		6.2	8.9	5	2.32	270	0.008	0.08	7.40	7.7	350	4.488	0.010	0.07	7.42	10.9	1.21	0.3888	1065.2	331.51	6	55.25				FCSS	1.14	0.017	0.11	JM
17							102																1.19	0.6054	985	193.62	6	32.27								
18						102																	1.20	0.3031	1011.9	400.62	6	66.77								
19	231	0.08	0.274	7.57	5.8		233	6.5	8.9	5.5	3.34	199	0.015	0.08	7.39	6.5	107	0.000	0.022	0.07	7.39	9.2	1.18	0.6090	980.4	189.96	8	23.75				Petro Can	1.08	0.014	0.11	JM
20	52	0.08	0.266	7.53	7.5	53		6.2	9.0	1	2.70	45	0.007	0.05	7.40	7.9	64	0.000	0.010	0.08	7.58	9.3	1.18	0.3810	1061.5	328.76	8	41.09				Fire Hall	0.80	0.008	0.15	JM
21	85	0.10	0.261	7.38	6.4		86	6.8	9.3	1.5	2.48	76	0.011	0.09	7.42	7.3	136	18.219	0.011	0.12	7.38	9.2	1.19	0.6342	1051.1	197.23	8	24.65		2261293	2261290	Petro Can	0.58	0.010	0.11	CH
22	179	0.11	0.265	7.44	8.0	182		6.6	9.7	3.5	2.75	167	0.010	0.06	7.36	9	113	18.219	0.008	0.11	7.34	9.6	1.19	0.6396	992.6	184.68	8	23.08				FCSS	1.01	0.012	0.12	CH
23	405	0.08	0.258	7.40	8.0		136	6.8	9.4	6.5	2.25	363	0.012	0.07	7.35	8.1	306	13.839	0.004	0.11	7.36	9.4	1.17	0.6324	1014	187.60	8	23.45				Gym	1.02	0.006	0.09	CH
24						137																	1.20	0.6354	1003.4	189.50	8	23.69								
25							137																1.17	0.6342	981.6	181.09	8	22.64								
26	135	0.12	0.264	7.32	7.7	137		6.2	9.1	2.5	2.60	118	0.006	0.07	7.36	8.4	114	2.551	0.008	0.10	7.38	9.5	1.21	0.6150	1064.8	209.50	8	26.19				Fire Hall	1.06	0.011	0.10	CH
27	82	0.07	0.270	7.56	8.5		84	6.7	9.2	2	3.42	73	0.008	0.07	7.39	9.2	111	1.098	0.009	0.06	7.35	10.5	1.22	0.8538	1055.5	150.82	6	25.14				Shop	1.35	0.003	0.07	JM
28	190	0.09	0.258	7.54	9.0	192		6.5	9.5	3	2.22	179	0.006	0.07	7.34	9.7	164	47.948	0.006	0.09	7.38	10.6	1.10	0.6342	1031.5	178.91	6	29.82		2261289	2261288	Gym	1.01	0.009	0.07	JM
29	314	0.09	0.267	7.51	8.8		318	6.8	9.4	5.5	2.46	278	0.009	0.09	7.40	8.2	120	74.297	0.003	0.08	7.31	9.6	1.21	0.6402	990	187.11	8	23.39				Petro Can	1.16	0.008	0.08	JM
30	333	0.09	0.273	7.57	6.6	112		5.5	8.0	6	2.53	302	0.008	0.09	7.42	7.1	372	22.900	0.010	0.08	7.36	9.5	1.15	0.6468	1036.2	184.23	8	23.03				FCSS	1.09	0.009	0.10	JM
31																																				
TOTAL	4992					2285	2546			87		4512					3956	424.829																		
MIN	52	0.07	0.258	7.32	5.2	1	65	5.5	8.0	0.5	1.08	45	0.006	0.05	7.34	5.9	64	0.000	0.003	0.06	7.31	8.1	1.10	0.3031	943.7	35.2314667	6	4.403933					0.58	0.003	0.07	
MAX	615	0.40	0.276	7.63	9.0	287	318	6.8	9.7	9.5	3.42	518	0.025	0.19	7.44	9.7	456	74.297	0.022	0.12	7.58	10.9	1.30	3.0000	1065.2	400.620257	8	66.77004					1.48	0.020	0.15	
AVG	226.91	0.10	0.267	7.49	6.83	152.33	159.13	6.29	8.88	3.95	2.48	205.09	0.013	0.08	7.39	7.58	179.82	19.310	0.012	0.09	7.41	9.49	1.21	0.7108	1011.62	199.70	7.60	26.99					1.11	0.011	0.09	

AQUATECH
CANADIAN WATER SERVICES INC.

Cremona Waterworks System

Registration No. 579-02-01

July 2023

Cremona Waterworks System

Registration No. 579-02-01

July 2023

Date	Raw Water					Raw Water Wells				12% Sodium Hypochlorite		Treated Water				Distribution Pumphouse						CT Disinfection						Bacteriological Sampling						Operator
	Volume	Turbidity	Manganese	pH	Temp	Well 12 Volume	Well 14 Volume	Well 12 Depth	Well 14 Depth	Used	Dose	Volume	Manganese	Turbidity	pH	Temp	Distribution Volume	Bulk Fill Volume	Manganese	Turbidity	pH	Temp	Min. Cl2	Qpeak	Min. Res Volume	CT Achieved	CT Required	CT Ratio	Raw Sample ID	Pump House Sample ID	Distribution Sample ID	Sampling Location	Cl2	Manganese	Turbidity	
	m3	NTU	mg/L		°C	m3	m3	m	m	L	mg/L	m3	mg/L	NTU		°C	m3	m3	mg/L	NTU		°C	mg/L										mg/L	mg/L	NTU	
1							112																1.24	1.3314	981.8	91.439988	8	11.43								
2						112																	1.13	0.2574	1003.3	440.454157	8	55.06								
3	170	0.10	0.270	7.62	7.1		173	6.6	9.2	3	2.48	162	0.016	0.07	7.36	9.8	78	0.000	0.008	0.07	7.40	10.1	1.19	0.6426	991.9	183.685185	6	30.61				Shop	1.32	0.013	0.07	JM
4	222	0.12	0.262	7.50	7.7	225		6.5	9.0	4.5	2.85	190	0.009	0.09	7.40	8.5	107	63.350	0.014	0.09	7.32	9.7	1.19	0.6456	1021.5	188.287639	8	23.54				Gym	1.31	0.009	0.09	CH
5	88	0.10	0.271	7.60	6.8		89	6.0	8.7	1	1.60	78	0.007	0.10	7.40	8.6	146	39.494	0.011	0.07	7.45	11.5	1.19	0.6396	1045.3	194.48202	6	32.41	2261287	2261286	2261285	Fire Hall	1.07	0.013	0.41	JM,
6	229	0.10	0.270	7.56	8.6	234		6.3	9.4	4	2.45	209	0.007	0.07	7.36	9.0	84	7.013	0.009	0.09	7.31	9.2	1.19	0.6384	991.4	184.800439	8	23.10				FCSS	1.06	0.009	0.12	CH
7	347	0.11	0.264	7.64	6.8		117	5.7	8.2	6	2.43	318	0.010	0.07	7.40	7.5	379	12.091	0.008	0.08	7.34	9.8	1.17	0.2226	1039.6	546.420485	8	68.30				Petro	1.11	0.012	0.12	CH
8						117																	1.15	0.6330	980.7	178.168246	8	22.27								
9							118																1.13	0.6060	997.6	186.021122	8	23.25								
10	159	0.09	0.270	7.46	7.0	161		5.8	8.5	2	1.77	138	..002	0.06	7.44	7.8	97	8.305	0.007	0.06	7.33	9.9	1.12	0.6186	983.2	178.012286	8	22.25				Gym	1.00	0.006	0.13	SS
11	73	0.07	0.268	7.60	7.6		73	6.3	8.7	2	3.85	64	0.007	0.06	7.40	8.4	58	15.390	0.010	0.08	7.38	12	1.11	0.6426	1056.9	182.564426	6	30.43				Bumper to Bumper	1.04	0.009	0.09	SS
12	105	0.07	0.281	7.68	8.0		107	6.6	9.0	2	2.67	96	0.011	0.06	7.43	10.0	163	11.454	0.010	0.09	7.37	10.6	1.10	0.6504	1047.0	177.075646	6	29.51		2261284	2261283	Petro	1.03	0.007	0.06	SS
13	237	0.06	0.279	7.62	7.4	240		6.3	9.2	4.5	2.67	218	0.004	0.06	7.42	10.4	115	2.115	0.009	0.05	7.39	10.5	1.11	0.3174	981.1	343.106805	6	57.18				Credit Union	1.03	0.006	0.08	SS
14	357	0.09	0.273	7.63	7.1		121	6.3	8.6	6	2.36	309	0.010	0.05	7.46	8.8	340	4.773	0.009	0.07	7.37	12	1.10	0.6108	1018.5	183.423379	6	30.57				Fire Hall	0.81	0.012	0.11	SS
15						121																	1.12	0.2778	986.9	397.886249	6	66.31								
16							121																1.09	0.6084	984.3	176.345661	6	29.39								
17	118	0.21	0.275	7.64	8.0	121		6.2	9.2	2	2.38	111	0.003	0.06	7.44	10.1	86	26.717	0.014	0.08	7.36	12.2	1.10	0.6408	1037.6	178.114856	6	29.69				FCSS	1.07	0.004	0.09	SS
18	130	0.30	0.276	7.64	7.6		252	6.5	9.0	2.5	2.70	118	0.007	0.06	7.44	9.3	72	0.000	0.011	0.06	7.37	11.4	1.09	0.6456	1039.6	175.521066	6	29.25				Gym	1.01	0.008	0.06	SS
19	50	0.19	0.274	7.61	7.5	51		6.0	8.9	0.5	1.40	42	0.005	0.06	7.45	9.5	132	29.320	0.006	0.06	7.39	10.8	1.09	0.6162	1049.5	185.646706	6	30.94		2261282	2261281	Neilons	0.85	0.006	0.07	SS
20	206	0.31	0.279	7.63	7.6		210	6.7	9.3	4	2.73	191	0.007	0.06	7.40	8.9	76	2.141	0.012	0.06	7.32	11.4	1.00	0.6300	963.2	152.888889	6	25.48				Iron Mountain	0.86	0.010	0.06	SS
21	469	0.12	0.266	7.48	8.3	245		5.7	8.3	8	2.39	424	0.008	0.08	7.39	8.2	365	74.529	0.009	0.018	7.31	11.2	1.08	0.6516	1007.6	167.005525	6	27.83				Fire Hall	1.11	0.008	0.08	CH
22							55																1.12	0.6060	981.2	181.343894	6	30.22								
23						281																	1.02	0.6474	1018.5	160.468026	6	26.74								
24	80	0.14	0.269	7.47	8.9		83	6.5	8.9	1.5	2.63	65	0.013	0.07	7.40	10.3	109	5.247	0.012	0.12	7.37	10.7	1.15	0.6054	1056.5	200.689627	6	33.45				Gym	1.00	0.014	0.10	CH
25	304	0.13	0.263	7.46	8.7	308		6.2	9.2	5.5	2.54	270	0.008	0.07	7.37	11.0	188	5.557	0.007	0.11	7.36	10.5	1.06	2.1204	1008.7	50.4254858	6	8.40				Fire Hall	1.08	0.009	0.11	CH
26	43	0.06	0.277	7.65	7.2		43	5.8	8.0	0.5	1.63	36	0.006	0.07	7.44	8.0	143	8.499	0.006	0.07	7.37	10.3	1.13	0.8952	1020.0	128.753351	6	21.46		2261280	2261279	Gym	1.08	0.007	0.09	SS
27	137	0.10	0.270	7.47	7.4	139		6.0	8.8	2.5	2.56	129	0.010	0.08	7.43	8.4	124	0.000	0.007	0.09	7.42	10.8	1.23	0.2826	981.3	427.105096	6	71.18				Petro	0.65	0.012	0.06	CH
28	374	0.08	0.276	7.66	9.0		126	6.7	9.2	9	3.38	336	0.004	0.08	7.53	9.2	416	2.156	0.007	0.08	7.40	10.7	1.13	0.2976	1044.7	396.677083	6	66.11				Fire Hall	1.09	0.003	0.10	SS
29						126																	1.10	0.3156	1013.7	353.31749	6	58.89								
30							127																1.10	0.8748	985.0	123.856882	6	20.64								
31	91	0.07	0.276	7.60	7.9	92		6.0	8.7	2.75	4.24	69	0.009	0.07	7.45	9.0	87	0.000	0.007	0.07	7.41	11.4	1.06	0.1208	1042.0	914.337748	6	152.3896				FCSS	0.98	0.008	0.07	SS
TOTAL	3989					2481	1927			73.75		3573					3365	318.151																		
MIN	43	0.06	0.262	7.46	6.8	51	43	5.7	8.0	0.5	1.40	36	0.003	0.05	7.36	7.5	58	0.000	0.006	0.018	7.31	9.2	1.00	0.1208	963.2	50.4254858	6	8.404248					0.65	0.003	0.06	
MAX	469	0.31	0.281	7.68	9.0	308	252	6.7	9.4	9	4.24	424	0.016	0.10	7.53	11.0	416	74.529	0.014	0.12	7.45	12.2	1.24	2.1204	1056.9	914.337748	8	152.3896					1.32	0.014	0.41	
AVG	189.95	0.12	0.272	7.58	7.72	171.53	120.44	6.22	8.86	3.51	2.56	170.14	0.008	0.07	7.42	9.08	160.24	15.150	0.009	0.07	7.37	10.80	1.12	0.6223	1011.62	246.08	6.52	38.33					1.03	0.009	0.10	

AQUATECH
CANADIAN WATER SERVICES INC.

Cremona Waterworks System
Registration No. 579-02-01
August 2023

Cremona Waterworks System
Registration No. 579-02-01
August 2023

Date	Raw Water					Raw Water Wells				12% Sodium Hypochlorite		Treated Water				Distribution Pumphouse						CT Disinfection						Bacteriological Sampling						Operator
	Volume	Turbidity	Manganese	pH	Temp	Well 12 Volume	Well 14 Volume	Well 12 Depth	Well 14 Depth	Used	Dose	Volume	Manganese	Turbidity	pH	Temp	Distribution Volume	Bulk Fill Volume	Manganese	Turbidity	pH	Temp	Min. Cl2	Qpeak	Min. Res Volume	CT Achieved	CT Required	CT Ratio	Raw Sample ID	Pump House Sample ID	Distribution Sample ID	Sampling Location	Cl2	Manganese	Turbidity	
	m3	NTU	mg/L		°C	m3	m3	m	m	L	mg/L	m3	mg/L	NTU		°C	m3	m3	mg/L	NTU		°C	mg/L										mg/L	mg/L	NTU	
1	126	0.09	0.263	7.42	8.5		128	6.3	9.2	2.25	2.51	107	0.007	0.08	7.32	9.8	125	3.655	0.007	0.09	7.38	10.7	1.11	0.9030	1052.9	129.43	6	21.57				Fire Hall	0.97	0.007	0.13	CH
2	210	0.12	0.266	7.42	7.9	165	48	6.1	8.9	3.75	2.51	199	0.011	0.09	7.3	10.3	154	85.945	0.012	0.10	7.35	10.8	1.11	1.1568	1057.9	101.51	6	16.92	2261278	2261276	2261277	Petro Canada	0.65	0.006	0.07	CH
3	302	0.12	0.264	7.42	8.0		306	6.2	9.0	5.25	2.44	272	0.003	0.09	7.35	10.1	172	234.863	0.005	0.09	7.40	11.0	1.15	1.1598	895.0	88.74	6	14.79				FCSS	1.17	0.005	0.09	CH
4	679	0.09	0.275	7.59	7.5	172		5.4	8.0	11.5	2.38	629	0.004	0.06	7.38	8.2	498	174.997	0.009	0.07	7.42	11.6	1.16	1.1598	845.8	84.59	6	14.10				Credit Union	1.09	0.007	0.09	SS
5							172																1.19	1.1556	1044.3	107.54	6	17.92								
6						172																	1.18	0.2832	1016.1	423.38	6	70.56								
7							172																1.17	1.1550	970.4	98.30	6	16.38								
8	83	0.08	0.267	7.40	8.6		85	6.4	8.7	1.5	2.54	68	0.007	0.07	7.33	9.9	86	0.000	0.012	0.09	7.36	11.3	1.16	1.1478	1054.7	106.59	6	17.77				Fire Hall	1.16	0.010	0.09	CH
9	76	0.13	0.285	7.56	9.0	77		6.1	8.9	1.5	2.77	55	0.011	0.07	7.40	10.0	131	0.159	0.011	0.08	7.38	11.4	1.16	0.5772	1061.1	213.25	6	35.54		2261275	2261274	FCSS	0.90	0.011	0.08	SS
10	126	0.35	0.263	7.40	8.5		128	6.7	9.2	2.5	2.79	117	0.013	0.09	7.32	10.7	183	10.257	0.013	0.10	7.30	10.9	1.14	1.1508	1039.9	103.01	6	17.17				Bumper to Bumper	1.02	0.010	0.12	CH
11	375	0.08	0.280	7.57	8.7	127		6.2	9.1	6.5	2.43	346	0.006	0.06	7.60	9.0	413	28.253	0.008	0.07	7.35	12.0	1.10	0.9360	1025.2	120.48	6	20.08				Credit Union	1.08	0.001	0.08	SS
12							127																1.11	1.1508	1014.5	97.85	6	16.31								
13						127																	1.10	0.2946	984.6	367.64	6	61.27								
14	202	0.12	0.282	7.58	8.5		205	6.4	8.9	3.5	2.43	176	0.011	0.11	7.35	9.7	102	46.337	0.012	0.11	7.37	12.6	1.09	1.1520	1034.6	97.89	6	16.32				Petro Canada	1.00	0.008	0.11	SS
15	79	0.11	0.270	7.44	7.7	79		5.7	8.2	1.5	2.67	62	0.010	0.09	7.36	8.9	150	0.000	0.015	0.06	7.36	11.3	1.12	1.1530	1034.4	100.48	6	16.75				Fire Hall	1.00	0.017	0.08	CH
16	159	0.07	0.280	7.52	9.0		163	6.4	8.8	3	2.65	149	0.008	0.06	7.48	11.6	195	100.860	0.006	0.08	7.31	11.1	1.12	1.1820	1032.4	97.82	6	16.30		2261273	2261272	Iron Mountain	1.08	0.005	0.07	SS
17	302	0.10	0.241	7.40	8.3	161		5.9	8.6	5.5	2.56	289	0.008	0.07	7.40	9.2	137	63.266	0.015	0.10	7.32	11.3	1.12	1.1562	952.3	92.25	6	15.37				FCSS	1.17	0.012	0.11	CH
18	582	0.09	0.255	7.36	7.7		246	5.7	7.8	10.75	2.59	534	0.008	0.08	7.32	8.3	362	266.597	0.013	0.10	7.33	10.3	1.12	1.1586	983.2	95.04	6	15.84				Bumper to Bumper	1.12	0.008	0.08	CH
19						246																	1.17	1.1634	909.4	91.46	6	15.24								
20							246																1.20	1.1268	911.7	97.09	6	16.18								
21	197	0.10	0.261	7.50	8.3	203		5.6	8.2	3.5	2.49	172	0.011	0.07	7.38	8.8	186	91.433	0.009	0.09	7.44	10.8	1.21	1.1262	1058.7	113.75	6	18.96				FCSS	0.86	0.005	0.11	CH
22	164	0.08	0.285	7.57	8.5		167	6.1	8.4	3	2.57	138	0.007	0.09	7.34	9.4	84	12.663	0.009	0.09	7.36	11.1	1.22	1.0134	1030.1	124.01	6	20.67				Blue & Bairn	1.16	0.003	0.169	SS
23	38	0.09	0.275	7.60	8.7	39		5.6	8.2	1	3.69	30	0.008	0.08	7.34	10.6	132	3.566	0.008	0.07	7.35	10.7	1.18	1.1814	1067.8	106.65	6	17.78		2261271	2261270	Gym	0.92	0.005	0.08	SS
24	227	0.10	0.262	7.52	8.9		231	5.7	9.1	4	2.47	200	0.007	0.08	7.34	10.2	203	35.540	0.008	0.07	7.44	11.2	1.16	1.1220	1014.5	104.89	6	17.48				Petro Canada	1.11	0.006	0.08	CH
25	446	0.10	0.277	7.56	8.5	141		5.8	8.7	8	2.52	383	0.008	0.07	7.38	9.3	474	21.837	0.002	0.10	7.48	11.3	1.15	0.3006	1044.3	399.52	6	66.59				Fire Hall	1.16	0.005	0.09	SS
26							141																1.15	0.2568	1009.4	452.03	6	75.34								
27						141																	1.13	0.3684	946.8	290.41	6	48.40								
28	59	0.09	0.279	7.65	8.2		60	5.9	8.0	0.75	1.78	40	0.007	0.07	7.42	9.2	77	15.063	0.005	0.10	7.49	11.2	1.11	1.1238	1019.8	100.73	6	16.79				Bumper to Bumper	1.07	0.008	0.08	SS
29	270	0.07	0.262	7.48	8.2	238	36	6.2	8.4	4.75	2.47	253	0.008	0.08	7.38	9.1	102	11.789	0.012	0.10	7.49	10.2	1.16	4.2114	970.9	26.74	6	4.46				Fire Hall	1.08	0.010	0.10	CH
30	13	0.11	0.266	7.44	7.9	13		5.4	7.9	0.25	2.70	13	0.012	0.09	7.38	8.5	95	11.411	0.012	0.12	7.34	10.7	1.18	1.1160	1031.5	109.07	6	18.18		2261269	1959543	FCSS	1.03	0.007	0.12	CH
31	182	0.08	0.267	7.48	9.1		191	6.6	9.0	3	2.31	151	0.010	0.06	7.32	11.6	112	0.000	0.008	0.12	7.42	10.4	1.16	0.4074	1006.4	286.55	6	47.76				Petro Canada	1.12	0.012	0.10	CH
TOTAL	4897					2101	2661			87.25		4383					4173	1218.491																		
MIN	13	0.07	0.241	7.36	7.5	13	36	5.4	7.8	0.25	1.78	13	0.003	0.06	7.30	8.2	77	0.000	0.002	0.06	7.30	10.2	1.09	0.2568	845.8	26.74	6	4.46					0.65	0.001	0.07	
MAX	679	0.35	0.285	7.65	9.1	246	306	6.7	9.2	11.5	3.69	629	0.013	0.11	7.60	11.6	498	266.597	0.015	0.12	7.49	12.6	1.22	4.2114	1067.8	452.03	6	75.34					1.17	0.017	0.17	
AVG	222.59	0.11	0.269	7.49	8.37	140.07	158.44	6.02	8.60	3.97	2.56	199.23	0.008	0.08	7.37	9.65	189.68	55.386	0.010	0.09	7.38	11.09	1.15	1.0500	1003.89	155.76	6.00	25.96					1.04	0.008	0.10	

AQUATECH
CANADIAN WATER SERVICES INC.

Cremona Waterworks System

Registration No. 579-02-01

September 2023

Cremona Waterworks System

Registration No. 579-02-01

September 2023

Date	Raw Water					Raw Water Wells				12% Sodium Hypochlorite		Treated Water					Distribution Pumphouse						CT Disinfection						Bacteriological Sampling							Operator
	Volume	Turbidity	Manganese	pH	Temp	Well 12 Volume	Well 14 Volume	Well 12 Depth	Well 14 Depth	Used	Dose	Volume	Manganese	Turbidity	pH	Temp	Distribution Volume	Bulk Fill Volume	Manganese	Turbidity	pH	Temp	Min. Cl2	Qpeak	Min. Res Volume	CT Achieved	CT Required	CT Ratio	Raw Sample ID	Pump House Sample ID	Distribution Sample ID	Sampling Location	Cl2	Manganese	Turbidity	
	m3	NTU	mg/L		°C	m3	m3	m	m	L	mg/L	m3	mg/L	NTU		°C	m3	m3	mg/L	NTU		°C	mg/L										mg/L	mg/L	NTU	
1	489	0.09	0.261	7.52	9.6	242		5.8	9.1	8.25	2.37	437	0.007	0.07	7.36	11.0	341	170.145	0.006	0.09	7.37	11.3	1.14	0.8298	1050.4	144.31	6	24.05				Gym	0.80	0.005	0.11	CH
2							242																1.13	0.8556	1007.1	133.01	6	22.17								
3						242																	1.10	0.3012	958.0	349.87	6	58.31								
4							243																1.08	1.1274	942.6	90.30	6	15.05								
5	325	0.09	0.272	7.44	8.0	330		5.6	8.2	5.75	2.48	297	0.013	0.10	7.42	8.6	95	136.183	0.011	0.10	7.48	10.1	1.10	1.1802	911.0	84.91	6	14.15				Petro Canada	1.11	0.011	0.11	CH
6	178	0.09	0.265	7.42	7.7		180	5.6	7.5	3	2.37	164	0.011	0.10	7.36	8.4	106	0.000	0.012	0.11	7.38	10.6	1.22	0.8604	973.3	138.01	6	23.00	2261298	2261266	2261267	Gym	0.77	0.015	0.13	CH
7	65	0.12	0.265	7.40	8.6	66		5.8	8.6	1.25	2.70	56	0.008	0.08	7.34	10.2	99	20.846	0.006	0.11	7.36	10.7	1.21	1.1448	1057.0	111.72	6	18.62				FCSS	0.99	0.009	0.09	CH
8	529	0.11	0.262	7.48	9.8		183	6.6	9.0	9	2.39	461	0.004	0.08	7.32	10.9	331	94.988	0.010	0.12	7.48	10.3	1.19	1.1076	1016.9	109.26	6	18.21				Bumper 2 Bumper	1.09	0.011	0.13	CH
9						183																	1.17	1.1232	984.3	102.53	6	17.09								
10							183																1.16	1.1262	1008.0	103.83	6	17.30								
11	127	0.12	0.275	7.57	8.9	130		5.8	8.6	2	2.21	107	0.006	0.10	7.38	10.0	104	19.769	0.007	0.13	7.39	10.5	1.05	1.1760	1032.9	92.22	6	15.37				Gym	0.72	0.004	0.11	SS
12	132	0.12	0.277	7.65	9.6		134	6.4	8.8	2.5	2.66	123	0.007	0.07	7.35	10.8	154	0.000	0.007	0.08	7.34	11.1	1.19	1.2020	1020.5	101.03	6	16.84				Credit Union	1.09	0.007	0.10	SS
13	86	0.08	0.289	7.59	9.4	254		5.6	8.4	1.5	2.45	71	0.004	0.08	7.40	9.9	137	206.274	0.004	0.07	7.46	11.0	1.08	0.9186	1009.7	118.71	6	19.79		2261264	2261265	Petro Canada	1.04	0.007	0.09	SS
14	241	0.41	0.279	7.63	8.4		247	6.6	8.4	4.5	2.62	217	0.007	0.07	7.46	9.4	73	188.921	0.014	0.13	7.40	11.4	1.12	1.1910	786.4	73.95	6	12.33				Iron Mountain	0.57	0.010	0.09	SS
15	952	0.17	0.265	7.54	8.4	322		5.6	7.6	16.5	2.43	875	0.006	0.08	7.40	8.8	382	345.222	0.007	0.11	7.40	10.2	1.10	1.1808	664.5	61.90	6	10.32				FCSS	0.90	0.005	0.10	CH
16							322																1.25	1.1706	754.8	80.60	6	13.43								
17						323																	1.24	1.1706	899.0	95.23	6	15.87								
18	258	0.21	0.287	7.64	8.3		262	5.4	7.4	4	2.18	231	0.01	0.08	7.45	9.3	84	290.268	0.011	0.08	7.41	10.4	1.24	1.1982	829.1	85.80	6	14.30				Petro Canada	1.09	0.009	0.09	SS
19	258	0.07	0.28	7.61	7.9	260		4.8	7.2	5	2.72	225	0.008	0.07	7.39	8.8	71	161.741	0.006	0.09	7.37	10.7	1.21	3.5484	695.4	23.71	6	3.95				FCSS	1.11	0.008	0.12	SS
20	402	0.44	0.284	7.64	8.0		409	4.7	7.0	7	2.44	362	0.009	0.07	7.46	9.0	141	90.725	0.008	0.09	7.50	11.1	1.22	1.1622	706.5	74.16	6	12.36		2246225	2246237	Iron Mountain	1.16	0.008	0.09	SS
21	324	0.26	0.298	7.54	8.2	328		4.7	6.9	6	2.60	309	0.008	0.08	7.45	8.7	89	0.000	0.009	0.08	7.44	11.4	1.26	1.1502	794.1	86.99	6	14.50				Bumper 2 Bumper	1.17	0.010	0.08	SS
22	360	0.15	0.293	7.64	7.9		125	4.9	6.7	6.5	2.54	311	0.01	0.08	7.46	8.8	319	17.877	0.011	0.09	7.50	11.6	1.23	0.3342	925.2	340.51	6	56.75				Blue & Bairn	0.95	0.011	0.08	SS
23						125																	1.20	1.1550	989.2	102.77	6	17.13								
24							126																1.19	0.3006	984.2	389.62	6	64.94								
25	151	0.29	0.275	7.60	9.1	158		5.7	8.6	2.5	2.32	120	0.009	0.08	7.38	11.0	97	47.619	0.007	0.09	7.41	11.0	1.14	0.4434	1032.5	265.46	6	44.24				Petro Canada	1.31	0.012	0.08	SS
26	182	0.13	0.278	7.63	9.1		185	6.2	8.5	3	2.31	168	0.008	0.07	7.35	11.2	54	0.000	0.010	0.08	7.40	11.2	1.13	1.1658	1000.9	97.02	6	16.17				Rec Center	0.98	0.007	0.12	SS
27	157	0.11	0.272	7.61	8.1			5.6	7.5	3	2.68	136	0.013	0.08	7.40	9.5	143	32.057	0.011	0.07	7.40	11.0	1.14	1.1502	1034.6	102.54	6	17.09		2246366	2246239	FCSS	1.06	0.010	0.09	SS
28	85	0.10	0.275	7.50	9.5	87	161	5.7	8.6	1.5	2.48	66	0.012	0.07	7.34	10.8	50	0.000	0.008	0.08	7.44	11.4	1.12	1.1574	1071.3	103.67	6	17.28				Blue & Bairn	0.96	0.007	0.08	SS
29	299	0.24	0.279	7.58	10.1	101		6.3	8.5	5.5	2.58	269	0.012	0.08	7.40	11.2	327	19.449	0.010	0.08	7.48	11.2	1.14	0.5748	1044.2	207.10	6	34.52				Gym	1.12	0.011	0.09	SS
30																							1.09	1.1562	963.6	90.84	6	15.14								
31																																				
TOTAL	5600					3151	3002			98.25		5005					3197	1842.084																		
MIN	65	0.07	0.261	7.40	7.7	66	125	4.7	6.7	1.25	2.18	56	0.004	0.07	7.32	8.4	50	0.000	0.004	0.07	7.34	10.1	1.05	0.3006	664.5	23.71	6	3.95					0.57	0.004	0.08	
MAX	952	0.44	0.298	7.65	10.1	330	409	6.6	9.1	16.5	2.72	875	0.013	0.1	7.46	11.2	382	345.222	0.014	0.13	7.50	11.6	1.26	3.5484	1071.3	389.62	6	64.94					1.31	0.015	0.13	
AVG	280.00	0.17	0.277	7.56	8.73	210.07	214.43	5.67	8.06	4.91	2.48	250.25	0.01	0.08	7.39	9.82	159.85	92.104	0.009	0.09	7.42	10.91	1.16	1.0721	938.24	132.05	6.00	22.01					1.00	0.009	0.10	

AQUATECH
CANADIAN WATER SERVICES INC.

Cremona Waterworks System
Registration No. 579-02-01
October 2023

Cremona Waterworks System
Registration No. 579-02-01
October 2023

Date	Raw Water					Raw Water Wells				12% Sodium Hypochlorite		Treated Water					Distribution Pumphouse						CT Disinfection						Bacteriological Sampling							Operator
	Volume	Turbidity	Manganese	pH	Temp	Well 12 Volume	Well 14 Volume	Well 12 Depth	Well 14 Depth	Used	Dose	Volume	Manganese	Turbidity	pH	Temp	Distribution Volume	Bulk Fill Volume	Manganese	Turbidity	pH	Temp	Min. Cl2	Qpeak	Min. Res Volume	CT Achieved	CT Required	CT Ratio	Raw Sample ID	Pump House Sample ID	Distribution Sample ID	Sampling Location	Cl2	Manganese	Turbidity	
	m3	NTU	mg/L		°C	m3	m3	m	m	L	mg/L	m3	mg/L	NTU		°C	m3	m3	mg/L	NTU		°C	mg/L										mg/L	mg/L	NTU	
1							102																1.10	0.2874	1016.8	389.17	6	64.86								
2	196	0.06	0.271	7.56	10.1	199		5.9	9.0	4	2.87	175	0.008	0.10	7.34	12.1	108	3.242	0.009	0.08	7.40	11.2	1.13	0.3396	986.2	328.15	6	54.69				Petro Canada	1.17	0.015	0.08	SS
3	92	0.12	0.272	7.57	9.0		94	6.3	8.4	1.75	2.67	83	0.006	0.06	7.39	10.9	59	0.000	0.007	0.09	7.38	11.0	1.13	1.0536	1053	112.94	6	18.82				FCSS	1.17	0.003	0.08	SS
4	77	0.10	0.270	7.48	10.0	79		5.8	8.7	1.5	2.74	68	0.005	0.06	7.36	11.3	136	14.591	0.005	0.09	7.33	11.3	1.19	0.9282	1050.7	134.71	6	22.45	2172496	2172495	2172497	Iron Mtn Diesel	1.16	0.003	0.07	SS
5	288	0.18	0.272	7.54	9.0		293	6.5	8.9	6	2.93	252	0.009	0.06	7.37	10.1	97	77.829	0.006	0.08	7.46	11.5	1.14	1.1106	952.0	97.72	6	16.29				Credit Union	1.15	0.003	0.11	SS
6	541	0.09	0.267	7.50	8.0	140.75		5.2	7.7	10.75	2.79	477	0.006	0.06	7.39	8.8	435	59.654	0.006	0.07	7.44	11.3	1.06	1.1544	1010.4	92.78	6	15.46				Gym	1.18	0.006	0.09	SS
7							140.75																1.28	1.1574	989.5	109.43	6	18.24								
8						140.75																	1.24	1.0278	1048.3	126.47	6	21.08								
9							140.75																1.34	0.2772	992.0	479.54	6	79.92								
10	120	0.07	0.274	7.50	9.6	166		5.9	8.9	1.5	1.76	110	0.004	0.06	7.31	11.4	45	0.000	0.005	0.07	7.40	11.0	1.28	1.1520	1027.8	114.20	6	19.03				Bumper to Bumper	1.20	0.004	0.07	SS
11	63	0.07	0.271	7.55	8.8		65	6.2	8.4	1	2.23	54	0.004	0.06	7.38	10.3	127	14.026	0.004	0.07	7.42	11.1	1.28	1.1598	1013.5	111.85	6	18.64		1959529	1959527	Petro Canada	1.22	0.000	0.07	SS
12	255	0.25	0.269	7.53	8.7	263		5.7	8.7	5.5	3.03	229	0.009	0.06	7.43	9.8	84	1.172	0.008	0.08	7.47	11.0	1.25	0.4554	942.3	258.65	6	43.11				Blue & Bairn	1.15	0.006	0.10	SS
13	532	0.08	0.261	7.48	7.7		179	5.6	7.5	10	2.64	489	0.007	0.08	7.40	8.6	277	216.497	0.005	0.08	7.38	10.0	1.24	0.9264	971.1	129.98	6	21.66				FCSS	1.38	0.000	0.09	CH
14							179																1.40	1.6760	892.7	74.57	6	12.43								
15							180																1.38	1.1592	932.0	110.95	6	18.49								
16	261	0.06	0.269	7.60	7.6		270	5.3	7.2	5	2.69	235	0.005	0.07	7.41	8.6	151	72.926	0.004	0.07	7.45	10.4	1.45	1.1724	983.3	121.61	6	20.27				Gym	1.36	0.003	0.09	SS
17	63	0.07	0.269	7.54	8.0		64	5.4	7.3	1	2.23	56	0.005	0.06	7.45	8.4	56	0.000	0.006	0.11	7.40	10.6	1.43	1.1820	994.6	120.33	6	20.05				FCSS	0.96	0.004	0.13	SS
18	41	0.10	0.269	7.52	8.6		43	6.0	8.2	1.25	4.28	40	0.001	0.07	7.36	10.2	104	9.522	0.004	0.09	7.38	10.5	1.33	1.1676	1033.7	117.75	6	19.62		1959528	1616917	Neilons	1.26	0.005	0.11	SS
19	220	0.09	0.260	7.48	9.2	225		5.9	9.0	4	2.55	190	0.007	0.07	7.38	10.0	145	66.154	0.006	0.08	7.40	10.4	1.33	1.1736	1005.0	113.89	6	18.98				Petro Canada	1.29	0.013	0.07	CH
20	467	0.09	0.263	7.52	8.7		158	6.0	8.6	7.75	2.33	413	0.004	0.07	7.34	10.4	352	13.997	0.001	0.07	7.36	10.6	1.31	1.1736	979.9	109.38	6	18.23				Fire Hall	1.37	0.006	0.07	SS
21						158																	1.32	0.9492	1003.3	139.52	6	23.25								
22							158																1.39	1.1352	984.2	120.51	6	20.09								
23	218	0.09	0.263	7.53	8.4	241		5.6	8.5	6.75	4.35	198	0.005	0.07	7.37	9.8	117	0.000	0.004	0.09	7.41	10.5	1.37	0.4314	1049.7	333.35	6	55.56				Credit Union	1.44	0.004	0.09	SS
24	128	0.08	0.267	7.62	8.2		194	5.9	8.0	2.5	2.74	100	0.004	0.06	7.44	8.9	54	75.433	0.003	0.07	7.40	10.1	1.36	1.1760	1038.9	120.14	8	15.02				Bumper to Bumper	1.01	0.005	0.10	SS
25	105	0.10	0.265	7.53	9.0	333		5.3	8.0	2.75	3.68	92	0.003	0.07	7.40	9.6	110	65.575	0.001	0.09	7.42	10.3	1.35	1.1562	1040.6	121.50	8	15.19		1959522	2172456	Gym	1.35	0.005	0.08	SS
26	276	0.13	0.264	7.48	8.1		431	6.3	8.5	5	2.54	240	0.006	0.07	7.42	9.2	133	40.990	0.005	0.08	7.40	9.5	1.36	1.1556	1008.9	118.74	8	14.84				Petro Canada	1.32	0.006	0.12	CH
27	593	0.11	0.274	7.50	8.6	612		5.2	8.0	13	3.08	540	0.007	0.06	7.43	9.3	361	342.358	0.007	0.10	7.48	9.8	1.35	1.1880	1054.0	119.77	8	14.97				Blue & Bairn	1.36	0.008	0.09	SS
28							612																1.33	1.1496	1053.1	121.84	8	15.23								
29						613																	1.33	1.1802	891.5	100.47	8	12.56								
30	297	0.06	0.270	7.63	7.4		321	5.2	7.1	6	2.83	266	0.007	0.06	7.42	8.0	111	54.336	0.007	0.10	7.41	9.7	1.40	1.1610	871.9	105.13	8	13.14				Petro Canada	1.41	0.005	0.11	SS
31		0.07	0.268	7.60	7.4			4.7	7.0				0.007	0.07	7.43	8.0			0.004	0.10	7.50	10.0					6					Gym	1.41	0.007	0.08	SS
TOTAL	4833					3170.5	3624.5			97		4307					3062	1128.302																		
MIN	41	0.06	0.260	7.48	7.4	79	43	4.7	7.0	1	1.755	40	0.001	0.06	7.31	8.0	45	0.000	0.001	0.07	7.33	9.5	1.06	0.2772	871.9	74.57	6	12.43					0.96	0.000	0.07	
MAX	593	0.25	0.274	7.63	10.1	613	612	6.5	9.0	13	4.347247706	540	0.009	0.10	7.45	12.1	435	342.358	0.009	0.11	7.5	11.5	1.45	1.6760	1054.0	479.54	8	79.92					1.44	0.015	0.13	
AVG	241.65	0.10	0.268	7.54	8.58	264.21	201.36	5.71	8.17	4.85	2.85	215.35	0.01	0.07	7.39	9.70	153.10	56.4151	0.005	0.08	7.41	10.56	1.30	1.0139	995.70	155.17	6.45	24.74					1.25	0.005	0.09	



2023 OPERATIONAL INFORMATION SUMMARY

Cremona Waterworks System

Registration No. 579-02-01

Operational Information Summary

Operators	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	ANNUAL
Supervisor	S Schlachter	S Schlachter	S Schlachter	S Schlachter	S Schlachter	S Schlachter	S Schlachter	S Schlachter	S Schlachter	S Schlachter	S Schlachter
Operator 1	C Hawthorne	C Hawthorne	C Hawthorne	C Hawthorne	C Hawthorne	C Hawthorne	C Hawthorne	C Hawthorne	C Hawthorne	C Hawthorne	C Hawthorne
Operator 2	J McNeil	J McNeil	J McNeil	J McNeil	J McNeil	J McNeil	J McNeil				J McNeil
Operator 3											

Operations Company:

Aquatech Canadian Water Services Inc.
Site 9 Box 41 RR#1
Cochrane, AB
T4C 1A1
Tel: 403.932.4507
Fax: 403.932.4554

VILLAGE OF CREMONA
ATTN: Karen O'Connor
205 1st Street East
Cremona AB
T0M0R0
Tel: 403.637.3762

Operations Staff Contact Information:

Samantha Mantai - Operations Supervisor: WTII, WDII, WWTII, WWCII
Office: 403.932.4507
Mobile: 403.354.1734
Fax: 403.932.4554

Colin Hawthorne - Operator: WTII, WDII, WWCII, WWTI
Office: 403.932.4507
Mobile: 403.836.8445
Fax: 403.932.4554

Jeremy McNeil - Operator: WTI, WDI, WWTI, WWCI
Office:
Mobile: 403.322.3950
Fax:

Chemicals Used:

Product Name: **Sodium Hypochlorite (12%)**
Manufacturer: ClearTech Industries Inc.
Product Function: Disinfection



2023 PROCESS SUMMARY

Cremona Waterworks System

Registration No. 579-02-01

AQUATECH
CANADIAN WATER SERVICES INC.

	RAW WATER		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	ANNUAL
	Volume m^3	TOTAL	3933.00	3677.00	5533.00	3826.00	4321.00	4992.00	3989.00	4897.00	5600.00	4833.00	45601.00
		MIN	0.00	10.00	0.00	46.00	60.00	52.00	43.00	13.00	65.00	41.00	0.00
		MAX	503.00	354.00	1044.00	450.00	542.00	615.00	469.00	679.00	952.00	593.00	1044.00
		AVG	178.77	193.53	240.57	191.30	196.41	226.91	189.95	222.59	280.00	241.65	216.17
Well 12	Volume m^3	TOTAL	2259.00	3677.00	2068.32	1654.00	2142.00	2285.00	2481.00	2101.00	3151.00	3170.50	24988.82
		MIN	1.00	10.00	48.00	59.00	60.00	1.00	51.00	13.00	66.00	79.00	1.00
		MAX	283.00	354.00	352.00	353.00	259.00	287.00	308.00	246.00	330.00	613.00	613.00
		AVG	141.19	193.53	142.37	150.36	142.80	152.33	171.53	140.07	210.07	264.21	170.85
	Depth m	MIN	6.0	5.9	5.3	5.2	5.8	5.5	5.7	5.4	4.7	4.7	4.7
		MAX	6.9	6.9	7.0	7.0	6.9	6.8	6.7	6.7	6.6	6.5	7.0
		AVG	6.46	6.39	6.29	6.32	6.31	6.29	6.22	6.02	5.67	5.71	6.17
Well 14	Volume m^3	TOTAL	1831.00	1704.32	2477.66	2762.00	2142.00	2546.00	1927.00	2661.00	3002.00	3624.50	24677.48
		MIN	2.00	10.00	43.00	46.00	63.00	65.00	43.00	36.00	125.00	43.00	2.00
		MAX	169.00	207.00	324.00	352.00	256.00	318.00	252.00	306.00	409.00	612.00	612.00
		AVG	107.71	113.62	190.59	162.47	139.44	159.13	120.44	158.44	214.43	201.36	156.76
	Depth m	MIN	8.3	10.0	7.7	7.5	8.1	8.0	8.0	7.8	6.7	7.0	6.7
		MAX	9.7	354.0	9.6	9.8	9.6	9.7	9.4	9.2	9.1	9.0	354.0
		AVG	9.14	193.53	8.92	8.82	8.91	8.88	8.86	8.60	8.06	8.17	27.19
Raw Water Quality	Turbidity ntu	MIN	0.06	0.05	0.06	0.05	0.06	0.07	0.06	0.07	0.07	0.06	0.05
		MAX	0.13	0.14	0.13	0.14	0.12	0.40	0.31	0.35	0.44	0.25	0.44
		AVG	0.09	0.09	0.08	0.08	0.08	0.10	0.12	0.11	0.17	0.10	0.10
	Manganese mg/L	MIN	0.277	0.272	0.268	0.262	0.263	0.258	0.262	0.241	0.261	0.260	0.241
		MAX	0.296	0.295	0.309	0.293	0.276	0.276	0.281	0.285	0.298	0.274	0.309
		AVG	0.285	0.280	0.285	0.273	0.270	0.267	0.272	0.269	0.277	0.268	0.274
	pH	MIN	7.37	7.37	7.36	7.53	7.38	7.32	7.46	7.36	7.40	7.48	7.32
		MAX	7.60	7.58	7.61	7.99	7.84	7.63	7.68	7.65	7.65	7.63	7.99
		AVG	7.47	7.50	7.47	7.82	7.51	7.49	7.58	7.49	7.56	7.54	7.54
	Temperature °C	MIN	4.6	3.9	3.2	3.2	3.5	5.2	6.8	7.5	7.7	7.4	3.2
		MAX	6.7	5.0	6.5	4.5	5.5	9.0	9.0	9.1	10.1	10.1	10.1
		AVG	5.3	4.6	4.2	3.8	4.4	6.8	7.7	8.4	8.7	8.6	6.2
	CHEMICAL SYSTEMS												
Chlorine	Used kg/day	TOTAL	67	54	91	55	71	87	74	87	98	97	781
		MIN	0.50	0.20	1.00	0.50	0.50	0.50	0.50	0.25	1.25	1.00	0.20
		MAX	8.00	5.50	16.00	6.00	10.00	9.50	9.00	11.50	16.50	13.00	16.50
		AVG	3.20	2.85	4.12	2.75	3.20	3.95	3.51	3.97	4.91	4.85	3.73
	Dose mg/L	MIN	1.27	0.63	1.75	0.92	0.76	1.08	1.40	1.78	2.18	1.76	0.63
		MAX	3.34	2.40	5.07	3.94	3.51	3.42	4.24	3.69	2.72	4.35	5.07
		AVG	2.14	1.72	2.51	1.98	2.28	2.48	2.56	2.56	2.48	2.85	2.36
	TREATED WATER												
CT	Minimum Chlorine Residual mg/L	MIN	0.97	1.07	1.05	0.98	1.02	1.10	1.00	1.09	1.05	1.06	0.97
		MAX	1.22	1.25	1.13	1.29	1.19	1.30	1.24	1.22	1.26	1.45	1.45
		AVG	1.11	1.13	1.09	1.10	1.11	1.21	1.12	1.15	1.16	1.30	1.15
	Minimum Reservoir Volume m3	MIN	964.0	968.0	783.0	678.8	954.0	943.7	963.2	845.8	664.5	871.9	664.5
		MAX	1069.0	1050.0	1059.0	1066.2	1067.6	1065.2	1056.9	1067.8	1071.3	1054.0	1071.3
		AVG	1018.8	1008.6	989.5	971.3	1007.6	1011.6	1011.6	1003.9	938.2	995.7	995.7
	Q PEAK m3/min	MIN	0.0940	0.3583	0.3347	0.3514	0.1140	0.3031	0.1208	0.2568	0.3006	0.2772	0.0940
		MAX	0.7028	0.7672	2.9505	3.0000	4.0800	3.0000	2.1204	4.2114	3.5484	1.6760	4.2114
		AVG	0.5000	0.5525	0.6539	0.7649	0.6152	0.7108	0.6223	1.0500	1.0721	1.0139	0.7556
	CT Required mg/L-min	MIN	8	8	8	8	8	6	6	6	6	6	6.00
		MAX	8	8	8	8	8	8	8	6	6	8	8.00
		AVG	8	8	8	8	8	8	7	6	6	6	7.26
	MIN CT Achieved mg/L-min	MIN	154.11	143.78	31.28	32.19	27.18	35.23	50.43	26.74	23.71	74.57	23.71
		MAX	1369.66	324.00	322.39	316.04	920.53	400.62	914.34	452.03	389.62	479.54	1369.66
		AVG	319.63	213.40	195.52	178.45	272.47	199.70	246.08	155.76	132.05	155.17	206.82
	Minimum CT Ratio	MIN	19.26	17.97	3.91	4.02	3.40	4.40	8.40	4.46	3.95	12.43	3.40
		MAX	171.21	40.50	40.30	39.50	115.07	66.77	152.39	75.34	64.94	79.92	171.21
		AVG	39.95	26.68	24.44	22.31	34.06	26.99	38.33	25.96	22.01	24.74	28.55
Treated Water Quality	Turbidity ntu	MIN	0.04	0.04	0.05	0.04	0.04	0.05	0.05	0.06	0.07	0.06	0.04
		MAX	0.19	0.16	0.10	0.11	0.08	0.19	0.10	0.11	0.10	0.10	0.19
		AVG	0.08	0.07	0.07	0.07	0.06	0.08	0.07	0.08	0.08	0.07	0.07
	Manganese mg/L	MIN	0.003	0.003	0.004	0.007	0.012	0.006	0.003	0.003	0.004	0.001	0.001
		MAX	0.025	0.019	0.030	0.032	0.029	0.025	0.016	0.013	0.013	0.009	0.032
		AVG	0.013	0.010	0.015	0.018	0.020	0.013	0.008	0.008	0.009	0.006	0.012
	pH	MIN	7.23	7.32	7.28	7.43	7.30	7.34	7.36	7.30	7.32	7.31	7.23
		MAX	7.90	7.49	7.48	7.85	7.82	7.44	7.53	7.60	7.46	7.45	7.90
		AVG	7.38	7.39	7.37	7.72	7.41	7.39	7.42	7.37	7.39	7.39	7.42
	Temperature °C	MIN	5.5	5.1	4.8	4.5	4.6	5.9	7.5	8.2	8.4	8.0	4.5
		MAX	8.8	7.0	8.6	8.4	8.6	9.7	11.0	11.6	11.2	12.1	12.1
		AVG	6.4	5.6	5.8	5.6	5.7	7.6	9.1	9.7	9.8	9.7	7.5
Pumphouse Water Quality	Turbidity ntu	MIN	0.06	0.05	0.05	0.05	0.05	0.06	0.02	0.06	0.07	0.07	0.02
		MAX	0.10	0.10	0.10	0.10	0.13	0.12	0.12	0.12	0.13	0.11	0.13
		AuG	0.08	0.07	0.08	0.08	0.08	0.09	0.07	0.09	0.09	0.08	0.08
	Manganese mg/L	MIN	0.003	0.005	0.007	0.007	0.006	0.003	0.006	0.002	0.004	0.001	0.001
		MAX	0.028	0.021	0.030	0.031	0.026	0.022	0.014	0.015	0.014	0.009	0.031
		AVG	0.013	0.011	0.014	0.017	0.018	0.012	0.009	0.010	0.009	0.005	0.012
	pH	MIN	7.11	7.17	7.22	7.34	7.33	7.31	7.31	7.30	7.34	7.33	7.11
		MAX	7.33	7.42	7.42	7.81	7.74	7.58	7.45	7.49	7.50	7.50	7.81
		AVG	7.18	7.32	7.32	7.65	7.43	7.41	7.37	7.38	7.42	7.41	7.39
	Temperature °C	MIN	5.9	4.7	4.8	6.6	6.9	8.1	9.2	10.2	10.1	9.5	4.7
		MAX	8.4	9.4	8.1	8.2	9.2	10.9	12.2	12.6	11.6	11.5	12.6
		AVG	7.0	7.5	6.9	7.4	8.2	9.5	10.8	11.1	10.9	10.6	9.0
Distribution Water Quality	Turbidity ntu	MIN	0.06	0.05	0.06	0.06	0.05	0.07	0.06	0.07	0.08	0.07	0.05
		MAX	0.14	0.13	0.15	0.20	0.15	0.15	0.41	0.17	0.13	0.13	0.41
		AVG	0.09	0.08	0.09	0.09	0.08	0.09	0.10	0.10	0.10	0.09	0.09
	Manganese mg/L	MIN	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.000
		MAX	0.03	0.01	0.04	0.04	0.03	0.02	0.01	0.02	0.02	0.02	0.036
		AVG	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.011
	Chlorine Residual mg/L	MIN	0.44	0.73	0.60	0.40	0.77	0.58	0.65	0.65	0.57	0.96	0.40
		MAX	1.10	1.15	1.10	1.20	1.19	1.48	1.32	1.17	1.31	1.44	1.48
		AVG	0.84	1.01	0.96	0.95	1.07	1.11	1.03	1.04	1.00	1.25	1.02

APPENDIX B

Water System Asset Ratings

Location: Village of Cremona
Asset Type Water Mains

Condition Rating	Description	Useful Life
1	New / Excellent Condition	<0%
2	Minor Deterioration	25% - 0%
3	Moderate Deterioration	50% - 25%
4	Significant Deterioration	75% - 50%
5	Beyond Life Expectancy	100% - 75%

Asset ID	Location	Cross Street 1	Cross Street 2	Size (mm)	Material	Length (m)	Install Date	Life Expectancy (years)	Breaks Within Past 5 Years	Age Based Rating (1-5)	Replacement Cost ($1100/m)	Recommendation
WAT 1	2 Street W	Railway Ave	152m North	150	Cast Iron	152	1962	60	1	5	$167,200.00	Fully Replace
WAT 2	Under Cowboy Trail	Hwy View	2 Street W	200	PVC	186	2000	100	0	1	$204,600.00	None
WAT 3	Railway Avenue E	2 Street W	1 Street W	150	Cast Iron	142	1962	60	0	5	$156,200.00	Fully Replace
WAT 4	Railway Avenue E	1 Street W	Centre Street	150	Cast Iron	110	1962	60	0	5	$121,000.00	Fully Replace
WAT 5	Railway Avenue E	Centre Street	1 Street E	150	Cast Iron	93	1962	60	0	5	$102,300.00	Fully Replace
WAT 6	Railway Avenue E	1 Street E	3 Street E	150	Cast Iron	199	1962	60	0	5	$218,900.00	Fully Replace
WAT 7	Railway Avenue E	3 Street E	East Street	150	Cast Iron	185	1962	60	1	5	$203,500.00	Fully Replace
WAT 8	Railway Avenue E	East Street	70m East	150	PVC	70	1980	100	0	2	$77,000.00	None
WAT 9	1 Avenue	2 Street W	1 Street W	150	Cast Iron	202	1962	60	1	5	$222,200.00	Fully Replace
WAT 10	1 Avenue	1 Street W	Centre Street	150	Cast Iron	109	1962	60	0	5	$119,900.00	Fully Replace
WAT 11	1 Avenue	Centre Street	1 Street E	150	Cast Iron	94	1962	60	0	5	$103,400.00	Fully Replace
WAT 12	1 Avenue	97m South	Edey Close	150	Cast Iron	97	1978	60	0	4	$106,700.00	Fully Replace
WAT 13	Edey Close	1 Avenue	Edey Close	150	Cast Iron	83	1978	60	0	4	$91,300.00	Fully Replace
WAT 14	Edey Close	loop		150	Cast Iron	281	1978	60	0	4	$309,100.00	Fully Replace
WAT 15	1 Street W	Railway Ave	1 Avenue	150	Cast Iron	123	1962	60	0	5	$135,300.00	Fully Replace
WAT 16	Centre Street	Railway Ave	1 Avenue	150	Cast Iron	123	1962	60	0	5	$135,300.00	Fully Replace
WAT 17	Centre Street	1 Avenue	2 Avenue	150	Cast Iron	116	1962	60	1	5	$127,600.00	Fully Replace
WAT 18	Centre Street	2 Avenue	3 Avenue	150	Cast Iron	177	1962	60	3	5	$194,700.00	Fully Replace
WAT 19	1 Street E	Railway Ave	1 Avenue	150	Cast Iron	123	1962	60	0	5	$135,300.00	Fully Replace
WAT 20	1 Street E	1 Avenue	2 Avenue	150	Cast Iron	116	1962	60	2	5	$127,600.00	Fully Replace
WAT 21	1 Street E	2 Avenue	2a Avenue	150	Cast Iron	94	1962	60	0	5	$103,400.00	Fully Replace
WAT 22	1 Street E	2a Avenue	3 Avenue	150	Cast Iron	81	1962	60	0	5	$89,100.00	Fully Replace
WAT 23	3 Avenue	Centre Street	1 Street E	150	Cast Iron	88	1962	60	0	5	$96,800.00	Fully Replace
WAT 24	3 Street E	Railway Ave	1 Avenue E	150	Cast Iron	87	1962	60	0	5	$95,700.00	Fully Replace
WAT 25	Cremona School			150	Cast Iron	117	1962	60	0	5	$128,700.00	Fully Replace
WAT 26	3 Street E	1 Avenue E	Webb Avenue	150	Cast Iron	94	1962	60	1	5	$103,400.00	Fully Replace
WAT 27	3 Street E	Webb Avenue	Boake Avenue	150	Cast Iron	93	1962	60	0	5	$102,300.00	Fully Replace
WAT 28	3 Street E	Boake Avenue	2a Avenue	150	Cast Iron	61	1962	60	0	5	$67,100.00	Fully Replace
WAT 29	East Street	Railway Ave	Cremona Heights	150	Cast Iron	113	1962	60	0	5	$124,300.00	Fully Replace
WAT 30	East Street	Webb Avenue	Boake Avenue	150	Cast Iron	94	1962	60	0	5	$103,400.00	Fully Replace
WAT 31	1 Avenue E	3 Street E	East Street	150	Cast Iron	185	1962	60	0	5	$203,500.00	Fully Replace
WAT 32	Webb Avenue	3 Street E	East Street	150	Cast Iron	182	1962	60	0	5	$200,200.00	Fully Replace
WAT 33	Boake Avenue	3 Street E	East Street	150	Cast Iron	182	1962	60	0	5	$200,200.00	Fully Replace
WAT 34	2a Avenue	1 Street E	3 Street E	150	Cast Iron	198	1962	60	0	5	$217,800.00	Fully Replace
WAT 35	Cremona Heights	East Street		150	PVC	140	2002	100	0	1	$154,000.00	None
RAW 1	Cremona Trailer Park			150	PVC	256	2000	100	0	1	$281,600.00	None
RAW 2	Under Cowboy Trail	Cremona Trailer Park	2 Street W	150	PVC	177	2000	100	0	1	$194,700.00	None

RAW 3	1 Avenue	2 Street W	1 Street W	150	PVC	198	2000	100	0	1	$217,800.00	None
RAW 4	1 Avenue	1 Street W	Centre Street	150	PVC	110	2000	100	0	1	$121,000.00	None
RAW 5	1 Avenue	Centre Street	1 Street E	150	PVC	100	2000	100	0	1	$110,000.00	None
RAW 6	1 Street E	Centre Street	Treatment Plant	150	PVC	42	2000	100	0	1	$46,200.00	None

Notes:

1. Replacement costs do not include replacing road surface.
2. Install year is assumed based on an atlas that referances the 1962 original asbuilt.

APPENDIX C

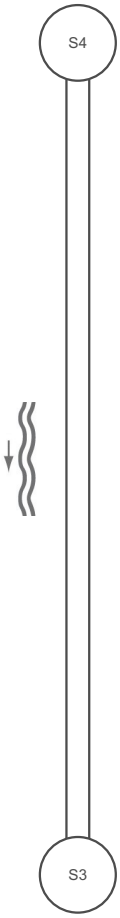
Sanitary System Video Logs

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S4 - S3	40	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S4	S3	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	0.00 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.10		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

1 : 10 POSITION DC CODE OBSERVATION VIDEO POS PHOTO

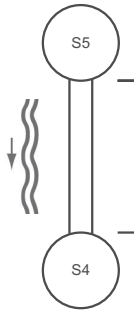


No data available

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S5 - S4	39	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S5	DOWNSTREAM MH: S4	
MUNICIPAL:	START NODE STREET NAME:	
CITY: Cremona	DIRECTION OF SURVEY: Downstream (U-D)	CALCULATED LENGTH: 125.45 m
INSPECTION DATE: 2025.10.10	PURPOSE OF SURVEY:	
WEATHER:	SEWER MATERIAL: Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT: 200	
PRE-CLEANED:	SEWER SHAPE: Circular	
COMMON REMARKS:		



1 : 6250 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S5 - START	00:00:13	0001
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:14	0002
0.00 m		AMH	Manhole, S5 - START	00:00:06	0000
125.45 m		AMH	Manhole, S6- FINISH	00:15:54	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S6 - S5	38	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S6	S5	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	2.14 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.10		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S6- Start	00:00:27	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:35	0001
2.14 m		OBZ	Obstacles Other, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, CANNOT PASS UNKOWN OBJECT	00:02:26	0002
2.14 m		MSA	Survey Abandoned, CANNOT PASS OBSTRUCTION	00:02:27	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S7 - S6 (2)	38	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S7	**DOWNSTREAM MH:** S6	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY: Cremona	**DIRECTION OF SURVEY:** Upstream (U-D)	**CALCULATED LENGTH:** 27.97 m
INSPECTION DATE: 2025.10.10	**PURPOSE OF SURVEY:**	
WEATHER:	**SEWER MATERIAL:** Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:** 200	
PRE-CLEANED:	**SEWER SHAPE:** Circular	
COMMON REMARKS:		



POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.18 m		AMH	Manhole, S6- Start	00:00:15	0000
0.18 m		MWL	Water Level, 5 % of cross sectional area	00:00:25	0001
28.15 m	5	MCU	Camera Underwater	00:04:37	0002
28.15 m	5	MSA	Survey Abandoned, CAMERA UNDER WATER	00:04:38	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S7 - S6	36	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S7	S6	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	46.80 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.10		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



1 : 1550	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S7 - Start	00:00:01	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:12	0001
	40.99 m		MMC	Material Change, Polyvinyl chloride	00:05:58	0002
	46.80 m	5	MCU	Camera Underwater	00:07:11	0004
	46.80 m		MMC	Material Change, Polyvinyl chloride	00:07:09	0003
	46.80 m	5	MSA	Survey Abandoned, CAMERA UNDER WATER	00:07:33	0005

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S8 - S7 (2)	35	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S8	**DOWNSTREAM MH:** S7	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY: Cremona	**DIRECTION OF SURVEY:** Upstream (U-D)	**CALCULATED LENGTH:** 20.18 m
INSPECTION DATE: 2025.10.10	**PURPOSE OF SURVEY:**	
WEATHER:	**SEWER MATERIAL:** Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:** 200	
PRE-CLEANED:	**SEWER SHAPE:** Circular	
COMMON REMARKS:		



1 : 450 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
2.78 m		AMH	Manhole, S7 - Start	00:00:01	0000
2.78 m		MWL	Water Level, 5 % of cross sectional area	00:00:10	0001
22.96 m	2	TFI	Tap Factory Made Intruding, at 10 o'clock, 1 mm dim, 50 mm intrusion	00:02:46	0004
22.96 m	2	TFI	Tap Factory Made Intruding, at 10 o'clock, 1 mm dim, 50 mm intrusion	00:02:42	0003
22.96 m	2	TFI	Tap Factory Made Intruding, at 10 o'clock, 1 mm dim, 50 mm intrusion	00:02:40	0002
22.96 m		MSA	Survey Abandoned, MADE IT TO LATERAL FROM PREVIOUS SURVEY	00:02:48	0005

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S8 - S7	34	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S8	S7	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	34.78 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.10		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		

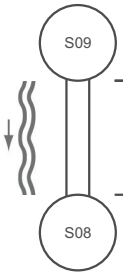


POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S8 - START	00:00:01	0000
0.00 m		MWL	Water Level, 15 % of cross sectional area	00:00:19	0001
20.05 m		MWL	Water Level, 5 % of cross sectional area	00:02:52	0002
34.78 m		DAE	Deposits Attached Encrustation, 10 % of cross sectional area, from 7 o'clock, to 5 o'clock	00:05:35	0004
34.78 m	2	TBI	Tap Break-In Intruding, at 9 o'clock, 100 mm dim, 50 mm intrusion	00:05:08	
34.78 m		MSA	Survey Abandoned, CANNOT PASS INTRUDING LATERAL	00:05:40	0005
34.78 m	2	TBI	Tap Break-In Intruding, at 9 o'clock, 100 mm dim, 50 mm intrusion	00:05:31	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S09 - S08	71	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S09	S08	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	77.64 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 5150 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S9 - Start	00:00:00	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:04	0001
77.64 m		AMH	Manhole, S8 - Finish	00:07:27	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S10 - S09	70	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S10	S09	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	59.01 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

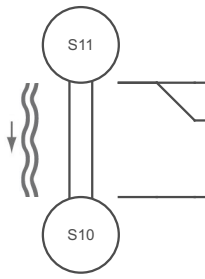


1 : 2350 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S10 Start	00:00:00	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:07	0001
34.14 m	2	RFL	Roots Fine Lateral, from 8 o'clock, to 9 o'clock	00:03:23	0002
51.62 m	2	TBA	Tap Break-In Active, at 2 o'clock, 100 mm dim	00:04:53	0003
59.01 m		AMH	Manhole, S9 - Finish	00:05:41	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S11 - S10	59	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S11	S10	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	34.77 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Polyvinyl chloride	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

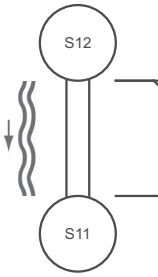


1 : 2300 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S11 Start	00:00:03	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:09	0001
34.77 m		AMH	Manhole, S10 Finish	00:03:31	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S12 - S11	69	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S12	S11	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	31.99 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.12		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		

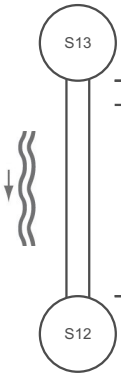


1 : 2100	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S12 Start	00:00:01	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:01	0001
	31.99 m		AMH	Manhole, S11 Finish	00:02:44	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S13 - S12	68	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S13	S12	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	62.67 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.12		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



1 : 2200 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S13 Start	00:00:00	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:07	0001
7.02 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 6 o'clock, to 7 o'clock, within 200 mm	00:00:53	0002
62.67 m		AMH	Manhole, S12 Finish	00:07:00	0003
62.67 m		MGO	General Observation, unknown debris at entrane to manhole	00:07:00	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S14 - S13	67	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S14	S13	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	54.96 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 1550 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S14 Start	00:00:00	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:04	0001
24.06 m		MMC	Material Change, Other (State in comments)	00:01:53	0002
26.00 m		MMC	Material Change, Reinforced concrete pipe	00:02:07	0003
41.83 m		MMC	Material Change, Other (State in comments)	00:03:44	0004
43.76 m		MMC	Material Change, Reinforced concrete pipe	00:03:58	0005
54.96 m		AMH	Manhole, S13 Finish	00:05:17	0006

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S15 - S14	66	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S15	S14	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	117.78 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.12		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



1 : 2850	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S15 Start	00:00:00	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:04	0001
	41.16 m	1	CC	Crack Circumferential, from 7 o'clock, to 5 o'clock, within 200 mm, 1 mm defective, 1 mm intrusion	00:04:30	0002
	42.10 m	1	CC	Crack Circumferential, from 7 o'clock, to 5 o'clock, within 200 mm, 1 mm defective, 1 mm intrusion	00:04:40	0003
	72.49 m		MMC	Material Change, Other (State in comments)	00:09:14	0006
	74.44 m		MMC	Material Change, Reinforced concrete pipe	00:09:23	0007
	117.78 m		AMH	Manhole, S14 Finish	00:13:15	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S16 - S11	58	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S16	S11	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	68.11 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 1350	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:06	0001
	0.00 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:00:15	0002
	0.00 m		AMH	Manhole, S16 Start	00:00:01	0000
	0.02 m	2	CC	Crack Circumferential, from 5 o'clock, to 7 o'clock, 1 mm defective, 1 mm intrusion	00:00:42	0003
	9.27 m	2	MWLS	Water Level, Sag in pipe, 15 % of cross sectional area, Start	00:01:50	0004
	18.61 m	2	MWLS	Water Level, Sag in pipe, 15 % of cross sectional area, Finish	00:02:35	0005
	67.49 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:06:58	0006
	68.11 m		AMH	Manhole, S11 Finish	00:07:10	0007

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S17 - S16	60	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S17	S16	
MUNICIPAL:	START NODE STREET NAME:	
CITY: Cremona	DIRECTION OF SURVEY: Upstream (U-D)	CALCULATED LENGTH: 41.91 m
INSPECTION DATE: 2025.10.12	PURPOSE OF SURVEY:	
WEATHER:	SEWER MATERIAL: Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT: 200	
PRE-CLEANED:	SEWER SHAPE: Circular	
COMMON REMARKS:		



1 : 650	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S16 Start	00:00:03	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:09	0001
	22.79 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:02:18	0002
	26.38 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:02:49	0003
	29.85 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:03:11	
	31.18 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:03:21	0004
	32.32 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:03:28	0005
	33.69 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:03:37	0006
	41.91 m		AMH	Manhole, S17 Finish	00:04:24	0007

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S18 - S17	61	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S18	S17	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	11.03 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 300	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S17 Start	00:00:00	0000
	0.81 m		MWL	Water Level, 5 % of cross sectional area	00:00:11	0001
	10.37 m	2	RMJ	Roots Medium Joint, from 7 o'clock, to 5 o'clock, 5 % lost	00:01:15	0004
	10.37 m	1	CC	Crack Circumferential, from 7 o'clock, to 5 o'clock, 1 mm defective, 1 mm intrusion	00:01:14	0003
	10.37 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock	00:01:13	0002
	11.03 m		AMH	Manhole, S18 Finish	00:01:25	0005

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S19 - S18	65	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S19	S18	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	38.59 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.12		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S19 Start	00:00:00	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:04	0001
25.57 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock	00:02:06	0002
26.70 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock	00:02:15	0003
29.11 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 12 o'clock, to 5 o'clock	00:02:32	0004
30.50 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 7 o'clock, to 5 o'clock, within 200 mm	00:02:40	0005
37.73 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 7 o'clock, to 5 o'clock, within 200 mm	00:03:18	0006
38.59 m		AMH	Manhole, S18 Finish	00:03:26	0007

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S39 - S34	22	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S39	S34	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	87.84 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.10		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		

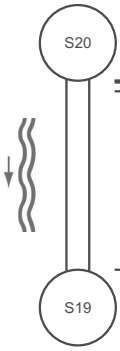


1 : 1900 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S39	00:00:01	0000
0.00 m		MWLS	Water Level, Sag in pipe, 5 % of cross sectional area	00:00:02	0001
34.93 m	2	DSGV	Deposits Settled Gravel, 5 % of cross sectional area, from 4 o'clock, to 5 o'clock	00:04:01	0002
56.43 m	2	DSGV	Deposits Settled Gravel, 5 % of cross sectional area, from 4 o'clock, to 5 o'clock	00:06:34	0003
84.78 m		ID	Infiltration Dripper, at 12 o'clock	00:09:35	0004
85.64 m	2	MWLS	Water Level, Sag in pipe, 15 % of cross sectional area, Start	00:10:00	0005
87.84 m	2	MWLS	Water Level, Sag in pipe, 15 % of cross sectional area, Finish	00:13:14	0006
87.84 m	2	MSA	Survey Abandoned, CAMERA WILL NOT PASS THIS POINT	00:13:16	0007

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S20 - S19	63	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S20	S19	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	63.75 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 2550	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S20 Start	00:00:01	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:05	0001
	0.59 m	2	MWLS	Water Level, Sag in pipe, 20 % of cross sectional area, Start	00:00:12	0002
	3.55 m	2	MWLS	Water Level, Sag in pipe, 5 % of cross sectional area, Finish	00:00:39	0003
	63.75 m		AMH	Manhole, S19 Finish	00:06:18	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S21 - S20 (2)	64	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S21	S20	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	0.52 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 10	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
S21	0.00 m		AMH	Manhole, S21 Start	00:00:04	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:11	0001
	0.52 m	5	DNZ	Deposits Ingress Other, 50 % of cross sectional area, from 7 o'clock, to 5 o'clock, within 200 mm, unable to pass unknown object	00:00:20	0002
S20	0.52 m		MSA	Survey Abandoned, unable to pass unknown object	00:00:21	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S21 - S20	62	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S21	S20	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	15.61 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 400	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S20 Start	00:00:03	0000
	0.00 m		MWL	Water Level, 15 % of cross sectional area	00:00:13	0001
	0.88 m	5	MCU	Camera Underwater, Start	00:00:22	0002
	3.83 m	5	MCU	Camera Underwater, Finish	00:00:36	0003
	14.79 m	1	CC	Crack Circumferential, from 5 o'clock, to 7 o'clock, within 200 mm, 1 mm defective, 1 mm intrusion	00:02:00	0004
	15.61 m	5	DNZ	Deposits Ingress Other, 50 % of cross sectional area, from 7 o'clock, to 5 o'clock, unknown debris	00:02:15	0005

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S22 - S8 (2)	33	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S22	**DOWNSTREAM MH:** S8	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY: Cremona	**DIRECTION OF SURVEY:** Upstream (U-D)	**CALCULATED LENGTH:** 57.60 m
INSPECTION DATE: 2025.10.10	**PURPOSE OF SURVEY:**	
WEATHER:	**SEWER MATERIAL:** Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:** 200	
PRE-CLEANED:	**SEWER SHAPE:** Circular	
COMMON REMARKS:		



1 : 1200 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
2.78 m		AMH	Manhole, S8 - START	00:00:01	0000
2.78 m		AMH	Manhole, S8 - START	00:00:07	0001
3.32 m		MWL	Water Level, 5 % of cross sectional area	00:00:42	0002
24.06 m		MWLS	Water Level, Sag in pipe, 5 % of cross sectional area, Start	00:04:06	0003
25.88 m		MWLS	Water Level, Sag in pipe, 5 % of cross sectional area, Finish	00:04:38	0004
31.17 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 1 o'clock, to 3 o'clock, within 200 mm	00:05:18	0005
50.07 m		MWLS	Water Level, Sag in pipe, 10 % of cross sectional area, Start	00:08:00	0006
60.38 m	5	MCU	Camera Underwater	00:09:31	0007
60.38 m	5	MSA	Survey Abandoned, CAMERA UNDER WATER	00:09:33	0008

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S22 - S8	32	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S22	S8	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	3.83 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.10		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
-0.05 m		AMH	Manhole, S22 - START	00:00:01	0000
-0.05 m		MWL	Water Level, 5 % of cross sectional area	00:00:07	0001
0.12 m		DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 11 o'clock, to 3 o'clock	00:00:28	0002
3.78 m		OBZ	Obstacles Other, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, CANNOT PASS OBSTRUCTION	00:01:52	0003
3.78 m		MSA	Survey Abandoned, CANNOT PASS OBSTRUCTION	00:01:55	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S23 - S16	57	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S23	S16	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	17.07 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 350	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S16 Start	00:00:01	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:05	0001
	0.01 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 3 o'clock, to 9 o'clock, within 200 mm	00:00:10	0002
	8.57 m	1	CC	Crack Circumferential, from 5 o'clock, to 7 o'clock, within 200 mm, 1 mm defective, 1 mm intrusion	00:01:11	0003
	16.61 m	1	CC	Crack Circumferential, from 5 o'clock, to 7 o'clock, within 200 mm, 1 mm defective, 1 mm intrusion	00:02:05	0004
	16.61 m	2	TBI	Tap Break-In Intruding, at 3 o'clock, 100 mm dim, 100 mm intrusion	00:02:07	0005
	17.07 m		MSA	Survey Abandoned, CANNOT PASS INTRUDING LATERAL	00:02:16	0006

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S23 - S22	56	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S23	S22	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	76.04 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.12		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



1 : 1000	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S23 Start	00:00:02	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:07	0001
	19.46 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock	00:02:05	0002
	30.82 m		MMC	Material Change, Polyvinyl chloride	00:03:06	0003
	31.65 m		MMC	Material Change, Reinforced concrete pipe	00:03:13	0004
	40.81 m		MMC	Material Change, Polyvinyl chloride	00:04:02	0005
	42.32 m		MMC	Material Change, Reinforced concrete pipe	00:04:13	0006
	70.83 m		MMC	Material Change, Polyvinyl chloride	00:06:54	0007
	70.83 m	3	JOM	Joint Offset Medium, 50 mm, 1 mm	00:06:54	0008
	73.84 m		MMC	Material Change, Reinforced concrete pipe	00:07:18	0009
	75.07 m	4	FM	Fracture Multiple, from 11 o'clock, to 1 o'clock, within 200 mm, 150 mm defective, 1 mm intrusion	00:07:32	0010
	75.61 m	2	DAE	Deposits Attached Encrustation, 10 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:07:37	0011
	76.04 m		MSA	Survey Abandoned, CANNOT PASS ENCRUSTATION	00:07:42	0012

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S24 - S22 (2)	31	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S24	DOWNSTREAM MH: S22	
MUNICIPAL:	START NODE STREET NAME:	
CITY: Cremona	DIRECTION OF SURVEY: Upstream (U-D)	CALCULATED LENGTH: 1.04 m
INSPECTION DATE: 2025.10.10	PURPOSE OF SURVEY:	
WEATHER:	SEWER MATERIAL: Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT: 200	
PRE-CLEANED:	SEWER SHAPE: Circular	
COMMON REMARKS:		



1 : 50 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.32 m		AMH	Manhole, S22 - Start	00:00:01	0000
0.32 m		MWL	Water Level, 5 % of cross sectional area	00:00:06	0001
1.36 m		MCU	Camera Underwater	00:00:55	0002
1.36 m		MSA	Survey Abandoned, CAMERA UNDER WATER	00:00:56	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S24 - S22	30	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S24	S22	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	34.76 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.10		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S24 START	00:00:07	0000
0.00 m		MWL	Water Level, 15 % of cross sectional area	00:00:12	0001
21.27 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 1 o'clock, to 4 o'clock, within 200 mm	00:02:28	0002
27.47 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 8 o'clock, to 11 o'clock, within 200 mm	00:03:15	0003
28.60 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 2 o'clock, to 5 o'clock, within 200 mm	00:03:25	0004
34.76 m		OBZ	Obstacles Other, 15 % of cross sectional area, from 5 o'clock, to 7 o'clock, CANNOT PASS OBSTRUCTION	00:05:22	0005
34.76 m		MSA	Survey Abandoned, CANNOT PASS OBSTRUCTION	00:05:24	0006

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S25 - S23	55	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S25	S23	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	69.47 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.12		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 4600	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S23 Start	00:00:00	0000
	0.10 m		MWL	Water Level, 5 % of cross sectional area	00:00:10	0001
	69.47 m	2	TBI	Tap Break-In Intruding, at 3 o'clock, 100 mm dim, 100 mm intrusion	00:06:51	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S25 - S24	54	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S25	S24	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	121.02 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.11		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



1 : 1750	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S25 Start	00:00:02	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:07	0001
	14.69 m	2	DSZ	Deposits Settled Other, 5 % of cross sectional area, at 6 o'clock, looks like a piece of concrete or pipe	00:01:33	0002
	34.82 m	2	RFC	Roots Fine Connection, at 3 o'clock, within 200 mm	00:03:14	0003
	52.38 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:04:51	0004
	55.35 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:05:05	0005
	72.54 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:06:45	0006
	88.96 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:08:09	0007
	91.90 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm	00:08:23	0008
	121.02 m		AMH	Manhole, S24 Finish	00:10:46	0009

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S26 - S25 (2)	53	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S26	S25	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	74.27 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.11		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

1 : 900	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
S25						
	0.00 m		AMH	Manhole, S25 Start	00:00:00	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:04	0001
	5.08 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 7 o'clock, to 5 o'clock, within 200 mm	00:00:38	0002
	12.09 m	2	CL	Crack Longitudinal, at 12 o'clock, within 200 mm, 900 mm defective, 1 mm intrusion	00:01:30	0003
	18.57 m	2	CL	Crack Longitudinal, at 12 o'clock, within 200 mm, 200 mm defective, 1 mm intrusion	00:02:08	0004
	21.33 m	2	CL	Crack Longitudinal, at 12 o'clock, within 200 mm, 200 mm defective, 1 mm intrusion	00:02:28	0005
	43.55 m		TFA	Tap Factory Made Active, at 4 o'clock, 100 mm dim	00:04:22	0006
	50.42 m	5	H	Hole, from 4 o'clock, to 5 o'clock, within 200 mm, 1 mm defective, 1 mm intrusion	00:05:25	0007
	74.27 m		MSA	Survey Abandoned, CANNOT PASS INTRUDING LATERAL	00:08:21	0010
S26	74.27 m	2	TBI	Tap Break-In Intruding, at 3 o'clock, 100 mm dim, 100 mm intrusion, within 200 mm	00:08:21	0009
	74.27 m		TFA	Tap Factory Made Active, at 3 o'clock, 100 mm dim, within 200 mm	00:08:20	0008
	74.27 m	2	CC	Crack Circumferential, from 7 o'clock, to 3 o'clock, within 200 mm, 200 mm defective, 1 mm intrusion	00:08:28	0011

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S26 - S25	52	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S26	S25	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	46.12 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.11		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 1250	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S26 Start	00:00:04	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:08	0001
	36.64 m	2	CC	Crack Circumferential, from 5 o'clock, to 7 o'clock, within 200 mm, 400 mm defective, 1 mm intrusion	00:04:07	0002
	37.07 m	2	CC	Crack Circumferential, from 5 o'clock, to 7 o'clock, within 200 mm, 400 mm defective, 1 mm intrusion	00:04:15	0003
	46.12 m	2	TBI	Tap Break-In Intruding, at 3 o'clock, 100 mm dim, 100 mm intrusion	00:05:11	0004
	46.12 m		MSA	Survey Abandoned, CANNOT PASS INTRUDING LATERAL	00:05:11	0005

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S27 - S26 (2)	51	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S27	**DOWNSTREAM MH:** S26	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY: Cremona	**DIRECTION OF SURVEY:** Upstream (U-D)	**CALCULATED LENGTH:** 83.38 m
INSPECTION DATE: 2025.10.11	**PURPOSE OF SURVEY:**	
WEATHER:	**SEWER MATERIAL:** Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:** 200	
PRE-CLEANED:	**SEWER SHAPE:** Circular	
COMMON REMARKS:		



1 : 4150 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S26 START	00:00:44	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:54	0001
83.38 m		TBI	Tap Break-In Intruding, at 3 o'clock, 1 mm dim, 50 mm intrusion	00:10:30	0002
83.38 m	2	MSA	Survey Abandoned, CANNOT PASS INTRUDING LATERAL	00:10:31	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S27 - S26	50	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S27	S26	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	15.78 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.11		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 250	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S27 Start	00:00:01	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:05	0001
	2.77 m	2	CL	Crack Longitudinal, at 12 o'clock, within 200 mm, 200 mm defective, 1 mm intrusion	00:00:27	0002
	2.77 m	2	TBI	Tap Break-In Intruding, at 12 o'clock, 100 mm dim, 100 mm intrusion, within 200 mm	00:00:30	0003
	5.76 m	2	CM	Crack Multiple, from 11 o'clock, to 1 o'clock, within 200 mm, 200 mm defective, 1 mm intrusion	00:00:48	0004
	7.24 m	2	CM	Crack Multiple, from 11 o'clock, to 1 o'clock, within 200 mm, 200 mm defective, 1 mm intrusion	00:01:01	0005
	10.97 m	2	CM	Crack Multiple, from 11 o'clock, to 1 o'clock, within 200 mm, 200 mm defective, 1 mm intrusion	00:01:23	0006
	15.78 m	2	TBI	Tap Break-In Intruding, at 3 o'clock, 100 mm dim, 100 mm intrusion	00:02:06	0007
	15.78 m		MSA	Survey Abandoned, CANNOT PASS INTRUDING LATERAL	00:02:07	0008

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S28 - S24 (2)	29	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S28	**DOWNSTREAM MH:** S24	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY: Cremona	**DIRECTION OF SURVEY:** Upstream (U-D)	**CALCULATED LENGTH:** 35.95 m
INSPECTION DATE: 2025.10.10	**PURPOSE OF SURVEY:**	
WEATHER:	**SEWER MATERIAL:** Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:** 200	
PRE-CLEANED:	**SEWER SHAPE:** Circular	
COMMON REMARKS:		

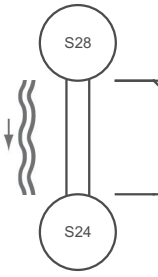


POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S24 START	00:00:16	0005
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:23	0006
0.00 m		AMH	Manhole, S24 START	00:00:01	0004
0.03 m		AMH	Manhole, S24 START	00:00:03	0000
0.46 m		MWL	Water Level, 15 % of cross sectional area	00:00:52	0001
1.39 m		MSA	Survey Abandoned, CAMERA UNDER WATER	00:01:27	0003
1.39 m	5	MCU	Camera Underwater	00:01:21	0002
21.81 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 2 o'clock, to 3 o'clock	00:03:13	0007
29.00 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 12 o'clock, to 5 o'clock, within 200 mm	00:04:36	0008
35.95 m	2	OBZ	Obstacles Other, 10 % of cross sectional area, from 5 o'clock, to 7 o'clock, UNKNOWN OBJECT	00:07:30	0009

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S28 - S24	28	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S28	S24	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	18.02 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.10		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



1 : 1200	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S28 START	00:00:03	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:08	0001
	18.02 m	5	MSA	Survey Abandoned, CANNOT PASS UNKOWN OBJECT	00:03:33	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S29 - S28	49	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S29	S28	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	19.21 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.11		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 800	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S29 START	00:00:06	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:10	0001
	19.21 m	3	TBI	Tap Break-In Intruding, at 12 o'clock, 100 mm dim, 150 mm intrusion	00:02:09	0002
	19.21 m		MSA	Survey Abandoned, Cannot pass Intruding Lateral	00:00:00	

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S30 - S29 (2)	46	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S30	DOWNSTREAM MH: S29	
MUNICIPAL:	START NODE STREET NAME:	
CITY: Cremona	DIRECTION OF SURVEY: Downstream (U-D)	CALCULATED LENGTH: 27.08 m
INSPECTION DATE: 2025.10.11	PURPOSE OF SURVEY:	
WEATHER:	SEWER MATERIAL: Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT: 200	
PRE-CLEANED:	SEWER SHAPE: Circular	
COMMON REMARKS:		

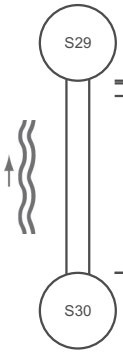


1 : 1350 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S29 START	00:00:01	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:15	0001
27.08 m		TBI	Tap Break-In Intruding, at 10 o'clock, 1 mm dim, 50 mm intrusion	00:03:24	0002
27.08 m		MSA	Survey Abandoned, CANNOT PASS INTRUDING LATERAL	00:03:26	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S30 - S29	48	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S30	S29	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Upstream (U-D)	39.38 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.11		
WEATHER:	**SEWER MATERIAL:**	
	Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		



POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.09 m		AMH	Manhole, S29 START	00:00:01	0000
0.63 m		MWL	Water Level, 5 % of cross sectional area	00:00:01	0001
3.21 m	2	TBI	Tap Break-In Intruding, at 3 o'clock, 50 mm dim, 50 mm intrusion	00:00:38	0002
39.47 m	2	TBI	Tap Break-In Intruding, at 8 o'clock, 50 mm dim, 50 mm intrusion	00:04:08	0003
39.47 m		MSA	Survey Abandoned, CANNOT PASS INTRUDING LATERAL	00:04:08	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S31 - S30 (3)	45	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S31	S30	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	17.42 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.11		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 650	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	-0.62 m		AMH	Manhole, S30 START	00:00:01	0000
	-0.62 m		MWL	Water Level, 5 % of cross sectional area	00:00:13	0001
	16.80 m		TBI	Tap Break-In Intruding, at 10 o'clock, 1 mm dim, 50 mm intrusion	00:02:24	0002
	16.80 m		TBI	Tap Break-In Intruding, at 10 o'clock, 1 mm dim, 50 mm intrusion	00:02:23	0003
	16.80 m	5	MSA	Survey Abandoned, CANNOT PASS INTRUDING LATERAL	00:02:24	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S31 - S30	43	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S31	S30	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	57.80 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.11		
WEATHER:	SEWER MATERIAL:	
	Polyvinyl chloride	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

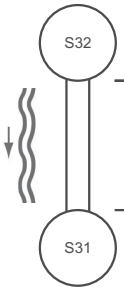


1 : 2050 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S31 START	00:00:01	0000
0.00 m		MWL	Water Level, 15 % of cross sectional area	00:00:18	0001
21.69 m		RFL	Roots Fine Lateral, from 7 o'clock, to 4 o'clock, ROOTS AT LATERALS	00:03:25	0002
57.23 m		TBI	Tap Break-In Intruding, at 10 o'clock, 1 mm dim, 25 mm intrusion	00:07:39	0003
57.80 m		MSA	Survey Abandoned, CANNOT PASS INTRUDING LATERAL	00:05:39	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S32 - S31	42	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S32	S31	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	1.71 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.11		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

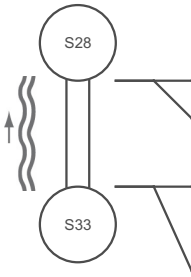


1 : 100	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.01 m		AMH	Manhole, S32 START	00:00:02	0000
	0.01 m		MWL	Water Level, 5 % of cross sectional area	00:00:08	0001
	1.72 m	5	MCU	Camera Underwater, LOOKS LIKE ROOTS UNDERWATER	00:00:46	

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S33 - S28 (2)	27	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S33	**DOWNSTREAM MH:** S28	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY: Cremona	**DIRECTION OF SURVEY:** Upstream (U-D)	**CALCULATED LENGTH:** 0.14 m
INSPECTION DATE: 2025.10.10	**PURPOSE OF SURVEY:**	
WEATHER:	**SEWER MATERIAL:** Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:** 200	
PRE-CLEANED:	**SEWER SHAPE:** Circular	
COMMON REMARKS:		



POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S28 START	00:00:08	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:16	0001
0.14 m	5	DSZ	Deposits Settled Other, 15 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm, CANNOT PASS OBSTRUCTION	00:01:02	0002
0.14 m		MSA	Survey Abandoned, CAMERA UNDER WATER	00:01:22	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S33 - S28	26	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S33	S28	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	3.92 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.10		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 150 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S33 START	00:00:01	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:08	0001
3.92 m		DSZ	Deposits Settled Other, 15 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm, CANNOT PASS OBJECT	00:01:07	0002
3.92 m		MSA	Survey Abandoned, CANNOT OBJECT	00:01:23	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S34 - S33 (2)	25	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S34	S33	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	10.20 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.10		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 650	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S33 START	00:00:01	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:03	0001
	10.20 m	5	MSA	Survey Abandoned, CAMERA UNDER WATER	00:01:52	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S34 - S33	24	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S34	S33	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	0.19 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.10		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 10	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:30	0001
	0.00 m	2	DAE	Deposits Attached Encrustation, 5 % of cross sectional area, from 7 o'clock, to 5 o'clock, within 200 mm	00:00:49	0002
	0.00 m		AMH	Manhole, S34 START	00:00:26	0000
	0.19 m		MSA	Survey Abandoned, UNKNOWN OBJECT	00:01:23	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S35 - S34	7	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S35	S34	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	83.59 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 3600	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.20 m		AMH	Manhole, S35 START	00:00:03	0000
	0.20 m		MWL	Water Level, 5 % of cross sectional area	00:00:08	0001
	55.27 m	3	CS	Crack Spiral, from 1 o'clock, to 4 o'clock, 1 mm defective, 1 mm intrusion	00:05:20	0002
	83.79 m		AMH	Manhole, S34 FINNISH	00:08:14	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S36 - S35	13	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S36	S35	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	94.32 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 6300 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.81 m		AMH	Manhole, S36 START	00:00:08	0000
0.81 m		MWL	Water Level, 5 % of cross sectional area	00:00:13	0001
95.13 m		AMH	Manhole, S36 FINNISH	00:10:26	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S37 - S36	12	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S37	S36	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	88.21 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

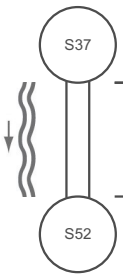


1 : 3800	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	3.34 m		AMH	Manhole, S37 START	00:00:01	0000
	3.34 m		MWL	Water Level, 5 % of cross sectional area	00:00:06	0001
	73.59 m	2	CC	Crack Circumferential, from 1 o'clock, to 3 o'clock, 1 mm defective, 1 mm intrusion	00:07:13	0002
	91.55 m		AMH	Manhole, S36 FINNISH	00:08:57	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S37 - S52	11	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S37	S52	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	6.77 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 450	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S37 START	00:00:04	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:10	0001
	6.77 m	5	RFJ	Roots Fine Joint, from 1 o'clock, to 8 o'clock, 70 % lost	00:00:51	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S38 - S31 (2)	44	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S38	**DOWNSTREAM MH:** S31	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY: Cremona	**DIRECTION OF SURVEY:** Upstream (U-D)	**CALCULATED LENGTH:** 37.10 m
INSPECTION DATE: 2025.10.11	**PURPOSE OF SURVEY:**	
WEATHER:	**SEWER MATERIAL:** Polyvinyl chloride	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:** 200	
PRE-CLEANED:	**SEWER SHAPE:** Circular	
COMMON REMARKS:		



1 : 1850 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.01 m		AMH	Manhole, S38 START	00:00:22	0000
0.01 m		MWL	Water Level, 5 % of cross sectional area	00:00:25	0001
37.11 m	5	MCU	Camera Underwater	00:08:51	0002
37.11 m	5	MSA	Survey Abandoned, CAMERA UNDER WATER	00:08:53	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S38 - S37	41	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S38	S37	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	63.21 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.11		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 2500 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.28 m		AMH	Manhole, S38 START	00:00:08	0000
0.79 m		AMH	Manhole, S38 START	00:00:02	0001
45.36 m		DH	Deformed Horizontal, 20 % changed, OVALITY	00:08:48	0002
56.46 m		MWL	Water Level, 15 % of cross sectional area	00:10:56	0003
63.49 m		AMH	Manhole, S38 FINISH	00:13:44	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S39 - S34 (2)	23	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S39	S34	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	0.00 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.10		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 10	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S34 START	00:00:19	0000
	0.00 m		MSA	Survey Abandoned, CANNOT PASS OBJECT	00:00:46	0001
	0.00 m		MSA	Survey Abandoned, CANNOT PASS OBJECT	00:01:00	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S40 - S39 (2)	21	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S40	**DOWNSTREAM MH:** S39	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY: Cremona	**DIRECTION OF SURVEY:** Upstream (U-D)	**CALCULATED LENGTH:** 64.69 m
INSPECTION DATE: 2025.10.10	**PURPOSE OF SURVEY:**	
WEATHER:	**SEWER MATERIAL:** Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:** 200	
PRE-CLEANED:	**SEWER SHAPE:** Circular	
COMMON REMARKS:		



1 : 2800 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, MH 39 START	00:00:01	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:20	0001
64.69 m	5	OBZ	Obstacles Other, 40 % of cross sectional area, from 5 o'clock, to 7 o'clock, CANNOT PASS OBSTRUCTION	00:07:19	0002
64.69 m		MSA	Survey Abandoned, CANNOT PASS OBSTRUCTION	00:07:21	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S40 - S39	20	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S40	S39	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	19.75 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.10		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 850	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S40 START	00:00:07	0000
	0.00 m		MWL	Water Level, 0 % of cross sectional area	00:00:17	0001
	19.75 m	5	OBZ	Obstacles Other, 40 % of cross sectional area, from 5 o'clock, to 7 o'clock, PIECE OF CONCRETE	00:03:46	0002
	19.75 m		MSA	Survey Abandoned, Cannot pass obstruction	00:03:49	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S41 - S40	19	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S41	S40	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	18.90 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.10		
WEATHER:	SEWER MATERIAL:	
	Polyvinyl chloride	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 600	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S40 START	00:00:08	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:11	0001
	16.99 m	2	DSF	Deposits Settled Fine, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm, Start	00:03:32	0002
	18.62 m	2	DSF	Deposits Settled Fine, 5 % of cross sectional area, from 5 o'clock, to 7 o'clock, within 200 mm, Finish	00:03:47	0003
	18.90 m		AMH	Manhole, S40 FINISH	00:04:48	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S42 - S41	18	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S42	S41	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	70.03 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.10		
WEATHER:	SEWER MATERIAL:	
	Polyvinyl chloride	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

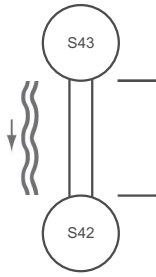


1 : 2800	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S42 START	00:00:06	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:07	0001
	65.42 m	2	MWLS	Water Level, Sag in pipe, 20 % of cross sectional area, Start	00:07:28	0002
	68.72 m	2	MWLS	Water Level, Sag in pipe, 5 % of cross sectional area, Finish	00:08:13	0003
	70.03 m		AMH	Manhole, S41 FINISH	00:08:50	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S43 - S42	17	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S43	S42	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY:	**DIRECTION OF SURVEY:**	**CALCULATED LENGTH:**
Cremona	Downstream (U-D)	46.31 m
INSPECTION DATE:	**PURPOSE OF SURVEY:**	
2025.10.10		
WEATHER:	**SEWER MATERIAL:**	
	Polyvinyl chloride	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:**	
	200	
PRE-CLEANED:	**SEWER SHAPE:**	
	Circular	
COMMON REMARKS:		

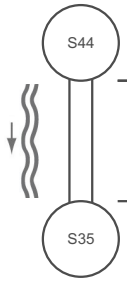


1 : 3050 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S43 Start	00:00:07	0002
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:34	0001
46.31 m		AMH	Manhole, S42 FINISH	00:06:35	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S44 - S35 (2)	8	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S44	DOWNSTREAM MH: S35	
MUNICIPAL:	START NODE STREET NAME:	
CITY: Cremona	DIRECTION OF SURVEY: Downstream (U-D)	CALCULATED LENGTH: 6.37 m
INSPECTION DATE: 2025.10.09	PURPOSE OF SURVEY:	
WEATHER:	SEWER MATERIAL: Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT: 200	
PRE-CLEANED:	SEWER SHAPE: Circular	
COMMON REMARKS:		

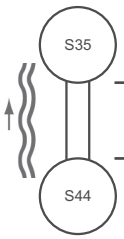


1 : 400 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S35 START	00:00:01	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:06	0001
6.37 m		MSA	Survey Abandoned, UNKNOWN OBJECT	00:02:00	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S44 - S35	7	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S44	S35	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	0.10 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 10	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	4.66 m		AMH	Manhole, S44 START	00:00:01	0000
	4.66 m		MWL	Water Level, 5 % of cross sectional area	00:00:07	0001
	4.76 m		MSA	Survey Abandoned, CANNOT PASS	00:01:17	0002
	4.76 m	3	DAE	Deposits Attached Encrustation, 20 % of cross sectional area, from 5 o'clock, to 7 o'clock	00:00:00	

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S45 - S44	6	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH: S45	**DOWNSTREAM MH:** S44	
MUNICIPAL:	**START NODE STREET NAME:**	
CITY: Cremona	**DIRECTION OF SURVEY:** Upstream (U-D)	**CALCULATED LENGTH:** 85.53 m
INSPECTION DATE: 2025.10.09	**PURPOSE OF SURVEY:**	
WEATHER:	**SEWER MATERIAL:** Reinforced concrete pipe	
LINING METHOD:	**SEWER DIAMETER OR HEIGHT:** 200	
PRE-CLEANED:	**SEWER SHAPE:** Circular	
COMMON REMARKS:		



1 : 3050 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.47 m		AMH	Manhole, S45 START	00:00:01	0000
0.51 m		MWL	Water Level, 5 % of cross sectional area	00:00:11	0001
17.47 m	5	HSV	Hole Soil Visible, from 10 o'clock, to 12 o'clock, 1 mm defective, 1 mm intrusion	00:02:28	0002
17.63 m	2	RML	Roots Medium Lateral, from 11 o'clock, to 12 o'clock, 5 % lost	00:02:38	0003
86.00 m		MSA	Survey Abandoned, DROP INVERT	00:10:20	0004

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S46 - S45	5	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S46	S45	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	10.18 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Polyvinyl chloride	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

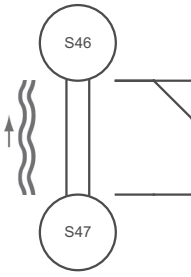


1 : 650 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.42 m		AMH	Manhole, S46 START	00:00:02	0000
0.43 m		MWL	Water Level, 5 % of cross sectional area	00:00:06	0001
10.60 m		AMH	Manhole, S45 FINNISH	00:01:30	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S47 - S46	3	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S47	S46	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	32.37 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Polyvinyl chloride	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

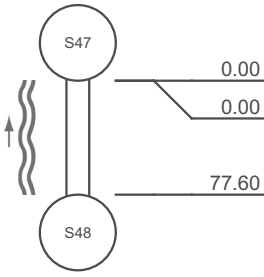


1 : 2150 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
1.82 m		AMH	Manhole, S47 START	00:00:02	0000
1.82 m		MWL	Water Level, 5 % of cross sectional area	00:00:08	0001
34.19 m		AMH	Manhole, S46 FINNISH	00:03:03	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S48 - S47	2	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S48	S47	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	77.60 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Polyvinyl chloride	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

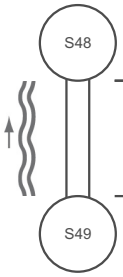


1 : 5150 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S47 START	00:00:08	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:13	0001
77.60 m		AMH	Manhole, S47 FINNISH	00:09:22	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S49 - S48	1	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S49	S48	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	37.38 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Polyvinyl chloride	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 2450	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
	0.00 m		AMH	Manhole, S49 Start	00:00:02	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:16	0001
	37.38 m		AMH	Manhole, S48 FINNISH	00:05:03	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S50 - S36	16	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S50	S36	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	0.20 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		

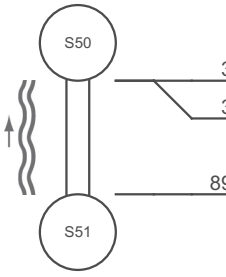


1 : 10	POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
S36						
	0.00 m		AMH	Manhole, S50 START	00:00:01	0000
	0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:06	0001
	0.20 m	3	DSF	Deposits Settled Fine, 20 % of cross sectional area, from 4 o'clock, to 8 o'clock	00:00:43	0002
S50	0.20 m		MSA	Survey Abandoned, CANT PASS DEBRIS	00:00:44	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S51 - S50	15	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S51	S50	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	86.31 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 5750 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
3.10 m		AMH	Manhole, S51 START	00:00:01	0000
3.10 m		MWL	Water Level, 5 % of cross sectional area	00:00:09	0001
89.41 m		AMH	Manhole, S50 FINNISH	00:07:30	0002

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S52 - S37 (2)	14	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S52	S37	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Downstream (U-D)	44.18 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 1900 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
0.00 m		AMH	Manhole, S37 START	00:00:01	0000
0.00 m		MWL	Water Level, 5 % of cross sectional area	00:00:07	0001
44.18 m	1	RTL	Roots Tap Lateral, from 1 o'clock, to 6 o'clock, 30 % of cross sectional area	00:04:09	0002
44.18 m		MSA	Survey Abandoned, CANT PASS ROOTS	00:04:13	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S52 - S37	10	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S52	S37	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	0.25 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 10 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
-1.06 m		AMH	Manhole, S52 START	00:00:01	0000
-1.02 m		MWL	Water Level, 5 % of cross sectional area	00:00:11	0001
-0.81 m		RFJ	Roots Fine Joint, from 5 o'clock, to 7 o'clock, 70 % lost	00:01:31	0002
-0.81 m		MSA	Survey Abandoned, CANT PASS ROOTS	00:01:33	0003

Section Protocol

SECTION NAME:	SECTION NUMBER:	CATALOG NAME:
S53 - S52	9	NASSCO PACP-6-m
CUSTOMER:	**PROJECT LEADER:**	**CONTRACTOR:**
MPE	Calgary Sewer Scope	Calgary Sewer Scope

UPSTREAM MH:	DOWNSTREAM MH:	
S53	S52	
MUNICIPAL:	START NODE STREET NAME:	
CITY:	DIRECTION OF SURVEY:	CALCULATED LENGTH:
Cremona	Upstream (U-D)	0.64 m
INSPECTION DATE:	PURPOSE OF SURVEY:	
2025.10.09		
WEATHER:	SEWER MATERIAL:	
	Reinforced concrete pipe	
LINING METHOD:	SEWER DIAMETER OR HEIGHT:	
	200	
PRE-CLEANED:	SEWER SHAPE:	
	Circular	
COMMON REMARKS:		



1 : 10 POSITION	DC	CODE	OBSERVATION	VIDEO POS	PHOTO
3.15 m		MWL	Water Level, 5 % of cross sectional area	00:00:09	0001
3.15 m		DSGV	Deposits Settled Gravel, 15 % of cross sectional area, from 3 o'clock, to 7 o'clock	00:00:09	0002
3.15 m		AMH	Manhole, S53 START	00:00:01	0000
3.79 m		MSA	Survey Abandoned, CANT PASS ROOTS	00:00:43	0003
3.79 m		RTJ	Roots Tap Joint, from 7 o'clock, to 5 o'clock, 90 % of cross sectional area, within 200 mm	00:00:43	0004

APPENDIX D

Sanitary System Asset Ratings

Location: Village of Cremona
Asset Type Sanitary Mains

	Condition Rating	Description	Useful Life
#4EA72E	1	New / Excellent Condition	100% - 75%
	2	Minor Deterioration	75% - 50%
#FFEB84	3	Moderate Deterioration	50% - 25%
	4	Significant Deterioration	25% - 0%
#FF0000	5	Beyond Life Expectancy	<0%

Asset ID	Upsteam MH	Downstream MH	Size (mm)	Slope	Capacity (m^3/s)	Material	Length (m)	Install Date	Life Expectancy (years)	Age Based Rating (1-5)	Structural Quick Score	Maintenance Quick Score	Notes	Asset Combined Rating (1-5)	Replacement Cost ($900/m)	CIPP Lining Cost ($450/m)	Recommendation
SNL-045	S3	S2	200			Concrete	24.6	1962	80	4				3	$22,184.92	$11,092.46	Assess Break History and Consider Lining
SNL-035	S4	S3	200			Concrete	109.1	1962	80	4				3	$98,202.51	$49,101.26	Assess Break History and Consider Lining
SNL-043	S5	S4	200			Concrete	187.9	1962	80	4				3	$169,081.87	$84,540.94	Assess Break History and Consider Lining
SNL-044	S6	S5	200			Concrete	189.3	1962	80	4	5100		Full length pipe was not inspected	4	$170,388.53	$85,194.27	Assess Break History and Consider Lining
SNL-034	S7	S6	200	0.39%	0.020	Concrete	100.0	1962	80	4	5100		Full length pipe was not inspected	4	$90,018.69	$45,009.34	Assess Break History and Consider Lining
SNL-033	S8	S7	200	0.38%	0.020	Concrete	58.1	1962	80	4	2500			3	$52,326.99	$26,163.49	Assess Break History and Consider Lining
SNL-008	S9	S8	200	5.87%	0.079	Concrete	78.8	1962	80	4				3	$70,903.86	$35,451.93	Assess Break History and Consider Lining
SNL-030	S22	S8	200	0.43%	0.022	Concrete	128.2	1962	80	4	5100	2100	Full length pipe was not inspected	4	$115,414.49	$57,707.25	Assess Break History and Consider Lining
SNL-009	S10	S9	200	2.80%	0.055	Concrete	60.6	1962	80	4	2100	2100		3	$54,563.63	$27,281.82	Assess Break History and Consider Lining
SNL-042	S11	S10	200	0.80%	0.029	PVC	35.5	1980	100	2				2	$31,970.41	$15,985.20	None
SNL-012	S12	S11	200	3.04%	0.057	Concrete	34.2	1978	80	3				2	$30,741.19	$15,370.60	None
SNL-011	S16	S11	200	0.20%	0.015	Concrete	69.6	1962	80	4	2200	2200		3	$62,630.58	$31,315.29	Assess Break History and Consider Lining
SNL-013	S13	S12	200	3.03%	0.057	Concrete	65.0	1978	80	3		2100		2	$58,523.68	$29,261.84	None
SNL-014	S14	S13	200	3.44%	0.061	Concrete	55.1	1978	80	3				2	$49,586.62	$24,793.31	None
SNL-038	S15	S14	200	0.94%	0.032	Concrete	119.4	1978	80	3	1200			2	$107,463.44	$53,731.72	None
SNL-040	S17	S16	200	2.40%	0.051	Concrete	43.9	1978	80	3		2600		2	$39,498.12	$19,749.06	None
SNL-010	S23	S16	200	0.48%	0.023	Concrete	93.4	1962	80	4	2112	2100	There is no pipe in Manhole S23 that heads toward S16, so we did a reverse from S16 towards S23, we could not complete the inspection, but there must be a buried manhole on the street.	3	$84,045.00	$42,022.50	Assess Break History and Consider Lining
SNL-041	S18	S17	200	0.34%	0.019	Concrete	13.0	1978	80	3	1100	2200		2	$11,664.86	$5,832.43	None
SNL-037	S19	S18	200	4.22%	0.067	Concrete	40.0	1978	80	3		2500		2	$36,027.65	$18,013.82	None
SNL-036	S20	S19	200	1.11%	0.034	Concrete	66.0	1978	80	3	2200			2	$59,403.15	$29,701.58	None
SNL-039	S21	S20	200	5.07%	0.074	Concrete	19.0	1978	80	3	5111	5100		3	$17,138.68	$8,569.34	None
SNL-029	S24	S22	200	0.33%	0.019	Concrete	101.5	1962	80	4		2300	Full length pipe was not inspected	3	$91,318.84	$45,659.42	Assess Break History and Consider Lining
SNL-031	S23	S22	200	5.51%	0.077	Concrete	123.7	1962	80	4	4131	2200	The pipe in the downstream manhole is inverted so we could not do the reverse	4	$111,311.25	$55,655.63	Assess Break History and Consider Lining
SNL-032	S25	S23	200	0.30%	0.018	Concrete	101.3	1962	80	4	2100		The upstream manhole to pipe is inverted, which we don't normally see, it's usually the downstream manhole.	3	$91,126.90	$45,563.45	Assess Break History and Consider Lining
SNL-001	S25	S24	200	4.25%	0.068	Concrete	123.7	1962	80	4		2700		3	$111,333.74	$55,666.87	Assess Break History and Consider Lining
SNL-028	S28	S24	200	0.30%	0.018	Concrete	101.6	1962	80	4	5221	2200	Full length pipe was not inspected	4	$91,415.01	$45,707.51	Assess Break History and Consider Lining
SNL-002	S26	S25	200	6.43%	0.083	Concrete	124.3	1962	80	4	5128	2100		4	$111,866.91	$55,933.45	Assess Break History and Consider Lining
SNL-003	S27	S26	200	1.36%	0.038	Concrete	178.5	1962	80	4	2700		Full length pipe was not inspected	3	$160,685.74	$80,342.87	Assess Break History and Consider Lining
SNL-004	S29	S28	200	4.60%	0.070	Concrete	124.0	1962	80	4	3100		Reverse cannot be done due to inverted pipe in downstream manhole	3	$111,616.86	$55,808.43	Assess Break History and Consider Lining
SNL-027	S33	S28	200	1.11%	0.034	Concrete	99.4	1962	80	4	5100		Full length pipe was not inspected	4	$89,489.39	$44,744.70	Assess Break History and Consider Lining
SNL-005	S30	S29	200	6.04%	0.081	Concrete	124.2	1962	80	4	2200		Full length pipe was not inspected	3	$111,798.60	$55,899.30	Assess Break History and Consider Lining
SNL-006	S31	S30	200	2.09%	0.047	Concrete	93.8	1962	80	4	5100		Full length pipe was not inspected	4	$84,424.63	$42,212.32	Assess Break History and Consider Lining
SNL-007	S32	S31	200	5.55%	0.077	Concrete	83.8	1962	80	4		5100	The pipe in the downstream manhole is inverted so we could not do the reverse	3	$75,464.21	$37,732.10	Assess Break History and Consider Lining
SNL-047	S38	S31	200			PVC	199.0	1980	100	2	5100		The upstream manhole to pipe is inverted, which we don't normally see, it's usually the downstream manhole. The flow is going from manhole S31 to S38, which is not shown on the map.	3	$179,139.50	$89,569.75	None
SNL-067	S34	S33	200	0.71%	0.028	Concrete	99.3	1962	80	4	5100	2100	Full length pipe was not inspected	4	$89,371.46	$44,685.73	Assess Break History and Consider Lining
SNL-021	S35	S34	200	4.51%	0.070	Concrete	85.4	1962	80	4	3100			3	$76,841.63	$38,420.82	Assess Break History and Consider Lining
SNL-058	S39	S34	200	0.82%	0.030	Concrete	92.2	1962	80	4	2300	2200	Full length pipe was not inspected	3	$82,986.95	$41,493.47	Assess Break History and Consider Lining
SNL-022	S36	S35	200	4.83%	0.072	Concrete	94.8	1962	80	4				3	$85,297.69	$42,648.84	Assess Break History and Consider Lining
SNL-024	S44	S35	200	0.40%	0.021	Concrete	90.8	1962	80	4	3100		Full length pipe was not inspected	3	$81,738.02	$40,869.01	Assess Break History and Consider Lining
SNL-020	S50	S36	200	2.39%	0.051	Concrete	91.9	1962	80	4		3100	The pipe in the downstream manhole is inverted so we could not do the reverse	3	$82,718.74	$41,359.37	Assess Break History and Consider Lining
SNL-023	S37	S36	200	8.41%	0.095	Concrete	93.3	1962	80	4	2100			3	$83,940.34	$41,970.17	Assess Break History and Consider Lining
SNL-018	S52	S37	200			Concrete	91.3	1962	80	4		5111	Full length pipe was not inspected	3	$82,196.37	$41,098.18	Assess Break History and Consider Lining
SNL-046	S38	S37	200			Concrete	68.6	1962	80	4				3	$61,712.65	$30,856.33	Assess Break History and Consider Lining
SNL-026	S40	S39	200	0.66%	0.027	Concrete	87.9	1962	80	4	5100			4	$79,123.77	$39,561.88	Assess Break History and Consider Lining
SNL-051	S41	S40	200			PVC	20.5	1980	100	2		2200		2	$18,494.88	$9,247.44	None
SNL-050	S42	S41	200			PVC	97.0	1980	100	2	2200			2	$87,338.56	$43,669.28	None
SNL-066	S43	S42	200			PVC	50.2	1980	100	2				2	$45,144.26	$22,572.13	None
SNL-025	S45	S44	200	3.08%	0.058	Concrete	88.3	1962	80	4	5100	2100		4	$79,476.85	$39,738.43	Assess Break History and Consider Lining
SNL-048	S46	S45	200	2.80%	0.055	PVC	12.1	2002	100	1				1	$10,920.36	$5,460.18	None
SNL-049	S47	S46	200	3.10%	0.058	PVC	34.2	2002	100	1				1	$30,820.34	$15,410.17	None
SNL-015	S48	S47	200	3.54%	0.062	PVC	79.0	2002	100	1				1	$71,132.80	$35,566.40	None
SNL-016	S49	S48	200	1.94%	0.046	PVC	39.2	2002	100	1				1	$35,304.26	$17,652.13	None
SNL-019	S51	S50	200	1.84%	0.044	Concrete	88.2	1962	80	4				3	$79,379.39	$39,689.69	Assess Break History and Consider Lining
SNL-017	S53	S52	200	0.42%	0.021	Concrete	88.6	1962	80	4			Missing reverse video	3	$79,780.38	$39,890.19	Assess Break History and Consider Lining

Notes:
1. Replacement costs do not include replacing road surface.
2. Install year is assumed based on an atlas that referances the 1962 original asbuilt.

APPENDIX E

2023 Stormwater Management Plan

a division of Englobe

Final Report for:

VILLAGE OF CREMONA

REGIONAL STORMWATER MANAGEMENT PLAN

Date: November 7, 2023
Project #: 2490-015-00

Proud of Our Past... Building the Future

www.mpe.ca

Suite 320, 6715 - 8 Street NE
Calgary, AB T2E 7H7
Phone: 403-250-1362
1-800-351-0929

a division of Englobe

Village of Cremona
205 – 1 Street E
Cremona, AB
T0M 0R0

November 7, 2023
File: N:\2490\015\R01-1.0

Attention: Karen O'Connor
Chief Administrative Officer

Dear Ms. O'Connor,

Re: Village of Cremona Regional Stormwater Plan – FINAL REPORT
Village of Cremona/Mountain View County

MPE a division of Englobe (MPE) is pleased to submit the *Village of Cremona Regional Stormwater Plan –Final Report* to the Village of Cremona and Mountain View County.

This report contains MPE's findings and recommendations pertaining to drainage improvements to minimize flooding for existing infrastructure. Proposed improvements as well as priority assessments were then explored to develop a recommended approach.

Should you have any questions or require clarification on any item, please contact the undersigned at 403-219-6322.

Yours truly,

MPE a division of Englobe

Tayler Marra, P.Eng.
Project Engineer

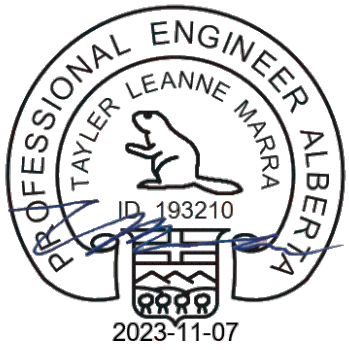
DS/tm
Enclosure

CORPORATE AUTHORIZATION

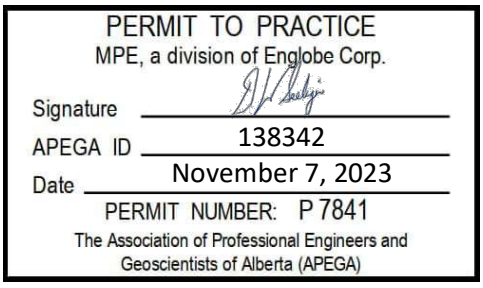
This report has been prepared by MPE a division of Englobe under authorization of the Village of Cremona and Mountain View County. The material in this report represents the best judgment of MPE a division of Englobe given the available information. Any use that a third party makes of this report, or reliance on or decisions made based upon it is the responsibility of the third party. MPE a division of Englobe accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions taken based upon this report.

Should any questions arise regarding content of this report, please contact the undersigned.

MPE a division of Englobe



Tayler Marra, P.Eng.



Professional Seal

Corporate Permit

EXECUTIVE SUMMARY

The Village of Cremona (Village) and Mountain View County (MVC) retained the services of MPE a division of Englobe (MPE) to complete a Regional Stormwater Management Plan for the Village and surrounding area.

This plan focuses on identifying existing drainage concerns (including capacity and erosion) during rainfall events and recommending infrastructure upgrades to eliminate these concerns across the Village. The main tasks completed as part of this plan include:

- Consulting with the Village staff to identify existing drainage and flooding issues.
- Conducting field assessments of the existing stormwater drainage infrastructure both within and upstream of the Village.
- Delineating and characterizing subcatchments within the Village and rural upstream catchments.
- Conducting hydrological and hydraulic modelling of existing stormwater conveyance systems (catchbasins, pipes, ditches, culverts, and swales).
- Reviewing the performance of the existing conveyance systems to identify drainage concerns in rainfall events.
- Developing proposed improvements to resolve drainage concerns and associated cost estimates.
- Providing general recommendations for future development within the study area.

Model Development and Analysis

Stormwater models were developed for the Village and its surrounding catchments by combining the hydrology derived from the catchment data with the hydraulics associated with the physical constraints and drainage paths.

The drainage infrastructure performance has been evaluated using the existing conditions model results by analyzing the following results:

- Ponding Extents,
- Flow Over Roadways,

- Flow Velocity vs. Depth,
- Level of Service Estimates.

General Cremona Proposed Improvements

The proposed improvements for the Village were then determined based on the following criteria:

- Improving the frequency of flow over Railway Avenue or other main roadways.
- Stormwater pipes will be designed for a 1:5 year return period Level of Service, and a 1:10 year return period for culverts.
- Mitigating current erosion concern locations.

To meet the proposed improvement criteria described in **Section 5.1,** the following upgrades are recommended for the general Village of Cremona area:

- Culvert and pipe upgrades in locations where the capacity is below an acceptable level.
- Increase catchbasin capacity by replacing or adding inlets.
- Allow proper flow conveyance by inspecting and maintaining drainage infrastructure frequently and paving major undeveloped roads.

All recommended upgrades are further described in **Sections 5.2-5.5** and the cost estimates as well as priorities can be seen in ***Table 1***.

Table 1: Cremona Improvement Costs and Priorities

Catchment	Location	Cost	Priority
East	N/A	$ 562,000	High
Central East	3 Street East	$ 400,000	High
Central East	1 Street East	$ 318,000	Medium
Central East	Centre Street	$ 187,000	Medium
Regional Catchments	Township Road 300	$ 24,000	Medium
Central West	N/A	$ 159,000	Low
Central East	2A Avenue	$ 3,000	Low
TOTAL		**$ 1,653,000**	-

Current Development Recommendations

The recommendations for the current stormwater systems in the Village of Cremona study area are as follows:

- Upgrade drainage infrastructure such as pipes, culverts, and catchbasins as identified in this report.
- Ensure upgrades to each system are completed starting from the downstream end of a system to avoid additional flooding and infrastructure damage.
- Utilize the detailed design processes to confirm final infrastructure sizes and alignments.
- Implement frequent and consistent inspection and maintenance measures for drainage infrastructure.

Future Development Recommendations

To minimize potential future drainage concerns, stormwater management principles and strategies for new developments should be utilized to control the 1:100 year flow rate to meet the lesser of the pre-development flow rate or the determined release rate of 4.8 L/s/ha. If possible, runoff from future development areas should avoid combining with existing drainage infrastructure. To ensure sustainable development, the considerations described in **Section 6.0** should be integrated into the Village bylaws.

TABLE OF CONTENTS

LETTER OF TRANSMITTAL

CORPORATE AUTHORIZATION

DEVELOPMENT APPROVALS CHECKLIST

EXECUTIVE SUMMARY

1.0 INTRODUCTION 1

1.1 STUDY AREA 1
1.2 SCOPE OF WORK 1
1.3 REGULATORY REQUIREMENTS 4
1.3.1 Stormwater Management Guidelines for the Province of Alberta, 1999 4
1.3.2 Water Act, 2000 4
1.3.3 Environmental Protection and Enhancement Act, 2000 4
1.4 BACKGROUND INFORMATION 4
1.4.1 Infrastructure Inspections 4
1.4.2 Previous Studies 5

2.0 EXISTING DRAINAGE SYSTEMS 6

2.1 REGIONAL CATCHMENTS 6
2.2 LOCAL DRAINAGE SYSTEMS 8
2.2.1 West Catchment 8
2.2.2 Central West Catchment 8
2.2.3 Central East Catchment 8
2.2.4 East Catchment 9
2.3 EXISTING DRAINAGE CONCERNS 11
2.3.1 1 Street West Near 1 Avenue 11
2.3.2 Centre Street North of the Community Arena 12
2.3.3 3 Street East Near 1 Avenue 12
2.3.4 East Street Near 1 Avenue 13

3.0 STORMWATER MODEL DEVELOPMENT 14

3.1 DESIGN STORMS 14
3.2 SUBCATCHMENTS 14
3.2.1 Rural Catchment Runoff Parameterization 15
3.2.2 Urban Catchment Parameterization 16
3.3 CONVEYANCE INFRASTRUCTURE 16

4.0 EXISTING DRAINAGE SYSTEM ANALYSIS 18

4.1 OVERLAND ANALYSIS 18
4.1.1 Ponding Extents 18
4.1.2 Flow Over Roadways 18
4.1.3 Flow Velocity vs. Depth 18
4.2 UNDERGROUND ANALYSIS 19
4.2.1 Level of Service Estimates 19
4.3 EXISTING MODEL RESULTS 19
4.3.1 Regional Catchments 22
4.3.2 West Catchment 22
4.3.3 Central West Catchment 22

4.3.4 Central East Catchment 22
4.3.5 East Catchment 23

5.0 PROPOSED IMPROVEMENTS 24

5.1 PROPOSED IMPROVEMENT CRITERIA 24
5.1.1 Culverts/Pipes 24
5.1.2 Catchbasin Improvements 24
5.1.3 Road Reconstruction 25
5.2 REGIONAL CATCHMENT IMPROVEMENTS 25
5.3 CENTRAL WEST CATCHMENT IMPROVEMENTS 25
5.4 CENTRAL EAST CATCHMENT IMPROVEMENTS 28
5.4.1 Centre Street 28
5.4.2 1 Street East/Railway Avenue 29
5.4.3 3 Street East/Railway Avenue 30
5.4.4 2A Avenue 31
5.5 EAST CATCHMENT 33
5.6 IMPROVEMENT COST ESTIMATES 36

6.0 FUTURE DEVELOPMENT AND PLANNING CONSIDERATIONS 37

6.1 POTENTIAL GRANT OPPORTUNITIES 37
6.2 FUTURE DRAINAGE INFRASTRUCTURE RECOMMENDATIONS 37
6.3 FUTURE RELEASE RATE RECOMMENDATION 38
6.4 FUTURE STORMWATER POLICIES 38
6.5 STORMWATER MANAGEMENT PRINCIPLES 39
6.6 STORMWATER MANAGEMENT STRATEGIES 40
6.7 INSPECTIONS AND MAINTENANCE 42

7.0 CONCLUSIONS AND RECOMMENDATIONS 44

7.1 GENERAL CREMONA PROPOSED IMPROVEMENTS 44
7.2 CURRENT DEVELOPMENT RECOMMENDATIONS 45
7.3 FUTURE DEVELOPMENT RECOMMENDATIONS 45

8.0 REFERENCES 46

FIGURES

Figure 1.1: Location Plan 3
Figure 2.1: Cremona Regional Catchments 7
Figure 2.2: Cremona Existing Infrastructure and Local Drainage Systems 10
Figure 4.1: Existing Overland Model Results 20
Figure 4.2: Existing Underground Model Results 21
Figure 5.1: Central West Catchment Proposed Improvements 27
Figure 5.2: Central East Catchment Proposed Improvements 32
Figure 5.3: East Catchment Proposed Improvements 35

TABLES

Table 3.1: Rural Subcatchment Parameters 15
Table 3.2: Urban Subcatchment Parameters 16
Table 3.3: Conveyance Infrastructure Manning's n Values 17
Table 3.4: CMP Culvert Codes 17
Table 5.1: Central West Catchment Proposed Improvements 25
Table 5.2: Centre Street Proposed Improvements 28
Table 5.3: 1 Street East/Railway Avenue Proposed Improvements 29
Table 5.4: 3 Street East/Railway Avenue Proposed Improvements 30
Table 5.5: 2A Avenue Proposed Improvements 31
Table 5.6: East Catchment Proposed Improvements 33
Table 5.7: Cremona Proposed Improvement Costs and Priorities 36
Table 6.1: Stream Flow Frequency Analysis Results 38
Table 6.2: End-of-Pipe Solutions 41
Table 6.3: Source Control Measures 42
Table 6.4: Drainage Inspection and Maintenance Schedule 43
Table 7.1: Cremona Improvement Costs and Priorities 44

APPENDICES

Appendix A: PCSWMM Schematics and Input/Output Files

Appendix B: Cremona Detailed Cost Estimates

1.0 INTRODUCTION

The Village of Cremona (Village) and Mountain View County (MVC) retained the services of MPE a division of Englobe (MPE) to complete a Regional Stormwater Management Plan for the Village and surrounding area. The analysis includes both the stormwater infrastructure within Village boundary, its upstream contributing catchments and the downstream infrastructure that will be impacted by changes to the Village runoff.

1.1 Study Area

The Village is located approximately 70 km northwest of the City of Calgary, at the intersection of Highway 580 and Highway 22. The Village boundary encompasses an area of 170 ha (***Figure 1.1***) and includes Highway 580, which is referred to as Railway Avenue. The existing development primarily consists of residential development with minor commercial businesses. East of the existing development within the Village boundary, there is approximately 90 ha of undeveloped land that is currently planned to include more residential properties.

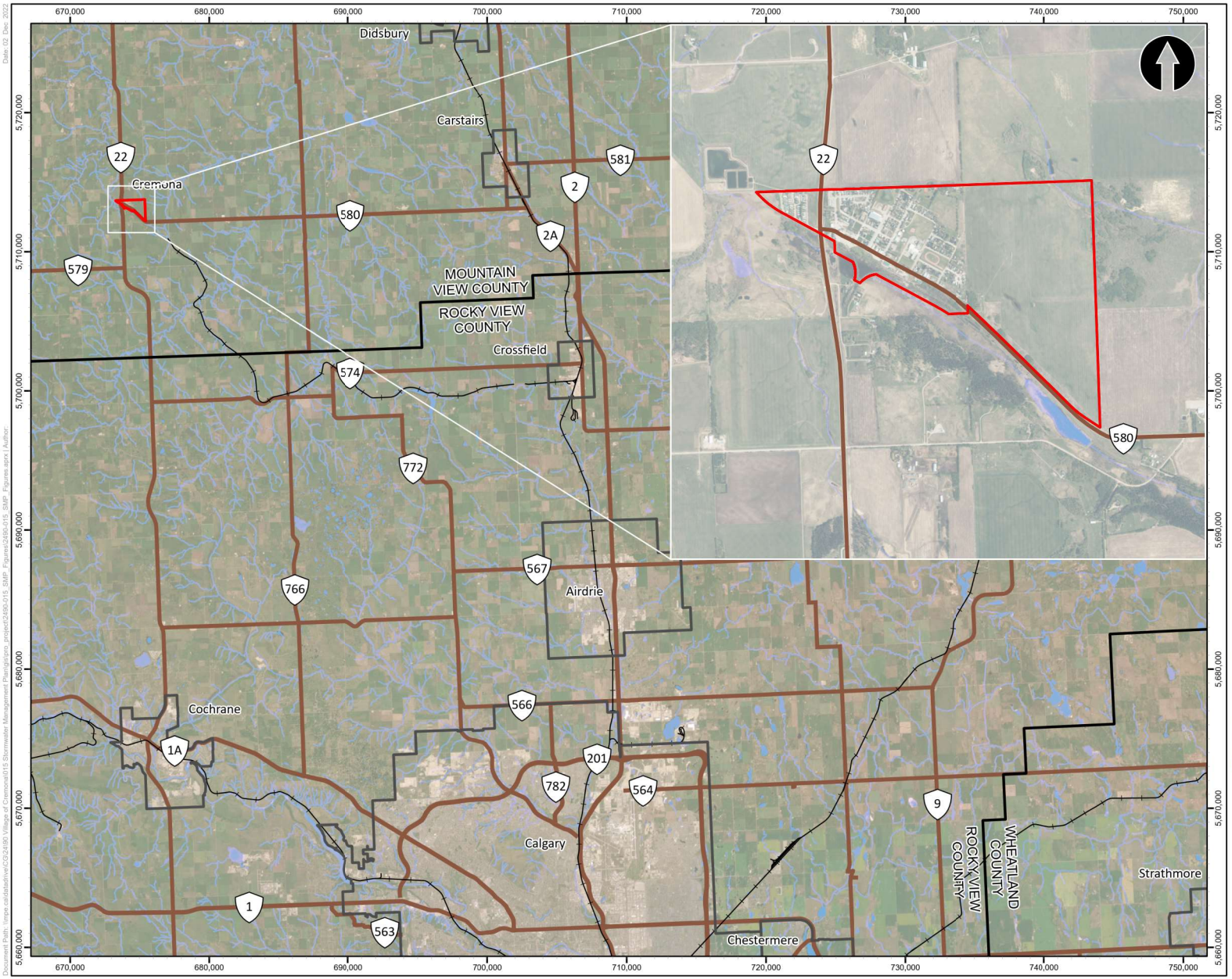
Within the Village, the drainage system includes underground storm sewer systems and a surface system such as curb and gutter or ditches with culverts to convey the runoff south towards several connected wetlands. The drainage of the surrounding rural catchments is generally directed away from the Village towards drainage paths downstream.

1.2 Scope of Work

This plan focuses on identifying existing drainage concerns (including capacity and erosion) during rainfall events and recommending infrastructure upgrades to eliminate these concerns across the Village. The future development stormwater requirements in the east portion of the Village boundary were also analyzed. The main tasks completed as part of this plan include:

- Consulting with the Village staff to identify existing drainage and erosion issues.
- Conducting field assessments of the existing stormwater drainage infrastructure both within and outside the Village boundary.
- Delineating and characterizing subcatchments within the Village and rural upstream catchments.

- Conducting hydrological and hydraulic modelling of existing stormwater conveyance systems (pipes, ditches, culverts, etc.).
- Reviewing the performance of existing drainage systems to identify drainage concerns with and without the new east development during rainfall events.
- Developing proposed improvements to resolve both the existing and potential drainage concerns along with associated cost estimates.
- Provide general recommendations for future development within the study area.



Legend

- Village of Cremona
- Municipal Boundary
- Municipal District / County Boundary
- Railway
- Highway
- Waterbody
- Watercourse

0 100 Km

Scale: 275,000
(ANSI B 11"x17")

Map Notes:
Background Layers: World Imagery; Mountain View County, Maxar; World Imagery; Earthstar Geographics; World Topographic Map; Esri, © OpenStreetMap contributors, HERE, Garmin, FAO, USGS, EPA, NPS, AAFC, NRCan
Data Sources: Altalis
Coordinate System: NAD 1983 UTM Zone 11N



a division of Englobe

TITLE
Location Plan
Cremona Regional Stormwater Study
Village of Cremona /Mountain View County

LOCATION	REVIEW
Village of Cremona	Drawn by DM on 02 Dec 2022
Mountain View County	Review by TW on 02 Dec 2022

JOB	FIGURE	REV	DATE
2490-015	1.1	A	02 Dec 2022

Date: 02 Dec 2022
Document Path: \\mpe.ca\data\win\CG\2490\Village of Cremona\015 Stormwater Management Planning\gis\gis_project\2490-015_SMP_Figures\2490-015_SMP_Figures.aprx | Author

1.3 Regulatory Requirements

This stormwater management assessment was developed based on current provincial guidelines and regulations. A description of the governing documents is provided in the following sections.

1.3.1 Stormwater Management Guidelines for the Province of Alberta, 1999

The *Stormwater Management Guidelines* sets out the requirements for new developments within the Province of Alberta. It presents general design criteria and approaches to manage stormwater generated from the developments. This includes water quantity (or rate) and water quality but also identifies other considerations such as downstream impacts that may need to be addressed. Stormwater Best Management Practices (BMPs) are also presented together with the key design criteria for each approach. This document provides guidance for stormwater drainage planning in rural and urbanized rural areas.

1.3.2 Water Act, 2000

Several natural streams are present in the adjacent drainage area of the Village; therefore, *Water Act* approval is required for future alteration/destruction of water bodies, such as a new outfall for future development. In addition to this, the *Alberta Wetland Policy* (2013) provides guidance and tools required to make management decisions regarding wetlands. The goal of the policy is to conserve, restore, protect, and manage Alberta's wetlands to sustain the benefits they provide to the environment, society, and economy.

1.3.3 Environmental Protection and Enhancement Act, 2000

Environmental Protection and Enhancement Act (EPEA) approvals are a condition for construction and operation of stormwater infrastructures such as pipes, ponds, and ditches.

1.4 Background Information

1.4.1 Infrastructure Inspections

A site visit was conducted in June 2022 to better understand the drainage systems and existing infrastructure conditions. As part of this site visit, culverts and pipes were inspected to determine the condition as well as information to be used in the stormwater modelling. Based on the site

investigations, it was seen that the culverts and pipes within the Village are in generally average to good condition, but some would benefit from frequent proper maintenance. The drainage concerns that have been raised by the Village operations personnel is further described in **Section 2.3.**

1.4.2 Previous Studies

Village of Cremona Infrastructure Study, 2005

An infrastructure study was conducted by MPE in July 2005 to review the Village's municipal infrastructure, including water, sanitary sewers, storm drainage systems, and road networks. From this review, recommendations were made for upgrading capacities of each system to meet current standards and anticipated growth. In terms of stormwater infrastructure, it was recommended that an underground storm system be constructed along each street perpendicular to Railway Avenue to better convey the flows.

Village of Cremona East Area Structure Plan, 2010

In 2010, Parkland Community Planning Services created an Area Structure Plan (ASP), with the assistance of MPE, for the future residential development east of the current development. The purpose of this document was to provide information on land use planning with conceptual considerations for municipal servicing. The ASP provided a land use concept, which consists of an area breakdown and a high-level drainage system including major storm sewers and stormwater pond facilities.

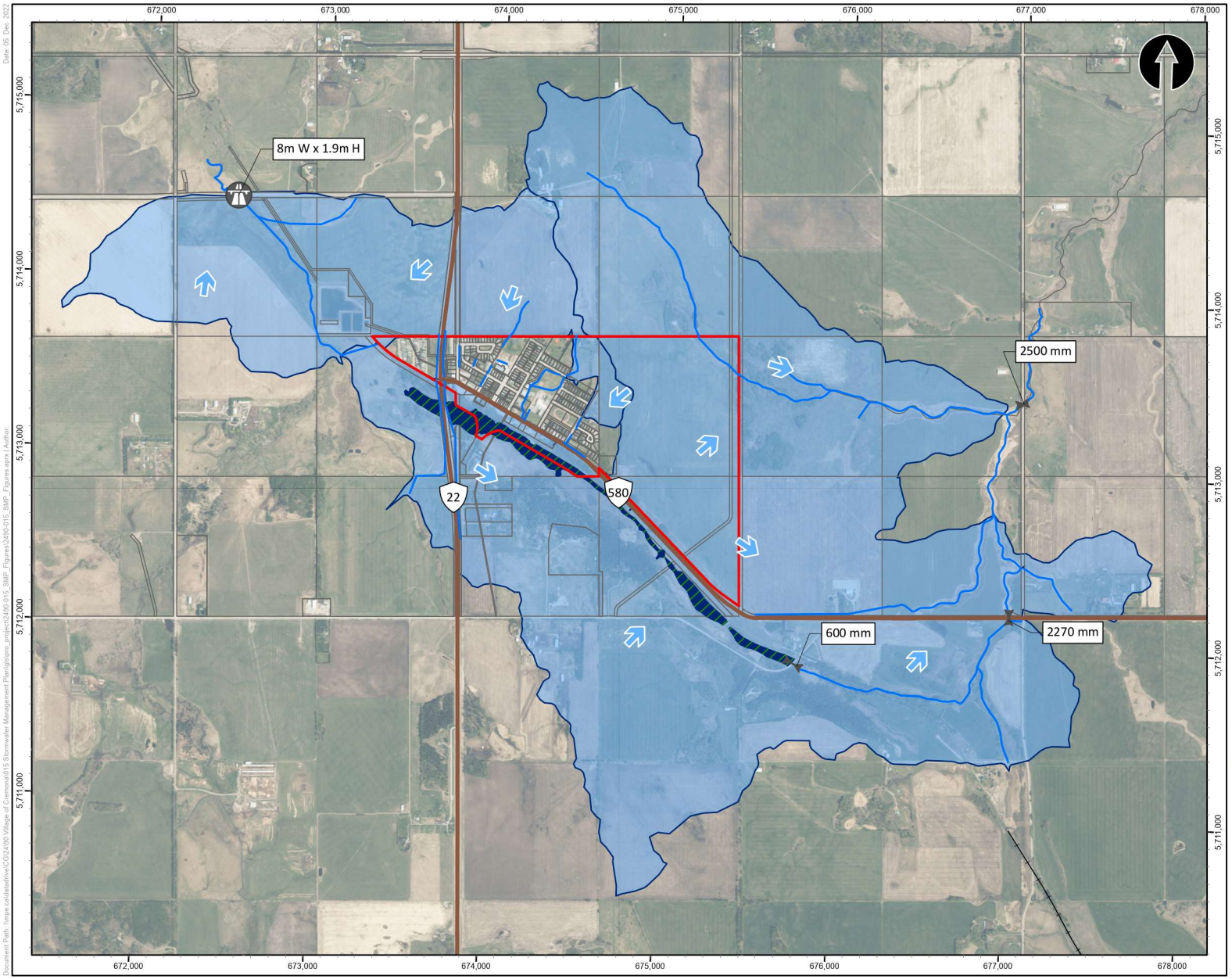
2.0 EXISTING DRAINAGE SYSTEMS

A review was conducted to understand the regional catchments outside the Village boundary as well as the local drainage systems. Regional catchments are defined in this scenario as undeveloped catchments both within and outside of the Village boundary, while local systems are within the existing developments.

2.1 Regional Catchments

The regional topography generally drains in an eastern direction towards the nearby tributaries, with few regional catchments that drain through the existing Village infrastructure. ***Figure 2.1*** shows the regional catchments impacting the study area, as well as their drainage directions. These catchments were delineated based on a topographical analysis of the LiDAR data and culvert locations.

The main regional catchments that are conveyed through the existing Village infrastructure are comprised of 62 ha of rural land north of the Village boundary. The regional catchments west of the Village boundary includes the Cremona lagoons and drains northwest towards Little Red Deer River. The regional catchments south of the Village include multiple wetland complexes that the Village runoff drains into. The regional catchments east of the existing developments include the system that the future development in this area will drain towards.



Legend

- Regional Catchments
- Drainage Path
- Culvert
- Bridge
- Flow Direction
- Wetland
- Village Boundary
- Highway
- Railway
- Cadastral

0 0.5 1 Km

Scale: 22,000
(ANSI B 11"x17")

Map Notes:
Background Layers: World Topographic Map, Mountain View County, Province of Alberta, Province of British Columbia, Esri Canada, Esri, © OpenStreetMap contributors, HERE, Garmin, USGS, NGA, EPA, USDA, NPS, AAFC, NRCan; World Imagery; Mountain View County, Maxar
Data Sources: Altalis
Coordinate System: NAD 1983 UTM Zone 11N



a division of Englobe

TITLE
Cremona Regional Catchments
Cremona Regional Stormwater Study
Village of Cremona / Mountain View County

LOCATION	REVIEW
Village of Cremona Mountain View County	Drawn by DM on 05 Dec 2022 Review by TW on 05 Dec 2022

JOB	FIGURE	REV	DATE
2490-015	2.1	A	05 Dec 2022

Date: 05 Dec 2022
Document Path: \\mpe.ca\data\drive\CO\2490 Village of Cremona\015 Stormwater Management Planning\plans_project\2490-015_SMP_Figures\2490-015_SMP_Figures.aprx | Author

2.2 Local Drainage Systems

Runoff from the existing developments within the Village typically drains in a southwest direction towards Railway Avenue before collecting in the wetland complexes south of Railway Avenue. The local drainage systems utilize overland drainage infrastructure such as ditches and culverts, and underground pipe systems to convey flows. The main local drainage systems can be divided into the following catchments:

- West Catchment,
- Central West Catchment,
- Central East Catchment,
- East Catchment.

Figure 2.2 shows the local catchments and the existing drainage infrastructure, which are further described in the following sections.

2.2.1 West Catchment

The West Catchment is located near the Village boundary, west of Highway 22, and consists of a mobile residential community. This catchment generally conveys flow overland and combines with the wetland complex south of Railway Avenue. A small portion of this catchment also combines with the regional catchment that drains west towards Little Red Deer River.

2.2.2 Central West Catchment

The Central West Catchment consists of developments such as residential houses, the community hall and arena, and local shops near its southern edge. Runoff from this area is conveyed through both overland and underground infrastructure towards four pipe locations that convey flow under Railway Avenue and into the southern wetlands.

2.2.3 Central East Catchment

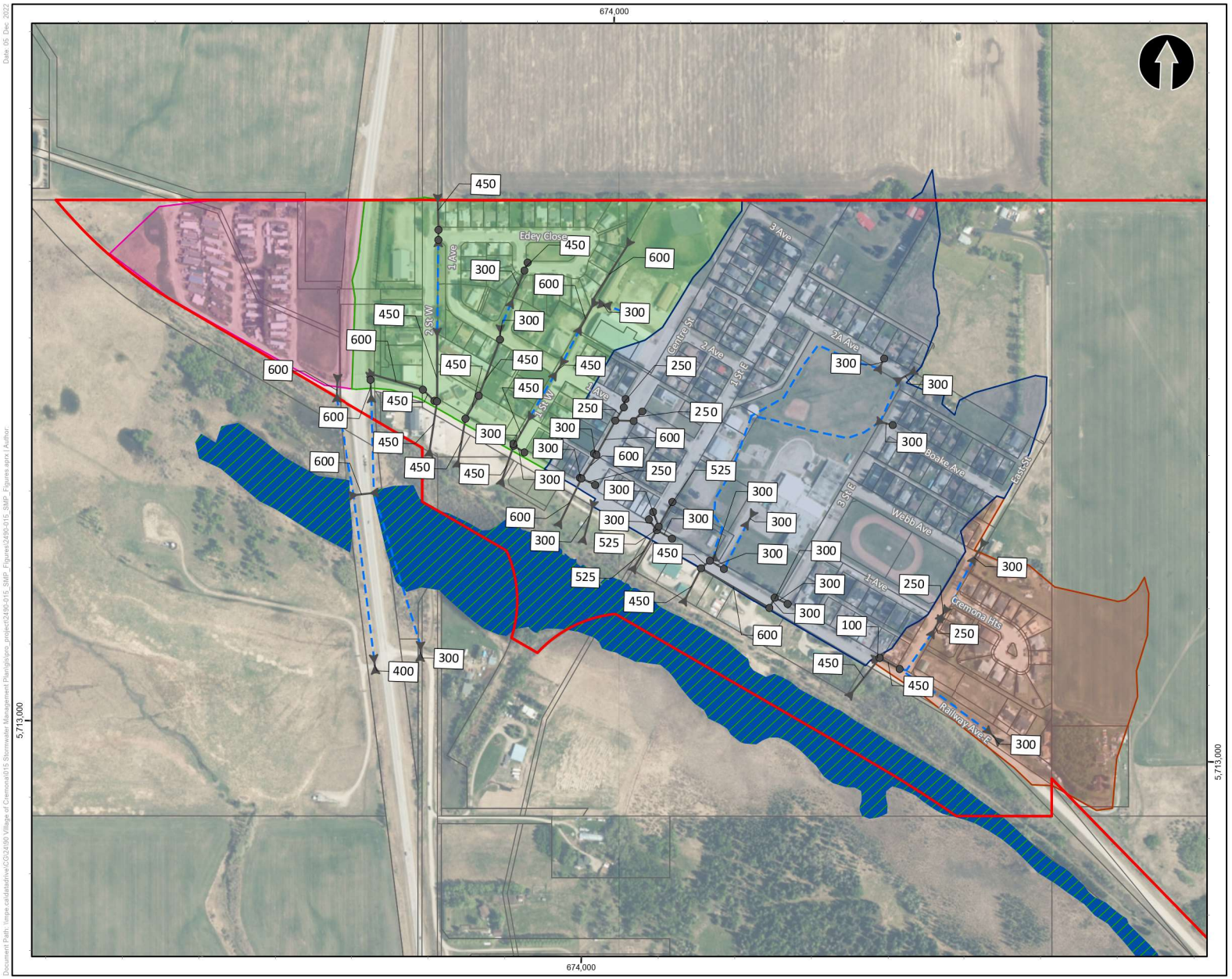
This catchment spans from Centre Street to East Street and includes residential houses, the Village office, and Cremona School along with its two large athletic fields. Similar to the Central West

Catchment, flows from this catchment utilize overland flow paths prior to an underground pipe network that includes three locations where the system crosses Railway Avenue.

2.2.4 East Catchment

The East Catchment extends to the edge of the existing development within the Village, and mainly includes residential lots. The runoff in this area flows south along East Street towards an underground pipe that crosses Railway Avenue. Flows that exceed the capacity of this underground system are conveyed northwest via the curb and gutter system along Railway Avenue towards the Central East Catchment.

There is a PVC pipe along the west side of East Street that collects groundwater flows and combines the flows into the stormwater system on Railway Avenue. As the groundwater flows are typically quite low, the PVC pipe was not included in the model, but it is recommended that this is accounted for in the detailed design phase, prior to construction.



Legend

- Catchbasin / Manhole
- Culvert Opening / Pipe Ends
- Existing Pipe (in mm)
- Existing Drainage Ditch
- West Catchment
- East Catchment
- Central West Catchment
- Central East Catchment
- Wetland
- Village Boundary
- Cadastral

0 25 50 100 150 m

Scale: 5,000
(ANSI B 11"x17")

Map Notes:
Background Layers: World Imagery; Mountain View County, Maxar; World Topographic Map; Mountain View County, Province of Alberta, Province of British Columbia, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS, AAFC, NRCan
Data Sources: Altalis
Coordinate System: NAD 1983 UTM Zone 11N



MPE
a division of Englobe

TITLE
Cremona Existing Infrastructure and Local Drainage Systems
Cremona Regional Stormwater Study
Village of Cremona / Mountain View County

LOCATION	REVIEW
Village of Cremona Mountain View County	Drawn by DM on 05 Dec 2022 Review by TW on 05 Dec 2022

JOB	FIGURE	REV	DATE
2490-015	2.2	A	05 Dec 2022

Date: 05 Dec 2022
Document Path: \\mpe.ca\data\drive\CO\2490 Village of Cremona\015 Stormwater Management Planning\gis\gis_project\2490-015_SMP_Figures\2490-015_SMP_Figures.aprx | Author

2.3 Existing Drainage Concerns

The Village operations personnel identified that the main drainage issues within the Village include the erosion of gravel roadways, which cause safety concerns as well as sediment to build up in the downstream infrastructure. The four main areas of concern include:

- 1 Street West near 1 Avenue,
- Centre Street north of the community arena,
- 3 Street East near 1 Avenue,
- East Street near 1 Avenue.

2.3.1 1 Street West Near 1 Avenue

1 Street West includes a grassed ditch system on the west side, which experiences erosion on the edge of the roads as flows attempt to enter it (***Photo 2.1***). This poses a safety concern for pedestrians and vehicles.



Photo 2.1: 1 Street West Erosion Concern

2.3.2 Centre Street North of the Community Arena

Near the Cremona Community Arena, a gravel patch is situated on the west side of Centre Street (***Photo 2.2***) where runoff flows onto and is then conveyed past the community arena. This gravel path frequently erodes, as well as a gravel strip north of the community arena (***Photo 2.3***). These gravel locations also cause capacity issues in the downstream culverts due to sediment buildup.



Photo 2.2: Centre Street Gravel Patch



Photo 2.3: Community Arena Gravel Strip

2.3.3 3 Street East Near 1 Avenue

South of Boake Avenue, 3 Street East is a gravel roadway that utilizes a curb and gutter system on both sides of the road. Despite the curb and gutter system, the gravel roadway gets eroded on the edge before the flow enters the curb and gutter. This erosion leads to flow frequently entering a driveway located at the intersection of 3 Street East and 1 Avenue East (***Photo 2.4***). The catchbasins at the southern end of this street also have a significant sediment accumulation, as seen in ***Photo 2.5***.



Photo 2.4: 3 Street East Erosion and Ponding



Photo 2.5: 3 Street East Sediment Buildup

2.3.4 East Street Near 1 Avenue

East Street utilizes a series of small culverts to convey flow under the driveways adjacent to the gravel road. This ditch then ends, and the flows are conveyed on the edge of road to the catchbasin at the south end. Due to the gravel nature of the road, the roadside is eroded and causes sediment to build up in the driveway culverts and catchbasin, which reduces conveyance capacity, as seen in ***Photo 2.6***.



Photo 2.6: East Street Erosion Concerns

3.0 STORMWATER MODEL DEVELOPMENT

The PCSWMM Version 5.1.015 modelling software was used to analyze the existing conditions and proposed drainage solutions for the study area. This software was chosen due to its ability to model various hydrological characteristics for rural and urban areas, as well as hydraulic routing of culverts and urban (major and minor) drainage infrastructure. Input/output files and schematics for the models are provided in ***Appendix A***.

3.1 Design Storms

The closest available Alberta Intensity-Duration-Frequency (IDF) curve data to the region being analyzed is the Sundre A rainfall gauging station. This station offers only 10 years of data but is representative of the rainfall experienced in the study area due to its proximity to the mountains. The two rainfall distributions selected for the rainfall analysis includes the 24-hour Huff distribution and the 4-hour Chicago distribution.

The 24-hour Huff distribution simulates steady, longer duration rainfall patterns from low pressure systems that are typically responsible for generating higher flows from larger rural catchments. The 4-hour Chicago distribution is representative of thunderstorm activity that applies more intense events over a shorter period of time, which produces the highest runoff from local urban catchments. Both distributions were examined for multiple return period storm events, but the 4-Hour Chicago distribution demonstrated governing flow estimates. This distribution was then used to evaluate the capacity of the existing infrastructure and to propose drainage improvements.

3.2 Subcatchments

The subcatchments from within the Village boundary as well as catchments that are impacted by the Village drainage have been incorporated into the stormwater model. These subcatchments were created using the Watershed Delineation Tool (WDT) in PCSWMM based on the Digital Elevation Model (DEM) derived from 1 m LiDAR data within the Village and 15 m LiDAR data in the rural areas. Subcatchments were reviewed and manually altered depending on the location of known drainage infrastructure and roadway features that create an impediment to the natural drainage paths. Wetland storage in some of the rural areas was estimated using DEM derived contours and incorporated into the

model as a storage node with a spill path. Subcatchment parameters were calibrated to ensure appropriate runoff characteristics are simulated.

3.2.1 Rural Catchment Runoff Parameterization

Rural catchments were modelled using the double layer Green Ampt equation by utilizing the LID module in PCSWMM. This equation ensures both surface and sub-surface flows are accounted for. The parameters used for rural subcatchments are shown in ***Table 3.1,*** which result in typical runoff values experienced by undeveloped catchments in the area. Other assumptions utilized for these subcatchments include no wetland storage, 30% initial saturation of the LID layer and variable impervious percentages.

Table 3.1: Rural Subcatchment Parameters

Parameter	Value
Surface	
Berm Height (mm)	27
Vegetation Volume (frac.)	0.10
Surface Roughness (Manning's n)	0.50
Surface Slope (%)	0.50
Soil	
Thickness (mm)	265
Porosity (frac.)	0.43
Field Capacity (frac.)	0.38
Wilting Point (frac.)	0.221
Conductivity (mm/hr)	1.2
Conductivity Slope (%)	10.0
Suction Head (mm)	240
Storage	
Thickness (mm)	5
Void Ratio	0.75
Seepage Rate (mm/hr)	0.10
Clogging Factor	0
Underdrain	
Drain Coefficient (mm/hr)	0.28
Drain Exponent	0.10
Drain Offset Height (mm)	2

3.2.2 Urban Catchment Parameterization

Urban catchments are defined in this analysis as subcatchments within the study area where grading has most likely been modified during the development process. Typically, pervious areas in urban catchments are mowed grass areas with less tree cover than rural catchments, and grading and soil features have been modified during the development process. The single layered Green Ampt equation rather than the LID module was used for these catchments.

The measuring tool in PCSWMM was utilized to manually estimate the impervious percentage of each urban subcatchment as well as the average slope of the area. Structures such as roadways, houses, and garages were considered 100% impervious, where gravel paths (back alleys, access roads, etc.) were considered 50% impervious. Depending on the catchment, a percentage of the impervious area was assumed to be routed over the adjacent pervious surfaces to avoid overestimating peak runoff in small storm events. The parameters utilized for the urban catchments are shown in ***Table 3.2***.

Table 3.2: Urban Subcatchment Parameters

Parameter	Value
Manning's n Impervious	0.013
Manning's n Pervious	0.15
Depression Storage Impervious (mm)	1.6
Depression Storage Pervious (mm)	3.2
Suction Head (mm)	210
Conductivity (mm/hr)	1.02
Initial Deficit (frac.)	0.261

3.3 Conveyance Infrastructure

The stormwater conveyance infrastructure (including ditches, culverts, catchbasins, curb and gutter, and storm pipes) were modelled utilizing LiDAR, field investigations, and survey data. ***Table 3.3*** shows the Manning's n roughness coefficients utilized for the different types of infrastructure.

Table 3.3: Conveyance Infrastructure Manning's n Values

Conveyance Type	Manning's n
Culvert – Concrete	0.013
Culvert – CSP	0.024
Ditch – Mowed Grass	0.035
Ditch – Tall Grass	0.050
Pipe – PVC	0.011

In addition to Manning's n values, the PCSWMM culvert code feature was used to include culvert losses depending on the inlet type. ***Table 3.4*** shows the typical culvert codes utilized for this area.

Table 3.4: CMP Culvert Codes

Culvert Type	Culvert Code
Headwall	4
Mitered to Slope	5
Projecting	6

Spill paths were added in locations where a piece of infrastructure did not have sufficient capacity for the more significant storm events modelled to demonstrate the direction of the overflow (i.e. overtop of the roadway) or converted to storage nodes to represent the ponding storage caused by the downstream flow restriction. The volume of the storage nodes was estimated using detailed LiDAR data and included spill points, if required. Catchbasin capacities were included in the model based on inlet capacity curves, which depends on the type of grated top, and pipe size leading to the main infrastructure.

4.0 EXISTING DRAINAGE SYSTEM ANALYSIS

Using the existing conditions stormwater model, the performance of the drainage infrastructure was evaluated using overland and underground analyses outlined in the following sections.

4.1 Overland Analysis

4.1.1 Ponding Extents

Ponding extents that occur in the 1:5 and 1:100 year storm events have been examined using the storage nodes in the model. These extents refer to localized inundation typically due to low-lying ground elevations with downstream drainage restrictions. Large ponding areas during more frequent return periods (i.e. 1:5 year) results in a higher risk than those during less frequent return periods (i.e. 1:100 year). Minor ponding on roadways or upstream of culverts are expected to occur in 1:100 year events; however, it becomes an issue when ponding enters private property or impacts infrastructure such as buildings.

Due to the steeply sloped topography in the Village, there are very few locations where ponding will occur. There may also be instances where flow may overtop curbs or ditches and cause ponding in private property not identified or quantified in this plan.

4.1.2 Flow Over Roadways

Typically, where there is minimal space for ponding to occur and insufficient drainage infrastructure capacity, flow may overtop the roadway crown and continue downstream. The locations where this occurs in the study area have been identified using the model results, as well as the lowest storm event it will occur (1:100, 1:50, 1:25, 1:10, 1:5, or 1:2 year storm events).

4.1.3 Flow Velocity vs. Depth

Alberta Environment and Protected Areas (AEPA) has created safety guidelines regarding the relationship between flow velocity and depth in overland drainage paths, which is important to analyze in an area such as the Village. Overland drainage infrastructure such as curb and gutters, ditches, and swales were analyzed using these guidelines for the 1:100 year storm event to identify areas that pose safety concerns.

4.2 Underground Analysis

4.2.1 Level of Service Estimates

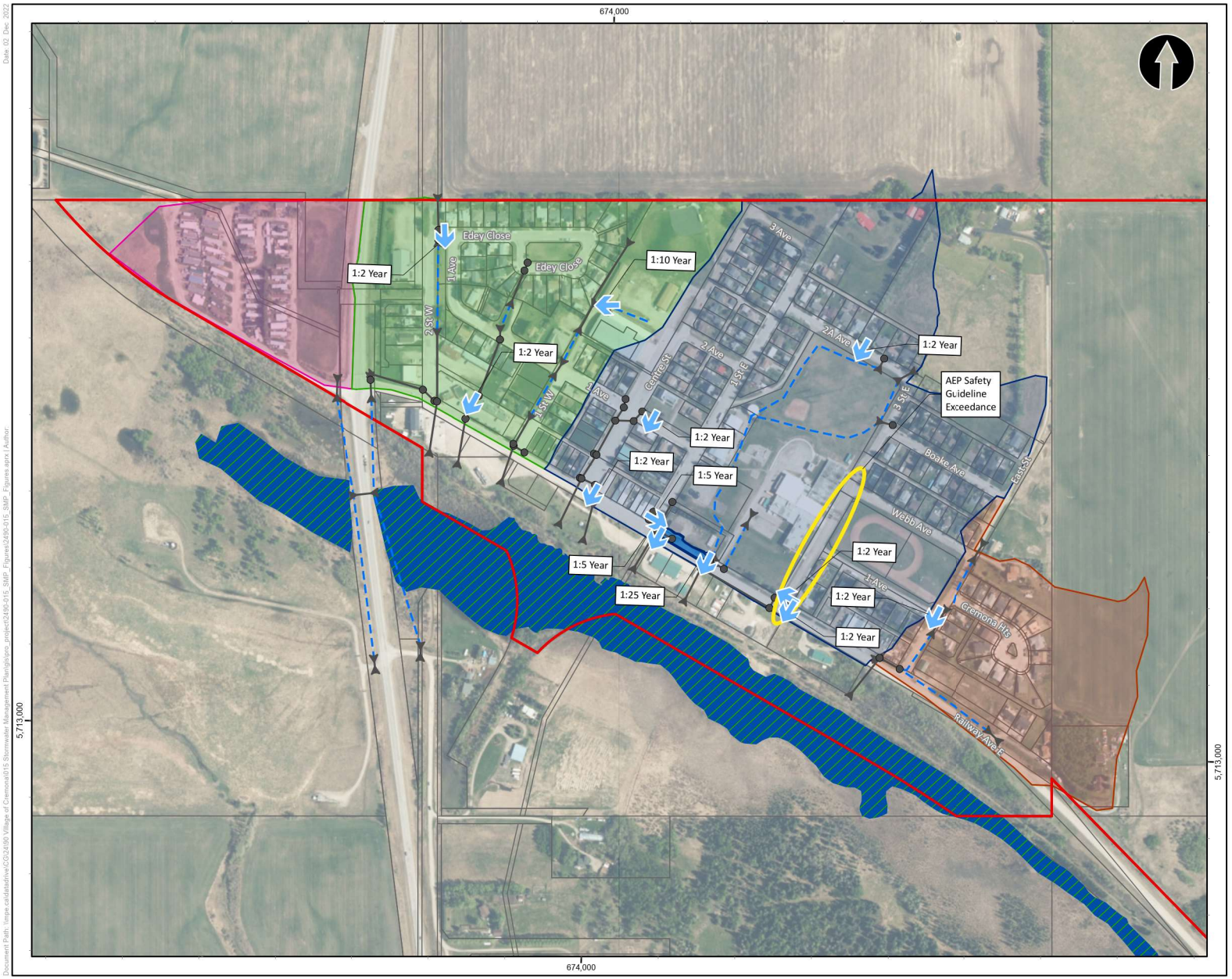
The Level of Service (LOS) is the capacity that a piece of drainage infrastructure, such as a culvert or storm sewer pipe, provides before its design capacity is reached. This is typically related to a design storm event and return period. The required LOS can vary depending on the importance of the infrastructure that it protects or the potential flood risk it might pose if the drainage system fails. Typically, an acceptable LOS of underground infrastructure for road types identified throughout the Village is 1:10 year.

The LOS of the culverts and pipes were estimated for the regional catchments and local drainage systems by removing all upstream restrictions, such as undersized infrastructure. This allowed the maximum flow for the infrastructure locations to be calculated for each return period, which was then used in the analyses.

The capacity of the existing culverts was estimated using the available headwater depth, which is typically measured from the invert of the upstream end of the culvert to the roadway elevation. A Manning's n calculation was used to determine the storm sewer pipe capacity before surcharge begins (the water level rises above the pipe obvert). The pipe capacities for both culverts and pipes were then compared to the unrestricted model flow results to determine a LOS.

4.3 Existing Model Results

The results of the overland and underground drainage system analysis described above can be seen in ***Figure 4.1*** and ***Figure 4.2*** and are further discussed in the following sections. ***Figure 4.1*** shows the ponding extents during more frequent storm events (i.e. 1:5 year) and less frequent (i.e. 1:100 year) as well as the locations that experience flow over the roadways, the corresponding return period, and the locations where the velocity depth guidelines are exceeded. ***Figure 4.2*** shows the LOS calculated for each piece of drainage infrastructure.



Legend

- Culvert Opening / Pipe Ends
- Existing Pipe
- West Catchment
- East Catchment
- Central West Catchment
- Central East Catchment
- 1:5 year Ponding Extents
- 1:100 year Ponding Extents
- Spill Over The Road (Storm Event)
- Existing Drainage Ditch
- Wetland
- Village Boundary
- Cadastral

0 25 50 100 150 m

Scale: 5,000
(ANSI B 11"x17")

Map Notes:
Background Layers: World Imagery; Mountain View County, Maxar; World Topographic Map; Mountain View County, Province of Alberta, Province of British Columbia, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS, AAFC, NRCan
Data Sources: Altalis
Coordinate System: NAD 1983 UTM Zone 11N



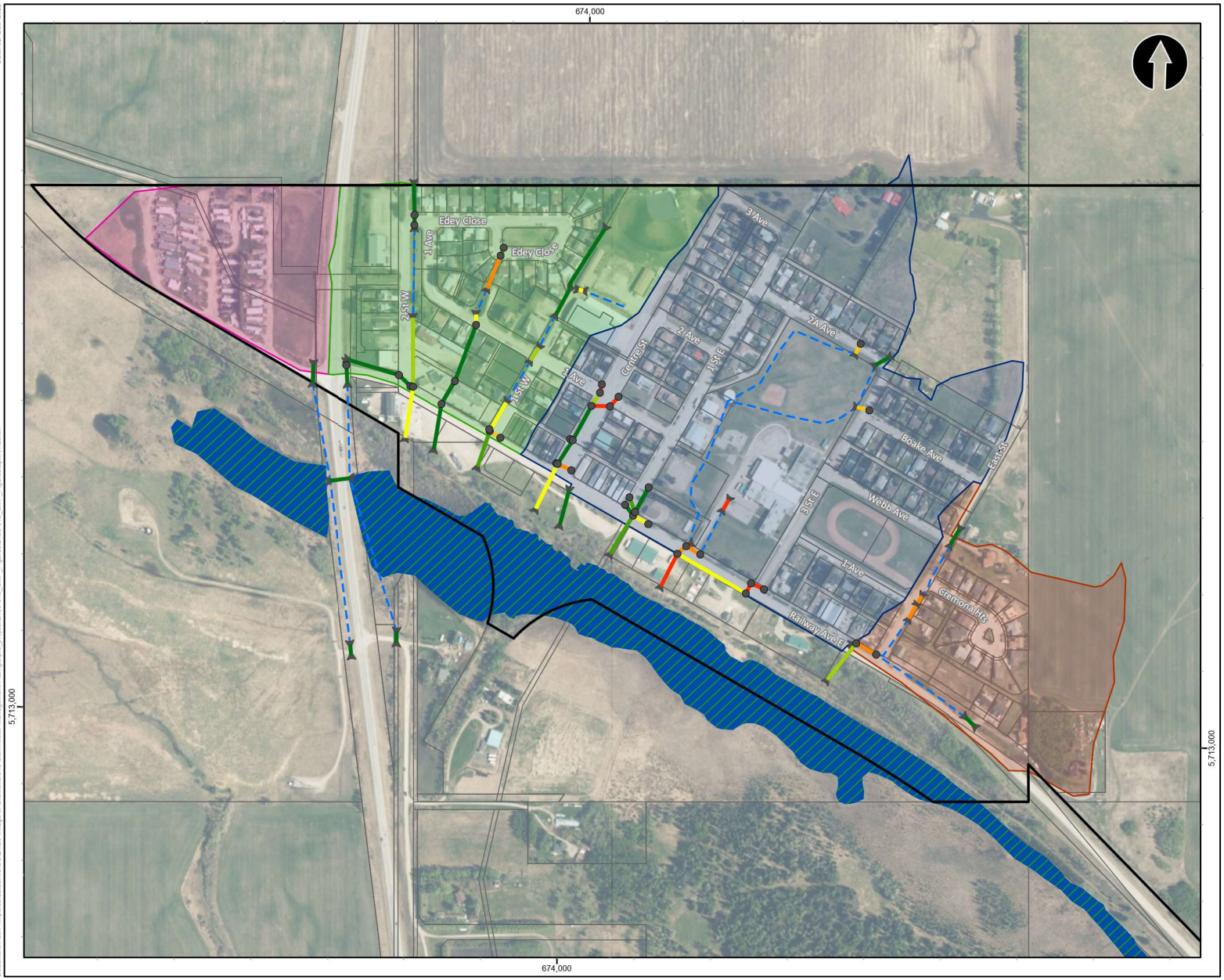
a division of Englobe

TITLE
Existing Overland Model Results
Cremona Regional Stormwater Study
Village of Cremona / Mountain View County

LOCATION	REVIEW
Village of Cremona Mountain View County	Drawn by DM on 02 Dec 2022 Review by TW on 02 Dec 2022

JOB	FIGURE	REV	DATE
2490-015	4.1	A	02 Dec 2022

Date: 02 Dec 2022
Document Path: \\mpe.ca\data\drive\CO\2490 Village of Cremona\015 Stormwater Management Planning\4pro_project\2490-015_SMP_Figures\2490-015_SMP_Figures.aprx | Author



Legend

- Catchbasin / Manhole

Pipes / Culverts - Level of Service

- <1:2 Year
- 1:2 Year
- 1:5 Year
- 1:10 Year
- 1:25 Year
- 1:50 Year
- 1:100 Year
- West Catchment
- East Catchment
- Central West Catchment
- Central East Catchment
- Existing Drainage Ditch
- Wetland
- Village Boundary
- Cadastral

0 25 50 100 150 m

Scale: 5,000
(ANSI B 11"x17")

Map Notes:
Background Layers: World Imagery; Mountain View County, Maxar; World Topographic Map; Mountain View County, Province of Alberta, Province of British Columbia, Esri Canada, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS, AAFC, NRCan
Data Sources: Altalis
Coordinate System: NAD 1983 UTM Zone 11N



a division of Englobe

TITLE
Existing Underground Model Results
Cremona Regional Stormwater Study
Village of Cremona / Mountain View County

LOCATION	REVIEW
Village of Cremona	Drawn by DM on 02 Dec 2022
Mountain View County	Review by TW on 02 Dec 2022

JOB	FIGURE	REV	DATE
2490-015	4.2	A	02 Dec 2022

Date: 02 Dec 2022
Document Path: \\mpe.ca\data\drive\CO\2490 Village of Cremona\015 Stormwater Management Planning\6 Proj_proj\CAD\2490-015_SMP_Figures\2490-015_SMP_Figures.aprx | Author

4.3.1 Regional Catchments

The analyses were completed for the regional catchments; however, most of the conveyance infrastructure has sufficient capacity for all flows, therefore it was not displayed on a separate figure. The culvert downstream of the Wetlands south of Railway Avenue, which conveys most of the flow from the Village under Township Road 300, was determined to have a 1:2 year LOS using the unrestricted model results. However, due to the upstream restrictions in the existing conditions model, the flow over the road currently occurs only in a 1:50 year storm event.

4.3.2 West Catchment

The West Catchment has no drainage concerns as there is only one culvert in the area, which has sufficient capacity for the 1:100 year storm event.

4.3.3 Central West Catchment

Mainly due to inadequate catchbasin inlet capacities, the Central West Catchment experiences flow over the roadways in two locations: the intersection of Edey Close and 2 Street West and the alley north of Railway Avenue. In addition to these two locations, the Cremona Curling Rink west entrance experiences flow over the walking path in a 1:10 year storm. No ponding locations were discovered; however, there are also a number of pipes and culverts that have a LOS lower than 1:10 year.

4.3.4 Central East Catchment

A portion of Railway Avenue just east of 1 Street East will experience ponding in both the 1:5 year and the 1:100 year event. At this same location, as well as two other locations at the south end of this catchment, flows overtop Railway Avenue in frequent return periods such as the 1:2 year event. Some of these flows over Railway Avenue will then spill through the private properties on the southern side of the road. The main causes of these issues are low LOS results along with the insufficient inlet capacity of catchbasins in several locations throughout the catchment.

The flows conveyed south along the 3 Street East in the curb and gutters exceed the AEPA safety guidelines in the 1:100 year storm event. Also, at the 1 Avenue and 3 Street East intersection, the flow enters a private property's driveway and ponds in a 1:5 year storm event. This ponding extent is minor

therefore it is not shown visually on the figure; however, this issue happens frequently and severely impacts the property owner's garage.

4.3.5 East Catchment

Upstream of the Railway Avenue and East Street intersection, multiple culverts are located under driveways, which will spill over the driveways in a 1:2 year storm event. The flow at this intersection that is not captured by the underground pipe system is conveyed west along Railway Avenue and avoids flowing south and overtopping the road. Multiple driveway culverts have a lower LOS due to both the pipe size and the allowable headwater depths. No ponding areas are experienced in this catchment.

5.0 PROPOSED IMPROVEMENTS

This section outlines the methodology for the improvement criteria and all proposed improvements for the drainage systems in the Village. The existing conditions PCSWMM model was altered according to the proposed improvement criteria. Refinement of the proposed improvements should be completed during the detailed design phase, prior to construction.

5.1 Proposed Improvement Criteria

The following sections outline the criteria utilized to determine if a piece of drainage infrastructure was recommended for upgrade as part of the proposed improvements.

5.1.1 Culverts/Pipes

The underground pipe network was analyzed using a LOS criterion; pipes with an LOS of less than a 1:5 year event were selected for upgrade. However, some pipe upgrades may not be required if the upstream capacity is sufficient to prevent flow from overtopping the road. Most roads within the Village can be classified as local roads, which allows flows to overtop the road in events up to a 1:10 year storm event.

Typically, roads classified as highways (Railway Avenue) only allow flows to overtop in a 1:100 year storm event. While Railway Avenue is considered a major road in the Village, its low-speed limit and minor traffic volume compared to other highways led to a smaller storm criterion as long as current conditions were improved. Due to cost and traffic implications, the proposed improvements attempt to minimize pipe upgrades underneath Railway Avenue where possible.

Due to blockage concerns, pipes were proposed to have a minimum diameter of 300 mm and culverts a minimum diameter of 450 mm.

5.1.2 Catchbasin Improvements

Improvements to catchbasins were proposed in some areas to increase the amount of flow captured by the underground system, which will lessen flow over the roads. Some of these improvements include adding new catchbasins or changing the inlet type to allow more flow capture. If the road grades permit, regrading around existing catchbasins has been proposed to allow a small ponding area on the road,

which increases flow capture rates. The areas that require additional or the replacement of catchbasins should be installed with a small depression below the gutter invert.

5.1.3 Road Reconstruction

The unpaved main roads in the Village are recommended to be paved to eliminate erosion concerns, maintain catchbasin capacities and alleviate pipe blockage concerns. Some paved roads are proposed to add curb and gutter where erosion is experienced due to runoff directed straight into ditches. These new curb and gutters should include curb cutouts to let the flows enter the ditches at controlled locations.

5.2 Regional Catchment Improvements

The existing conditions model resulted in only one area of concern in the regional catchments, which is the culvert under Township Road 300 near its intersection with Highway 580 (C64). An additional 600 mm CSP culvert is proposed in this location to improve the existing culvert's 1:2 year LOS to a 1:10 year LOS. This improvement will also reduce the frequency of flow over the road from a 1:50 to a 1:100 year storm event.

5.3 Central West Catchment Improvements

The proposed improvements to the drainage infrastructure within the Central West Catchment can be seen in ***Table 5.1*** and ***Figure 5.1***. This catchment also includes proposed curb and gutters as well as a concrete swale installation along 1 Street West to reduce erosion concerns.

Table 5.1: Central West Catchment Proposed Improvements

Pipe/Culvert Upgrades		
Location	**Existing Size (m)/Material**	**Proposed Size (m)/Material**
C68	0.3 / PVC	0.375 / PVC
C77_1	0.3 / CSP	0.45 / CSP
Other Upgrades		
Location	**Proposed Upgrade**	
J6	Regrade to allow 0.1 m of ponding	
J67[1]	Regrade to allow 0.1 m of ponding	
1 Street West	Install 110 m of curb and gutter Install 50 m of concrete swale	

1: This upgrade may not be required if the area is able to pond before spilling between buildings.

The catchbasin at the north end of Edey Close (J6) exhibited flows spilling across roadways in frequent storms such as a 1:2 year storm event. The existing conditions at this location were improved to only cause flow over the road in a 1:50 year storm. Also, in the Edey Close area, a pipe that is located between private property (C68) currently has a LOS 1:2 year storm, which has been improved to a 1:50 year LOS by upsizing the pipe.

Despite meeting the proposed improvement criteria, the culvert located under the Cremona Curling Rink west entrance (C77_1) was proposed to be upgraded due to flow concerns from the Village operations personnel. By installing a larger pipe at this location, the flow over the pathway has been improved from a 1:10 year to larger than a 1:100 year storm event.



Legend

- Culvert Improvement
- Pipe Improvement
- Catchbasin / Manhole Improvement
- Proposed Curb and Gutter
- Proposed Swale
- Existing Culvert Opening / Pipe Ends
- Existing Pipe
- Existing Catchbasin / Manhole
- West Catchment
- Central West Catchment
- Central East Catchment
- Wetland
- Existing Drainage Ditch
- Cadastral

0 25 50 m

Scale: 2,000
(ANSI B 11"x17")

Map Notes:
Background Layers: World Imagery; Mountain View County; World Topographic Map; Mountain View County, Province of Alberta, Province of British Columbia, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/NASA, EPA, USDA, AAFC, NRCan
Data Sources: Altalis
Coordinate System: NAD 1983 UTM Zone 11N



MPE
a division of Englobe

TITLE
Central West Catchment Proposed Improvements
Cremona Regional Stormwater Study
Village of Cremona / Mountain View County

LOCATION	REVIEW
Village of Cremona Mountain View County	Drawn by DM on 02 Dec 2022 Review by TW on 02 Dec 2022

JOB	FIGURE	REV	DATE
2490-015	5.1	A	02 Dec 2022

Date: 02 Dec 2022
Document Path: \\mpe.ca\data\drive\CO\2490 Village of Cremona\015 Stormwater Management Plan\gis\mxd_projects\2490-015_SMP_Figures\2490-015_SMP_Figures.aprx | Author

5.4 Central East Catchment Improvements

The proposed improvements in the Central East Catchment are primarily focused on the southern portion of the drainage system near Railway Avenue, as seen in ***Figure 5.2.*** The following types of upgrades utilized in these locations include:

- Replacing pipes or culverts due to capacity concerns.
- Increasing catchbasin capacities by regrading the area to allow for a small ponding area.
- Adding new catchbasins and pipes along Railway Avenue to direct more flow underground.

Due to the various proposed improvements in this catchment, they have been split up by location to be further discussed in the following sections:

- Centre Street,
- 1 Street East/Railway Avenue,
- 3 Street East/Railway Avenue,
- 2A Avenue.

5.4.1 Centre Street

These improvements are located at the intersection of Centre Street and both Railway Avenue and 1 Avenue and are shown in ***Table 5.2***.

Table 5.2: Centre Street Proposed Improvements

Pipe/Culvert Upgrades		
Location	**Existing Size (m)/Material**	**Proposed Size (m)/Material**
C86	0.25 / PVC	0.45 / PVC
C90	0.25 / PVC	0.375 / PVC
C91	0.25 / PVC	0.375 / PVC
Other Upgrades		
Location	**Proposed Upgrade**	
J79	Replace existing inlet with 1 x Type TwinC inlet Regrade to allow 0.1 m of ponding	
J84	Regrade to allow 0.2 m of ponding	
Centre Street (2 Avenue – 3 Avenue)	Install 160 m of curb and gutter	

These improvements cause the flow over the roadways to decrease significantly in frequency. The flow over 1 Avenue will now occur in a 1:25 year event, and the flow over Railway Avenue in a 1:100 year event, which are significant improvements from the 1:2 year event shown in the existing conditions model.

5.4.2 1 Street East/Railway Avenue

The improvements outlined in ***Table 5.3*** are located at the intersection of Railway Avenue and 1 Street East as well as near the Cremona School driveway. The proposed improvements related to Railway Avenue avoid replacing drainage infrastructure that is located within the southern private properties. Therefore, new pipe connections (C144_1 and C144_2) are proposed to direct flow west to combine with the upgraded pipe (C103). At the south end of 1 Street East, the pipe crossing Railway Avenue (C65) is proposed to be upsized to reduce flows over the road.

Table 5.3: 1 Street East/Railway Avenue Proposed Improvements

Pipe/Culvert Upgrades		
Location	**Existing Size (m)/Material**	**Proposed Size (m)/Material**
C95	N/A	0.525 / PVC
C99	0.3 / PVC	0.525 / PVC
C103	0.525 / CSP	2 x 0.75 / CSP
C105	0.3 / PVC	0.525 / PVC
C108	0.3 / PVC	0.375 / PVC
C144_1	N/A	0.75 / PVC
C144_2	N/A	0.75 / PVC
Other Upgrades		
Location	**Proposed Upgrade**	
J18	Replace existing inlet with 1 x Type C inlet	
J89	Replace existing inlet with 1 x Type K3 inlet	
J99	Regrade to allow 0.2 m of ponding	
J115	1 x Type TwinC inlet – New	

In the existing conditions model, flow over 1 Street East and Railway Avenue is expected in a 1:5 year event. However, this frequency lessens to a 1:10 year event with the proposed improvements. Flow that spills into the southern private properties has also been reduced from a 1:25 year to a 1:100 year storm event.

5.4.3 3 Street East/Railway Avenue

For immediate improvements to the area, catchbasins located at the intersection of 3 Street East and Railway Avenue require hydrovaccing to remove the sediment buildup. All further improvements in this area are seen in ***Table 5.4*** and ***Figure 5.2***, but the two major improvements include:

- Paving 3 Street East (Boake Avenue to Railway Avenue) to avoid erosion concerns.
- Installing a new storm sewer along 3 Street (1 Avenue to Railway Avenue).

At the south end of 3 Street East, the pipe crossing Railway Avenue (C111_1) is also proposed to be upsized to reduce flows over the road.

Table 5.4: 3 Street East/Railway Avenue Proposed Improvements

Pipe/Culvert Upgrades		
Location	**Existing Size (m)/ Material**	**Proposed Size (m)/ Material**
C63	N/A	0.45 / PVC
C111_1	0.3 / PVC	0.525 / PVC
C111_2	0.3 / PVC	0.525 / PVC
C113	0.3 / PVC	0.45 / PVC
C115	0.3 / PVC	0.45 / PVC
C121	N/A	0.45 / PVC
C135	N/A	0.525 / PVC
C135_1	0.3 / PVC	0.525 / PVC
C143	N/A	0.45 / PVC
Other Upgrades		
Location	**Proposed Upgrade**	
J111	1 x Type C inlet – New	
J112	1 x Type TwinK2 inlet – New	
J131	1 x Type C inlet – New	
J135	1 x Type K2 inlet – New	
3 Street East	Pave 185m of roadway	

The existing conditions model demonstrated flow across 3 Street East as well as Railway Avenue in a 1:2 year storm event. These improvements resulted in flow over these locations to increase to a 1:25 year storm event. Previously, flow that is not captured by the southern Railway Avenue catchbasin then spills into the southern private site in a 1:2 year storm event, but this has also been improved to a 1:50 year storm.

At the intersection of 1 Avenue and 3 Street East, the property owner's driveway experienced flow overtopping the curb in a 1:5 year storm. This will now be improved to only occur in a 1:100 year storm. As 3 Street East was considered an area that poses a safety concern in terms of the AEPA guidelines, the improvements described in this section mitigate that risk.

5.4.4 2A Avenue

The proposed improvement located on 2A Avenue, as seen in ***Table 5.5*** and ***Figure 5.2***, has reduced the frequency of flow over 2A Avenue from a 1:2 year to a 1:10 year storm event.

Table 5.5: 2A Avenue Proposed Improvements

Location	Proposed Upgrade
J28	Replace existing inlet with 1 x Type TwinK2 inlet



Legend

- Road Reconstruction
- Culvert Improvement
- Pipe Improvement
- Catchbasin / Manhole Improvement
- Proposed Curb and Gutter
- Existing Culvert Opening / Pipe Ends
- Existing Pipe
- Existing Catchbasin / Manhole
- East Catchment
- Central West Catchment
- Central East Catchment
- Existing Drainage Ditch
- Wetland
- Cadastral

0 25 50 m

Scale: 2,500
(ANSI B 11"x17")

Map Notes:

Background Layers: World Topographic Map; Mountain View County, Province of Alberta, Province of British Columbia, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCan; World Imagery; Mountain View County, Maxar
Data Sources: Altalis
Coordinate System: NAD 1983 UTM Zone 11N



a division of Englobe

TITLE
Central East Catchment Proposed Improvements
Cremona Regional Stormwater Study
Village of Cremona / Mountain View County

LOCATION	REVIEW
Village of Cremona Mountain View County	Drawn by DM on 02 Dec 2022 Review by TW on 02 Dec 2022

JOB	FIGURE	REV	DATE
2490-015	5.2	A	02 Dec 2022

Date: 02 Dec 2022
Document Path: \\mpe.ca\data\drive\CO\2490 Village of Cremona\015 Stormwater Management Planning\gis\mxd_projects\2490-015_SMP_Figures\2490-015_SMP_Figures.aprx | Author:

5.5 East Catchment

The proposed improvements for the East Catchment are primarily focused on alleviating drainage concerns along Railway Avenue as well as erosion mitigation along East Street. These improvements can be seen in ***Figure 5.3*** and include the following types of upgrades:

- Increasing catchbasin capacities by lowering catchbasin rim elevations and changing inlet types.
- Increasing pipe sizes where required.
- Adding new catchbasins and pipes along Railway Avenue and East Street (including required manholes where pipes intersect).
- Paving East Street (Webb Avenue to Railway Avenue) to avoid existing erosion concerns.

These upgrades are further outlined in ***Table 5.6***.

Table 5.6: East Catchment Proposed Improvements

Pipe/Culvert Upgrades		
Location	**Existing Size (m)/Material**	**Proposed Size (m)/Material**
C2	N/A	0.3 / PVC
C34	0.45 / CSP	0.9 / CSP
C39	N/A	0.45 / PVC
C44	0.4 / CSP	0.75 / CSP
C111	N/A	0.3 / CSP
C122	0.1 / PVC	0.45 / PVC
C136	N/A	0.3 / PVC
C138	N/A	0.525 / PVC
C140	N/A	0.3 / PVC
Other Upgrades		
Location	**Proposed Upgrade**	
J39	1 x Type C inlet – New	
J117	Replace existing inlet with 1 x Type TwinC inlet	
J120	1 x Type TwinC inlet – New	
J133	1 x Type C inlet – New	
J134	1 x Type TwinK2 inlet – New	
East Street	Pave 185 m of roadway, include curb and gutter on both sides	

During a 1:2 year storm, flow across several private property driveways occur. The implementation of the proposed improvements causes flows to be conveyed through the new curb and gutter in a 1:10 year storm event; however, this overland flow will not overtop the curb and enter private properties. The flow over East Street in the existing conditions occurred in a 1:2 year storm event, which

will now be improved to occur in a 1:50 year storm event. While the flow along Railway Avenue was carried west through a curb and gutter, the upsizing of pipe (C34) as well as other upgrades in this area decreases the amount of overland flow that is contributed to the Central East Catchment.



Legend

- Road Reconstruction
- Culvert Improvement
- Pipe Improvement
- Catchbasin/Manhole Improvement
- Existing Culvert Opening / Pipe Ends
- Existing Pipe
- Existing Catchbasin / Manhole
- East Catchment
- Central East Catchment
- Existing Drainage Ditch
- Wetland
- Cadastral

0 25 50 m

Scale: 1,500
(ANSI B 11"x17")

Map Notes:
Background Layers: World Topographic Map; Mountain View County, Province of Alberta, Province of British Columbia, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/NASA, EPA, USDA, AAFC, NRCan; World Imagery; Mountain View County, Maxar
Data Sources: Altalis
Coordinate System: NAD 1983 UTM Zone 11N



a division of Englobe

TITLE
East Catchment Proposed Improvements
Cremona Regional Stormwater Study
Village of Cremona / Mountain View County

LOCATION	REVIEW
Village of Cremona Mountain View County	Drawn by DM on 02 Dec 2022 Review by TW on 02 Dec 2022

JOB	FIGURE	REV	DATE
2490-015	5.3	A	02 Dec 2022

Date: 02 Dec 2022
Document Path: \\mpe.ca\data\drive\GO\2490 Village of Cremona\015 Stormwater Management Planning\gis_project\2490-015_SMP_Figures\2490-015_SMP_Figures.aprx | Author

5.6 Improvement Cost Estimates

High-level cost estimates have been developed for the proposed improvements, which have been outlined in the previous sections. These costs as well as priorities of each improvement area can be seen in ***Table 5.7***, while further details can be found in ***Appendix B.*** The following allowances have been added to each cost estimate to account for the entire project amount:

- Design Cost – 15%,
- Contingency – 25%,
- Mobilization and Demobilization – 10%.

Table 5.7: Cremona Proposed Improvement Costs and Priorities

Catchment	Location	Cost	Priority
East	N/A	$ 562,000	High
Central East	3 Street East	$ 400,000	High
Central East	1 Street East	$ 318,000	Medium
Central East	Centre Street	$ 187,000	Medium
Regional Catchments	Township Road 300	$ 24,000	Medium
Central West	N/A	$ 159,000	Low
Central East	2A Avenue	$ 3,000	Low
TOTAL		**$ 1,653,000**	-

It is recommended that any improvements made to drainage infrastructure be implemented from the downstream end of the system to the upstream end, if the improvements at a certain location are not all being upgraded at the same time.

6.0 FUTURE DEVELOPMENT AND PLANNING CONSIDERATIONS

If development and land use practices are not adequately designed and maintained, negative impacts to infrastructure, property, wetlands, watercourses, and the downstream receiving outfalls can result. To provide orderly and planned development of associated stormwater management systems, a set of stormwater management policies and guiding principles are proposed to assist with sustainable development of a new community or subdivision. The policies and guiding principles can be included in the stormwater section of the Village bylaws or standards to ensure the recommendations in the sections below are followed.

6.1 Potential Grant Opportunities

Several grant opportunities may be available to provide financial assistance for the construction of the proposed improvements. Examples of these grants include:

- **Water Resiliency and Restoration Program (WRRP):** A provincial program typically directed towards small natural infrastructure projects.
- **Disaster Mitigation and Adaptation Fund (DMAF):** An Infrastructure Canada program to support community projects that mitigate the potential for economic, environmental, and social impacts of climate change. The maximum federal contribution is 40% and can be applied to small or large-scale projects.
- **Alberta Community Resilience Program (ACRP):** This provincial program aims to assist municipalities in projects related to creating flood resilient communities. All aspects of the project (design, land, construction, etc.) are eligible for funding. This program does not currently have budget allocated to fund projects in 2023 however, it may be reinstated in the future.
- **Alberta Community Partnership (ACP):** This provincial grant program provides municipalities that collaborate regionally with funds to complete studies and design work for infrastructure improvements. These funds are not eligible to be used for construction.

6.2 Future Drainage Infrastructure Recommendations

Drainage infrastructure such as catchbasins without ponding area, known as flow-by conditions, do not effectively utilize the underground sewer system as the capture capacity is much lower relative to a catchbasin with a small ponding area included. Due to the sloped topography of the region, this can be

difficult; however, any future catchbasins installed are recommended to avoid these flow-by conditions and include at least 0.1 m of ponding area as road conditions permit.

6.3 Future Release Rate Recommendation

A frequency analysis of historical hydrometric data was completed for multiple nearby Water Survey Canada Stations to recommend a release rate for future developments. Two stream gauges were chosen due to proximity to the Village, as well as having extensive data to analyze. The peak flows and corresponding Unit Area Release Rates (UARRs) resulting from this analysis are shown in ***Table 6.1***.

Table 6.1: Stream Flow Frequency Analysis Results

Station Name	Station Number	Effective Drainage Area (km^2)	1:100 Year Peak Flow (m^3/s)	1:100 Year UARR (L/s/ha)
Little Red Deer River Near Water Valley	05CB002	451	219	4.8
Fallentimber Creek Near Sundre	05CA012	489	360	7.3

Due to a comparable drainage area to the study catchments and conservative release rate, the Little Red Deer River Near Water Valley station was selected for future release rate targets. Any runoff from new developments within the Village is recommended to meet the lesser of the pre-development flow rate or determined release rate of 4.8 L/s/ha.

6.4 Future Stormwater Policies

Potential developments will need to be planned and designed to minimize the potential impacts on existing developments and infrastructure, environmentally sensitive areas such as wetlands, and the management of volume to meet the objectives of the ultimate receiving stream. Policies have been developed and recommended to control the peak flow rate and timing as well as improve water quality from a development.

The key stormwater management policy recommendations include:

- Provide constructed wetlands, wet ponds, and other measures to provide detention storage to control peak flows to a maximum discharge rate of 4.8 L/s/ha in the 1:100 year storm event. If

possible, runoff from future development areas should avoid combining with existing drainage infrastructure.

- Provide a stormwater conveyance system that directs stormwater flows above pre-development levels away from natural wetlands and streams that will be retained.
- Adopt Low Impact Development (LID) practices to reduce erosion impacts on smaller streams and improve water quality.

6.5 Stormwater Management Principles

The following stormwater principles should be incorporated into the planning, design, construction, and management of new development within the communities:

- Restrict the flows from a 1:100 year storm event to the lesser of the pre-development flow rate or 4.8 L/s/ha.
- Provide water quality improvement/enhancement practices as required by Alberta Environment and Protected Areas (AEPA).
- Design a safe overland flow path in the road or public right-of-way (ROW) without impacting private properties.
- Set building and building opening elevations a minimum of 0.3 m above the 1:100 year flood levels.
- Include a paved road design complete with curb and gutter, where applicable, to avoid erosion concerns.
- Locate public drainage infrastructure within a ROW or registered easement.
- Design new development outside the current 1:100 year flood risk areas.
- Retain existing wetlands in accordance with the *Provincial Wetland Policy*.
- Provide riparian buffers between development and natural wetlands and watercourses.

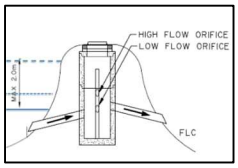
6.6 Stormwater Management Strategies

In addition to flood control, other design criteria may need to be considered to mitigate downstream impacts including water quality, erosion of smaller streams and impact to natural wetlands. A range of stormwater management controls could be considered for future development including:

- **End-of-Pipe Solutions:** Practices that control flow rates and treat stormwater at the outlet of drainage systems before it reaches the receiving streams or water bodies. These controls are usually implemented to manage the runoff from larger development areas.
- **Source Control Practices (SCPs):** Practices that reduce runoff quantity and improve quality of stormwater before it reaches a municipal conveyance system. The controls are applied at the individual or multiple lot level, or at the street level and generally manages smaller areas.
    - LID Practices are common types of SCPs. LID is a term used to describe a land planning and engineering design approach to managing stormwater runoff. LID emphasizes conservation and use of on-site natural features to provide flow control and protect water quality. This approach implements engineered small-scale measures to replicate the pre-development hydrologic regime of watersheds.

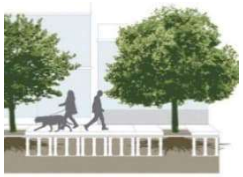
Table 6.2 and ***Table 6.3*** show a summary of several End-of-Pipe Solutions and Source Control Practices, respectively, and their potential applicability within the Village of Cremona.

Table 6.2: End-of-Pipe Solutions

End-of-Pipe Solutions		Description	Applicability to the Village
Dry Ponds		Impoundment areas used to temporarily detain stormwater runoff, restricting the downstream discharge to pre-determined rates and reducing downstream flooding and erosion potential. Less suitable where high groundwater exists.	✓
Wet Ponds Photo Source: www.calgary.ca		Pond active storage is used temporarily to detain stormwater runoff and promote settlement of runoff pollutants, as well as to the restrict downstream discharge to predetermined rates to reduce downstream flooding and erosion potential. Storage can also be retained for irrigation or other approved reuse purposes.	✓✓✓
Engineering Existing Natural Wetlands Photo Source: www.riparian.ca		Modified natural wetlands with forebays, outlet control structures or other engineered components used to increase stormwater storage and treatment capabilities. Requires AEPA approval.	✓
Constructed Stormwater Wetlands		Wetlands designed and constructed specifically for stormwater management purposes and to provide some ecological amenity value. Grading encourages large shallow areas with wetland meadow plantings.	✓✓
Naturalized Storm Pond Photo Source: www.nativeplantsolutions.ca		Naturalized storm ponds have the same hydraulic function as a wet pond but generally feature flatter side slopes and are vegetated with native wetland and riparian plantings.	✓✓✓
Pond Outlet Flow Control		Providing a dual orifice control on the outlet limits flows for small to medium events. Most applicable when discharging into smaller streams and can be used at all end-of-pipe facilities.	✓✓

Controls on the outlets used in conjunction with the End-of-Pipe Solutions outlined in ***Table 6.2,*** such as dual orifice structures, can assist in limiting flows in different storm events.

Table 6.3: Source Control Measures

Source Control Measures		Description	Applicability to the Village
Swales/ Bioswales		Shallow grassed channels that accept flows from small areas of adjacent paved surfaces. These provide flow attenuation as well as treatment of stormwater through settling, fine filtration, extended detention, and some biological uptake.	✓✓✓
Green Roofs		Veneers of living vegetation installed on top of buildings. These manage stormwater through a variety of hydrologic processes that otherwise take place at ground level.	✓
Rainwater Harvesting Photo Source: Joel Cantu, Houston, Texas		Collection of runoff from a roof area or other impermeable surface before discharge onto the ground into a storm sewer system.	✓
Resilient (Absorbent) Landscaping and Rain Gardens		Ability of topsoil to effectively store and slowly release water is dependent on soil texture, structure, depth, organic matter content, and biota. Rain gardens are comprised of resilient landscape with a shallow depression. They are most effective when involving the redirection of downspouts from the roof.	✓✓✓
Soil Cells and Tree Trenches		Soil cells provide adequate soil volume for healthy tree growth under hard pavements. Stormwater is directed to soil cells to provide a source of water and water quality treatment. Tree trenches are similar in function by directing stormwater to trees but may not be located under hard pavements.	✓✓
Permeable Pavement Photo Source: www.quietnature.ca		A permeable surface that allows precipitation and runoff from adjacent areas to percolate into the ground beneath. Mostly applicable in non trafficable or lightly trafficked areas.	Generally Not Applicable

6.7 Inspections and Maintenance

To ensure the drainage system can convey the intended design flows during major storm events, it is important to conduct regular inspection and maintenance activities. This includes conducting maintenance on catchbasins, stormwater outfalls, culvert crossings, and stormwater ponds as described in ***Table 6.4***. Additional maintenance activities around the stormwater ponds, drainage ditches and

natural conveyance systems may be required or desirable, such as landscaping to meet community expectations.

Table 6.4: Drainage Inspection and Maintenance Schedule

Type	Description	Frequency
Catchbasin	Remove silt and debris buildup	Spring and fall
Culverts	Remove debris and repair erosion	Spring and fall, after major event
Stormwater Outfall	Repair erosion and remove debris	Spring and fall, after major event
Channels and Ditches	Repair erosion and remove debris	Spring and fall, after major event
Channels and Ditches	Vegetation and woody weed maintenance	Fall and as required for aesthetic needs
Stormwater Pond Inlet and Outlet	Repair erosion and debris buildup	Spring and fall, after major event
Stormwater Pond Forebay	Dewater and remove silt	5 to 10 years
Stormwater Pond	Dewater and remove silt	20 to 25 years

7.0 CONCLUSIONS AND RECOMMENDATIONS

The existing drainage system analysis for the Village of Cremona indicated that drainage is a concern in multiple locations within the Village boundary. These concerns are due to insufficient conveyance capacities of pipes and culverts, minimal ponding allowances on catchbasins, and gravel paved roads. Improvements to the drainage systems have been proposed in locations where infrastructure has been determined to be lower than an acceptable capacity, or where flows spill across the crown of the road in frequent storm events.

7.1 General Cremona Proposed Improvements

To meet the proposed improvement criteria described in **Section 5.1**, the following upgrades are recommended for the general Village of Cremona area:

- Culvert and pipe upgrades in locations where the capacity is below an acceptable level.
- Increased catchbasin capacity by replacing or adding inlets.
- Inspecting and maintaining drainage infrastructure frequently and paving major undeveloped roads.

All recommended upgrades are further described in **Sections 5.2-5.5** and the cost estimates as well as priorities are summarized in ***Table 7.1***.

Table 7.1: Cremona Improvement Costs and Priorities

Catchment	Location	Cost	Priority
East	N/A	$ 562,000	High
Central East	3 Street East	$ 400,000	High
Central East	1 Street East	$ 318,000	Medium
Central East	Centre Street	$ 187,000	Medium
Regional Catchments	Township Road 300	$ 24,000	Medium
Central West	N/A	$ 159,000	Low
Central East	2A Avenue	$ 3,000	Low
TOTAL		**$ 1,653,000**	-

7.2 Current Development Recommendations

The recommendations for the current stormwater systems in the Village of Cremona study area are as follows:

- Upgrade drainage infrastructure such as pipes, culverts, and catchbasins as identified in this report.
- Ensure upgrades to each system are completed starting from the downstream end of a system to avoid additional flooding and infrastructure damage.
- Utilize the detailed design processes to confirm final infrastructure sizes and alignments.
- Implement frequent and consistent inspection and maintenance measures for drainage infrastructure.

The detailed design processes for each improvement described in **Sections 5.2-5.5** may include, but is not limited to the following tasks:

- Obtaining locate information,
- Conducting detailed site survey,
- Confirming pipe sizes and materials,
- Identifying and obtaining regulatory approvals,
- Obtaining crossing agreements (if required),
- Developing further detailed cost estimates,
- Creating construction drawings,
- Establishing specifications (if required).

7.3 Future Development Recommendations

To minimize potential future drainage concerns, stormwater management principles and strategies for new developments should be utilized to control the 1:100 year flow rate to meet the lesser of the pre-development flow rate or the determined release rate of 4.8 L/s/ha. If possible, runoff from future development areas should avoid combining with existing drainage infrastructure. To ensure sustainable development, the considerations described in **Section 6.0** should be integrated into the Village bylaws.

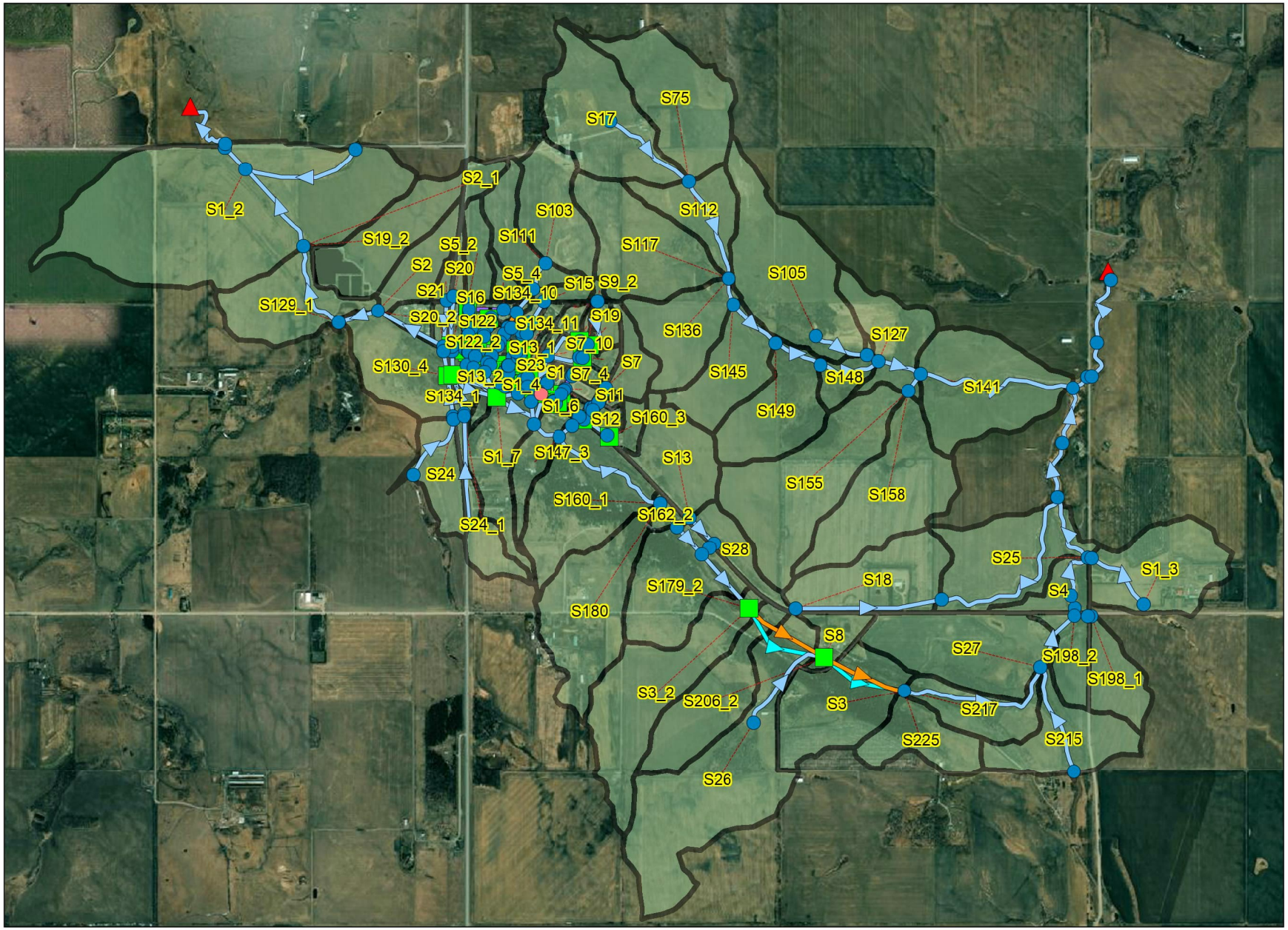
8.0 REFERENCES

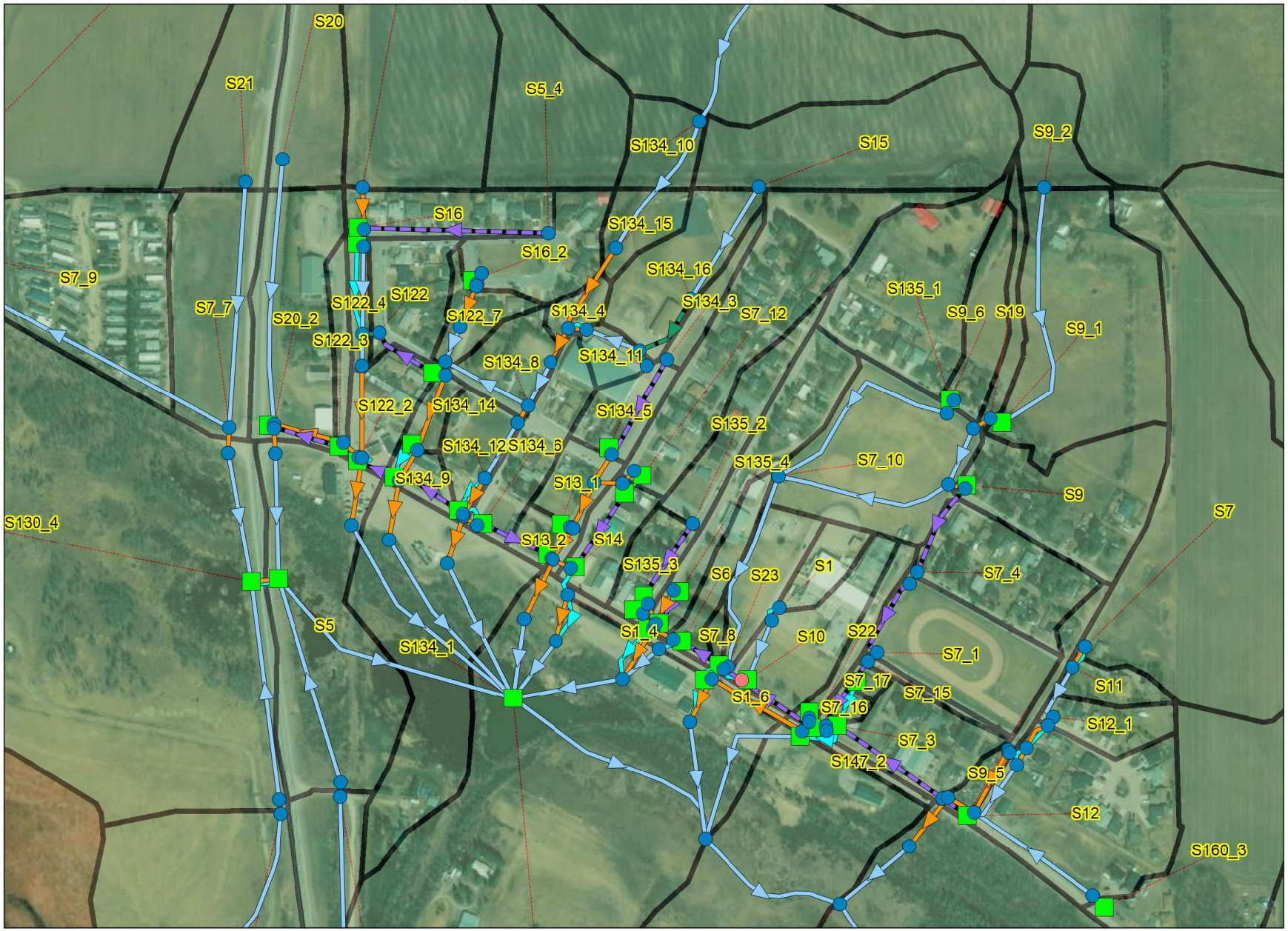
- City of Calgary, 2011. *"Stormwater Management & Design Manual,"* City of Calgary Wastewater & Drainage.
- City of Calgary, 2017. *"Standard Specifications of Sewer Construction,"* City of Calgary Water Resources, 2017.
- Rossman, Lewis A., 2010. *"Storm Water Management Model User's Manual Version 5.0"*.

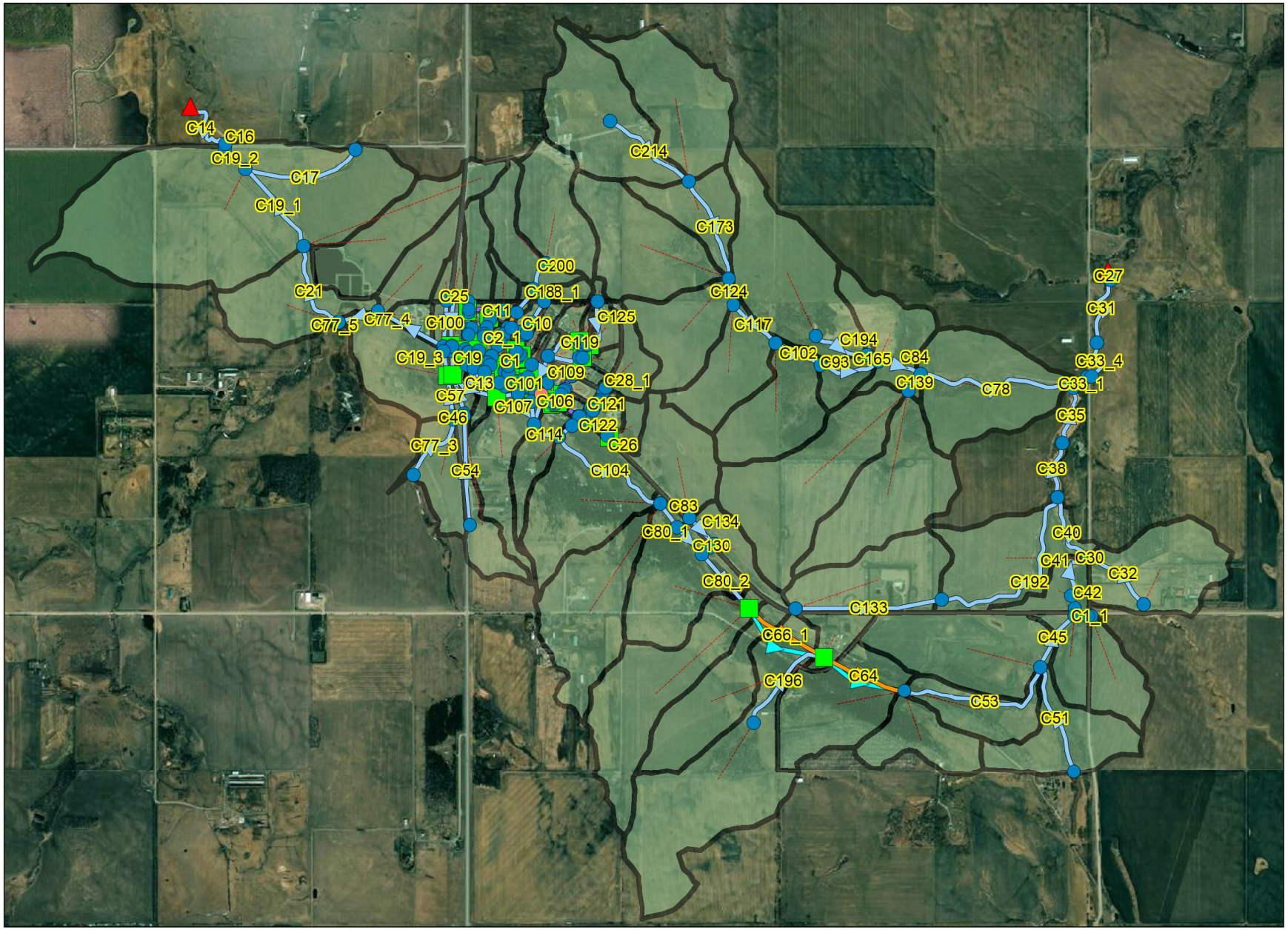
APPENDIX A

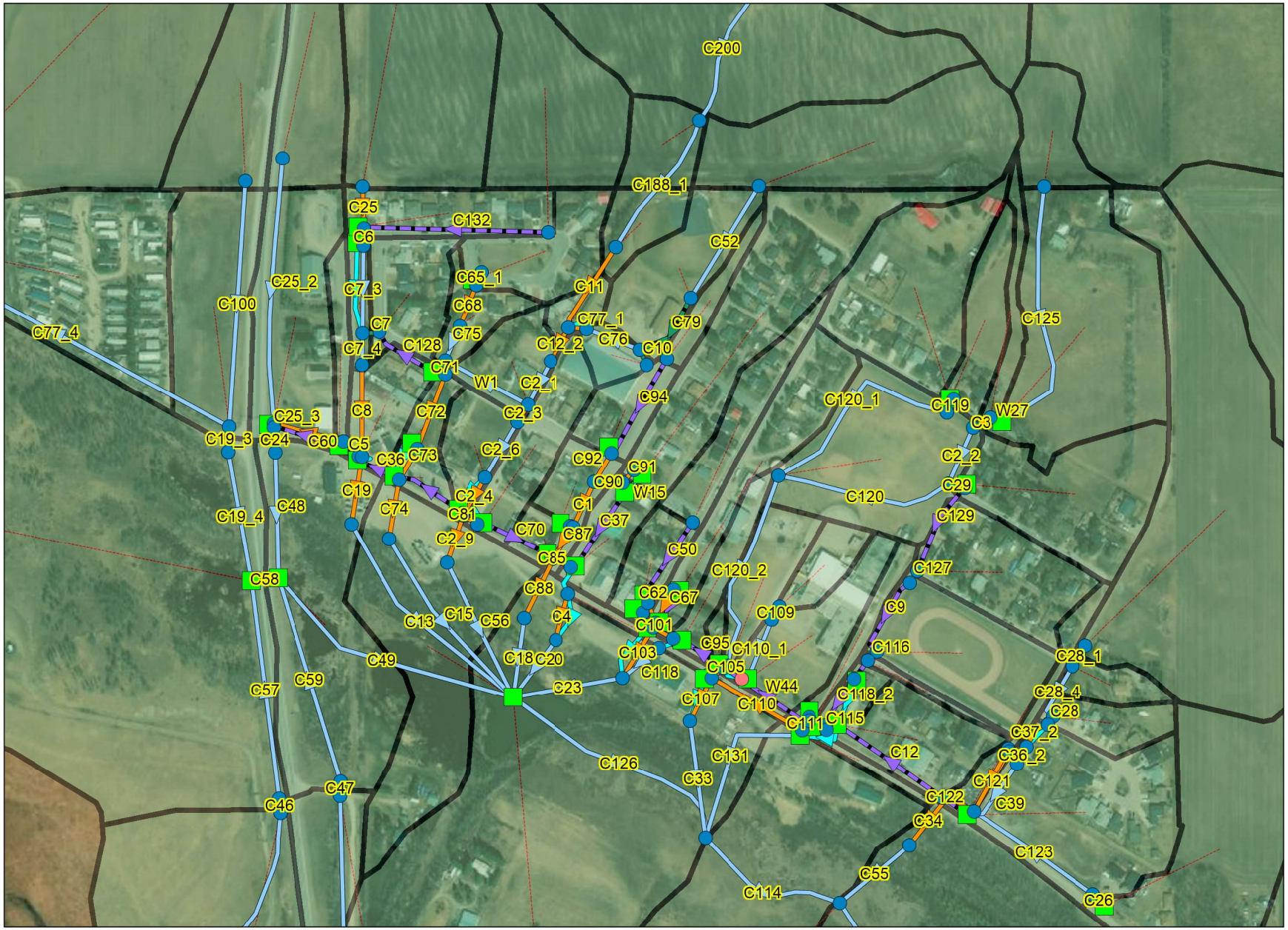
PCSWMM Schematics and Input/Output Files

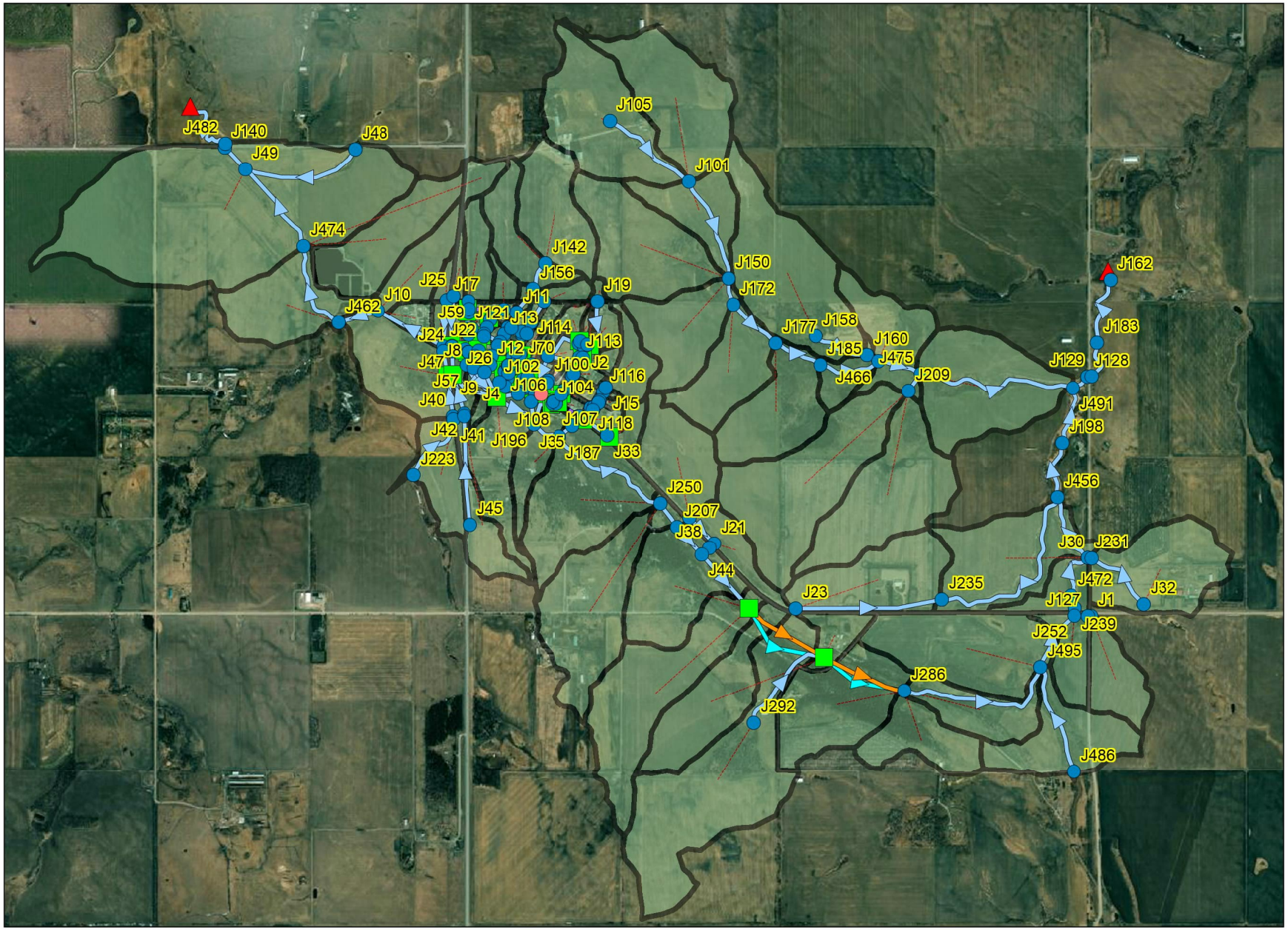
SCHEMATICS

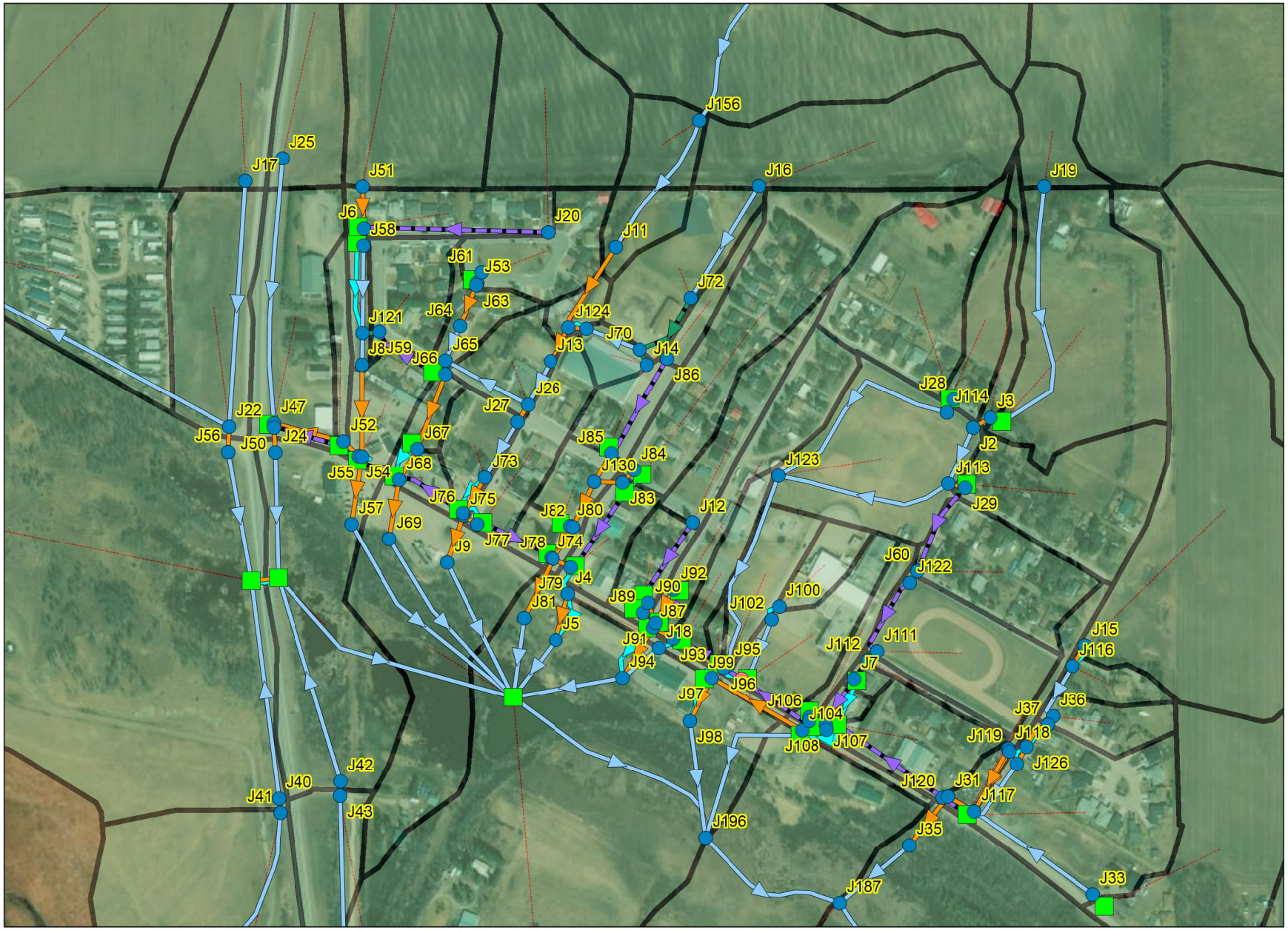

S75
S17
S2_1
S1_2
S103
S112
S19_2
S5_2
S111
S117
S2
S20
S5_4
S15
S9_2
S105
S21
S16
S134_10
S129_1
S19
S20_2
S122
S134_11
S136
S127
S122_2
S13_1
S7_10
S7
S130_4
S23
S1
S7_4
S145
S148
S141
S13_2
S1_4
S11
S134_1
S1_6
S12
S160_3
S149
S1_7
S147_3
S13
S24
S155
S158
S160_1
S162_2
S24_1
S28
S25
S1_3
S18
S179_2
S4
S180
S8
S27
S198_2
S198_1
S3_2
S206_2
S3
S217
S225
S215
S26


S20
S21
S5_4
S134_10
S15
S9_2
S16
S134_15
S16_2
S134_16
S7_9
S135_1
S7_7
S20_2
S122_4
S122
S122_7
S134_4
S134_3
S7_12
S9_6
S19
S9_1
S122_3
S134_11
S134_8
S122_2
S134_14
S134_5
S135_2
S134_12
S134_6
S135_4
S7_10
S134_9
S13_1
S9
S7
S130_4
S13_2
S14
S135_3
S6
S23
S1
S7_4
S5
S1_4
S7_8
S10
S22
S134_1
S7_1
S7_17
S11
S1_6
S7_15
S7_16
S12_1
S7_3
S147_2
S9_5
S12
S160_3


C14
C16
C19_2
C17
C19_1
C21
C77_5
C77_4
C100
C25
C11
C10
C2_1
C19_3
C19
C1
C13
C101
C109
C57
C107
C106
C121
C46
C122
C114
C26
C77_3
C54
C104
C28_1
C200
C188_1
C125
C119
C214
C173
C124
C117
C102
C194
C93
C165
C84
C139
C78
C27
C31
C33_4
C33_1
C35
C38
C40
C41
C30
C32
C192
C42
C1_1
C45
C83
C134
C80_1
C130
C80_2
C133
C66_1
C64
C196
C53
C51


C200
C188_1
C25
C132
C6
C52
C65_1
C25_2
C7_3
C11
C100
C68
C77_1
C79
C7
C125
C77_4
C75
C76
C7_4
C128
C12_2
C10
C71
W1
C2_1
C94
C120_1
C119
C25_3
C8
C72
C2_3
C3
W27
C19_3
C24
C60
C5
C2_6
C92
C2_2
C36
C73
C91
C90
C29
C19
C2_4
W15
C120
C48
C1
C129
C19_4
C74
C61
C37
C70
C87
C2_9
C50
C85
C127
C58
C120_2
C88
C62
C67
C9
C109
C13
C15
C56
C4
C101
C116
C95
C110_1
C28_1
C49
C18
C20
C103
C105
C118
C57
C59
C23
W44
C118_2
C28_4
C107
C110
C28
C111
C115
C37_2
C131
C12
C36_2
C126
C33
C121
C47
C122
C39
C46
C34
C123
C55
C114
C26


J482
J140
J48
J49
J474
J462
J10
J105
J101
J142
J156
J19
J11
J150
J172
J162
J183
J177
J158
J160
J185
J475
J466
J209
J129
J128
J491
J198
J456
J25
J17
J59
J121
J13
J24
J22
J114
J113
J8
J12
J70
J47
J26
J102
J100
J2
J116
J57
J9
J4
J106
J104
J15
J40
J108
J107
J118
J42
J41
J196
J35
J187
J33
J223
J45
J250
J207
J38
J21
J44
J23
J235
J30
J231
J472
J32
J127
J1
J239
J252
J495
J286
J292
J486


J156
J25
J17
J51
J16
J19
J6
J58
J20
J11
J61
J53
J72
J64
J63
J124
J121
J70
J65
J59
J66
J13
J14
J86
J26
J28
J114
J3
J22
J47
J27
J56
J50
J24
J52
J67
J85
J2
J68
J84
J123
J55
J54
J73
J130
J113
J76
J75
J83
J29
J57
J82
J80
J12
J69
J9
J77
J78
J74
J60
J122
J4
J92
J79
J90
J100
J89
J102
J81
J87
J5
J18
J15
J91
J112
J111
J116
J93
J95
J99
J7
J94
J96
J97
J106
J37
J36
J104
J119
J118
J98
J108
J107
J126
J42
J40
J120
J31
J41
J117
J43
J196
J35
J33
J187

EXISTING RAINFALL

INPUT FILES

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CMS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        YES
SKIP_STEADY_STATE    NO

START_DATE           06/03/2022
START_TIME           00:00:00
REPORT_START_DATE    06/03/2022
REPORT_START_TIME    00:00:00
END_DATE             06/04/2022
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:01:00
DRY_STEP             00:01:00
ROUTING_STEP         1
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              10

[EVAPORATION]
;;Data Source    Parameters
;;--------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
Huff_24h_100y_101.3mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_100y_101.3mm
Huff_24h_10y_67.6mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_10y_67.6mm
Huff_24h_25y_81.2mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_25y_81.2mm
Huff_24h_2y_40.5mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_2y_40.5mm
Huff_24h_50y_91.3mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_50y_91.3mm
Huff_24h_5y_56.8mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_5y_56.8mm
Sundre_4h_100y   INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_100y
Sundre_4h_10y    INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_10y
Sundre_4h_25y    INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_25y
Sundre_4h_2y     INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_2y
Sundre_4h_50y    INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_50y
Sundre_4h_5y     INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_5y

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
;Local Central East
S1               Sundre_4h_5y     J100             0.4143   52       37.664   4        0
;West
S1_2             Sundre_4h_5y     J49              104.202639 100    1132.637 6.09     0
;East
S1_3             Sundre_4h_5y     J32              26.9617  100      512.957  5.831    0
;Local Central East
S1_4             Sundre_4h_5y     J4               0.159    70       9.938    0.5      0
;Local Central East
S1_6             Sundre_4h_5y     SU31             0.0783   70       9.434    1        0
;East
S1_7             Sundre_4h_5y     SU3              19.0603  100      596.367  5.389    0
;Local Central East
S10              Sundre_4h_5y     SU29             1.1169   33       55.845   4.5      0
;Upstream
S103             Sundre_4h_5y     J142             20.1611  100      314.811  4.3      0
```

;East
S105 Sundre_4h_5y J158 40.6845 100 263.485 4.64 0
;Local East
S11 Sundre_4h_5y J116 0.3635 12 33.657 5 0
;Upstream
S111 Sundre_4h_5y J142 12.2857 100 179.921 3.4 0
;East
S112 Sundre_4h_5y J101 15.1432 100 545.152 6.499 0
;East
S117 Sundre_4h_5y J150 29.6565 100 326.974 5.5 0
;Local East
S12 Sundre_4h_5y SU37 2.5307 20 127.813 7 0
;Local East
S12_1 Sundre_4h_5y J36 0.5337 22 40.128 6 0
;Central West
S122 Sundre_4h_5y J59 0.8907 24 65.589 5 0
;Central West
S122_2 Sundre_4h_5y SU21 0.7093 40 55.85 3.73 0
;Central West
S122_3 Sundre_4h_5y SU42 0.3359 60 15.77 3.5 0
;Central West
S122_4 Sundre_4h_5y J121 0.2679 10 20.93 3.5 0
;Central West
S122_7 Sundre_4h_5y J64 0.459 35 39.569 5 0
;East
S127 Sundre_4h_5y J466 17.3706 100 650.181 4.343 0
;West
S129_1 Sundre_4h_5y J462 22.0431 100 688.828 4.96 0
;East
S13 Sundre_4h_5y J46 18.501 100 270.088 3.7 0
;Local Central East
S13_1 Sundre_4h_5y SU18 0.4485 45 58.247 3.5 0
;Local Central East
S13_2 Sundre_4h_5y SU19 0.303 26.915 40.4 1.6 0
;East
S130_4 Sundre_4h_5y SU1 21.55 100 446.838 4.147 0
;East
S134_1 Sundre_4h_5y SU3 3.4404 100 255.228 4.47 0
;Upstream
S134_10 Sundre_4h_5y J156 0.6367 100 69.814 4.7 0
;Central West

S134_11 Sundre_4h_5y J14 0.2774 68 39.07 1 0
;Central West
S134_12 Sundre_4h_5y J73 0.5975 30 37.344 2 0
;Central West
S134_14 Sundre_4h_5y SU6 0.2511 40 32.192 3.5 0
;Central West
S134_15 Sundre_4h_5y J11 0.4965 3 51.719 2.5 0
;Central West
S134_16 Sundre_4h_5y J72 1.2397 10 62.929 2.5 0
;Local Central East
S134_3 Sundre_4h_5y J86 0.3215 33 18.164 2.2 0
;Central West
S134_4 Sundre_4h_5y J124 0.248 42 31 4 0
;Local Central East
S134_5 Sundre_4h_5y SU14 0.5397 22 51.894 4.8 0
;Central West
S134_6 Sundre_4h_5y SU11 0.9513 37 44.662 4 0
;Central West
S134_8 Sundre_4h_5y J26 0.6623 20 63.076 4.47 0
;Central West
S134_9 Sundre_4h_5y SU7 0.2918 40 38.395 3.5 0
;Local Central East
S135_1 Sundre_4h_5y SU38 2.1457 16 99.8 6 0
;Local Central East
S135_2 Sundre_4h_5y J12 0.833 13 32.589 4 0
;Local Central East
S135_3 Sundre_4h_5y SU22 0.5244 25 48.556 4 0
;Local Central East
S135_4 Sundre_4h_5y SU24 1.2801 16.27 39.388 4.5 0
;East
S136 Sundre_4h_5y J150 20.206 100 630.425 7.026 0
;Local Central East
S14 Sundre_4h_5y SU20 0.6106 45 57.806 3.264 0
;East
S141 Sundre_4h_5y J475 34.7862 100 843.261 6.845 0
;East
S145 Sundre_4h_5y J172 18.6084 100 299.277 6.532 0
;Local East
S147_2 Sundre_4h_5y SU32 0.1574 70 9.425 1 0
;East
S147_3 Sundre_4h_5y J187 9.0146 100 693.997 5.431 0

;East
S148 Sundre_4h_5y J185 6.0977 100 228.903 7.532 0
;East
S149 Sundre_4h_5y J177 22.8161 100 429.845 6.636 0
;Upstream
S15 Sundre_4h_5y J16 2.7816 100 111.711 4.5 0
;East
S155 Sundre_4h_5y J209 43.0668 100 499.684 5.24 0
;East
S158 Sundre_4h_5y J209 34.4039 100 500.066 4.257 0
;Central West
S16 Sundre_4h_5y SU39 0.9707 45 50.822 3.2 0
;Central West
S16_2 Sundre_4h_5y SU34 1.0012 40 57.211 2.5 0
;East
S160_1 Sundre_4h_5y J250 33.8979 100 1297.769 7.667 0
;Upstream
S160_3 Sundre_4h_5y J34 3.3524 100 98.6 5.8 0
;East
S162_2 Sundre_4h_5y J207 2.2463 100 107.995 2.7 0
;East
S17 Sundre_4h_5y J105 33.2926 100 315.205 4 0
;East
S179_2 Sundre_4h_5y SU4 26.1151 100 363.214 6.6 0
;East
S18 Sundre_4h_5y J23 25.2713 100 311.991 4.4 0
;East
S180 Sundre_4h_5y J250 32.4692 100 444.232 5.85 0
;Local Central East
S19 Sundre_4h_5y J3 0.3719 28.218 15.079 5.389 0
;West
S19_2 Sundre_4h_5y J474 22.3794 100 245.119 3.9 0
;East
S198_1 Sundre_4h_5y J1 12.1265 100 183.457 3.8 0
;East
S198_2 Sundre_4h_5y J252 9.4032 100 191.122 2.7 0
;West
S2 Sundre_4h_5y J10 10.8441 100 162.337 4.5 0
;West
S2_1 Sundre_4h_5y J474 3.529 100 107.572 4.25 0
;Upstream

S20 Sundre_4h_5y J25 2.1166 100 46.519 3.3 0
;Central West
S20_2 Sundre_4h_5y J47 1.9866 18.459 79.738 4.969 0
;East
S206_2 Sundre_4h_5y SU5 23.5551 100 228.69 6 0
;Upstream
S21 Sundre_4h_5y J17 1.798 100 60.949 5.3 0
;East
S215 Sundre_4h_5y J486 21.7132 100 734.691 6.471 0
;East
S217 Sundre_4h_5y J286 15.008 100 285.467 10.1 0
;Local East
S22 Sundre_4h_5y SU36 0.3506 35 17.356 4 0
;East
S225 Sundre_4h_5y J286 15.2036 100 293.396 8.088 0
;Local Central East
S23 Sundre_4h_5y J95 0.7551 15 46.043 4 0
;East
S24 Sundre_4h_5y J41 12.3798 100 209.472 4.362 0
;East
S24_1 Sundre_4h_5y J43 9.6288 100 162.128 6.674 0
;East
S25 Sundre_4h_5y J231 30.1026 100 352.077 2.88 0
;East
S26 Sundre_4h_5y J292 57.8345 100 400.457 5.022 0
;East
S27 Sundre_4h_5y J495 33.0075 100 377.66 2 0
;East
S28 Sundre_4h_5y J21 8.6446 100 172.892 3.3 0
;East
S3 Sundre_4h_5y J286 28.2996 100 427.486 7 0
;East
S3_2 Sundre_4h_5y SU4 38.345 100 328.859 5.3 0
;East
S4 Sundre_4h_5y J472 7.8986 100 115.14 1.8 0
;East
S5 Sundre_4h_5y SU2 3.5597 100 225.387 5.934 0
;Upstream
S5_2 Sundre_4h_5y J51 7.0535 100 133.085 5.855 0
;Upstream
S5_4 Sundre_4h_5y J20 2.3885 100 85.609 4 0

```
;Local Central East
S6               Sundre_4h_5y     SU25            0.5043   36       28.331   4.2      0
;Upstream
S7               Sundre_4h_5y     J15             7.1671   100      144.79   2.3      0
;Local East
S7_1             Sundre_4h_5y     J111            1.5812   30       93.012   4        0
;Local Central East
S7_10            Sundre_4h_5y     J123            2.2864   35       109.923  4.5      0
;Local Central East
S7_12            Sundre_4h_5y     SU15            2.6356   26       65.89    4.8      0
;Local East
S7_15            Sundre_4h_5y     J112            0.1232   70       7.605    1.2      0
;Local East
S7_16            Sundre_4h_5y     SU40            0.142    30       24.483   4.5      0
;Local East
S7_17            Sundre_4h_5y     J125            0.1039   30       22.587   5        0
;Local East
S7_3             Sundre_4h_5y     SU40            1.0766   25       61.52    3.5      0
;Local East
S7_4             Sundre_4h_5y     J60             1.4051   15       80.753   3.3      0
;Local West
S7_7             Sundre_4h_5y     J22             1.9568   12       84.345   4.6      0
;Local Central East
S7_8             Sundre_4h_5y     SU30            0.0875   15       13.889   6        0
;Local West
S7_9             Sundre_4h_5y     J10             3.3166   21       134.821  1.14     0
;East
S75              Sundre_4h_5y     J101            31.3666  100      348.518  4        0
;East
S8               Sundre_4h_5y     SU5             6.7392   99.994   194.213  5        0
;Local East
S9               Sundre_4h_5y     SU41            1.9638   20       94.413   2        0
;Upstream
S9_1             Sundre_4h_5y     SU13            3.3778   100      135.655  4.6      0
;Upstream
S9_2             Sundre_4h_5y     J19             0.7781   100      67.078   2        0
;Local East
S9_5             Sundre_4h_5y     SU37            0.4655   25       17.904   3.322    0
;Local Central East
S9_6             Sundre_4h_5y     SU38            0.7494   9        36.379   5.6      0
```

```
[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
S1               0.013      0.15       1.6        3.2        0          OUTLET
S1_2             0.013      0.15       1.6        3.2        0          OUTLET
S1_3             0.013      0.15       1.6        3.2        0          OUTLET
S1_4             0.013      0.15       1.6        3.2        0          OUTLET
S1_6             0.013      0.15       1.6        3.2        0          OUTLET
S1_7             0.013      0.15       1.6        3.2        0          OUTLET
S10              0.013      0.15       1.6        3.2        0          OUTLET
S103             0.013      0.15       1.6        3.2        0          OUTLET
S105             0.013      0.15       1.6        3.2        0          OUTLET
S11              0.013      0.15       1.6        3.2        0          OUTLET
S111             0.013      0.15       1.6        3.2        0          OUTLET
S112             0.013      0.15       1.6        3.2        0          OUTLET
S117             0.013      0.15       1.6        3.2        0          OUTLET
S12              0.013      0.15       1.6        3.2        0          OUTLET
S12_1            0.013      0.15       1.6        3.2        0          OUTLET
S122             0.013      0.15       1.6        3.2        0          OUTLET
S122_2           0.013      0.15       1.6        3.2        0          OUTLET
S122_3           0.013      0.15       1.6        3.2        0          OUTLET
S122_4           0.013      0.15       1.6        3.2        0          OUTLET
S122_7           0.013      0.15       1.6        3.2        0          OUTLET
S127             0.013      0.15       1.6        3.2        0          OUTLET
S129_1           0.013      0.15       1.6        3.2        0          OUTLET
S13              0.013      0.15       1.6        3.2        0          OUTLET
S13_1            0.013      0.15       1.6        3.2        0          OUTLET
S13_2            0.013      0.15       1.6        3.2        0          OUTLET
S130_4           0.013      0.15       1.6        3.2        0          OUTLET
S134_1           0.013      0.15       1.6        3.2        0          OUTLET
S134_10          0.013      0.15       1.6        3.2        0          OUTLET
S134_11          0.013      0.15       1.6        3.2        0          OUTLET
S134_12          0.013      0.15       1.6        3.2        0          OUTLET
S134_14          0.013      0.15       1.6        3.2        0          OUTLET
S134_15          0.013      0.15       1.6        3.2        0          OUTLET
S134_16          0.013      0.15       1.6        3.2        0          OUTLET
S134_3           0.013      0.15       1.6        3.2        0          OUTLET
S134_4           0.013      0.15       1.6        3.2        0          OUTLET
S134_5           0.013      0.15       1.6        3.2        0          OUTLET
S134_6           0.013      0.15       1.6        3.2        0          OUTLET
S134_8           0.013      0.15       1.6        3.2        0          OUTLET
```

S134_9	0.013	0.15	1.6	3.2	0	OUTLET
S135_1	0.013	0.15	1.6	3.2	0	OUTLET
S135_2	0.013	0.15	1.6	3.2	0	OUTLET
S135_3	0.013	0.15	1.6	3.2	0	OUTLET
S135_4	0.013	0.15	1.6	3.2	0	OUTLET
S136	0.013	0.15	1.6	3.2	0	OUTLET
S14	0.013	0.15	1.6	3.2	0	OUTLET
S141	0.013	0.15	1.6	3.2	0	OUTLET
S145	0.013	0.15	1.6	3.2	0	OUTLET
S147_2	0.013	0.15	1.6	3.2	0	OUTLET
S147_3	0.013	0.15	1.6	3.2	0	OUTLET
S148	0.013	0.15	1.6	3.2	0	OUTLET
S149	0.013	0.15	1.6	3.2	0	OUTLET
S15	0.013	0.15	1.6	3.2	0	OUTLET
S155	0.013	0.15	1.6	3.2	0	OUTLET
S158	0.013	0.15	1.6	3.2	0	OUTLET
S16	0.013	0.15	1.6	3.2	0	OUTLET
S16_2	0.013	0.15	1.6	3.2	0	OUTLET
S160_1	0.013	0.15	1.6	3.2	0	OUTLET
S160_3	0.013	0.15	1.6	3.2	0	OUTLET
S162_2	0.013	0.15	1.6	3.2	0	OUTLET
S17	0.013	0.15	1.6	3.2	0	OUTLET
S179_2	0.013	0.15	1.6	3.2	0	OUTLET
S18	0.013	0.15	1.6	3.2	0	OUTLET
S180	0.013	0.15	1.6	3.2	0	OUTLET
S19	0.013	0.15	1.6	3.2	0	OUTLET
S19_2	0.013	0.15	1.6	3.2	0	OUTLET
S198_1	0.013	0.15	1.6	3.2	0	OUTLET
S198_2	0.013	0.15	1.6	3.2	0	OUTLET
S2	0.013	0.15	1.6	3.2	0	OUTLET
S2_1	0.013	0.15	1.6	3.2	0	OUTLET
S20	0.013	0.15	1.6	3.2	0	OUTLET
S20_2	0.013	0.15	1.6	3.2	0	OUTLET
S206_2	0.013	0.15	1.6	3.2	0	OUTLET
S21	0.013	0.15	1.6	3.2	0	OUTLET
S215	0.013	0.15	1.6	3.2	0	OUTLET
S217	0.013	0.15	1.6	3.2	0	OUTLET
S22	0.013	0.15	1.6	3.2	0	OUTLET
S225	0.013	0.15	1.6	3.2	0	OUTLET
S23	0.013	0.15	1.6	3.2	0	OUTLET
S24	0.013	0.15	1.6	3.2	0	OUTLET
S24_1	0.013	0.15	1.6	3.2	0	OUTLET
S25	0.013	0.15	1.6	3.2	0	OUTLET
S26	0.013	0.15	1.6	3.2	0	OUTLET
S27	0.013	0.15	1.6	3.2	0	OUTLET
S28	0.013	0.15	1.6	3.2	0	OUTLET
S3	0.013	0.15	1.6	3.2	0	OUTLET
S3_2	0.013	0.15	1.6	3.2	0	OUTLET
S4	0.013	0.15	1.6	3.2	0	OUTLET
S5	0.013	0.15	1.6	3.2	0	OUTLET
S5_2	0.013	0.15	1.6	3.2	0	OUTLET
S5_4	0.013	0.15	1.6	3.2	0	OUTLET
S6	0.013	0.15	1.6	3.2	0	OUTLET
S7	0.013	0.15	1.6	3.2	0	OUTLET
S7_1	0.013	0.15	1.6	3.2	0	OUTLET
S7_10	0.013	0.15	1.6	3.2	0	OUTLET
S7_12	0.013	0.15	1.6	3.2	0	OUTLET
S7_15	0.013	0.15	1.6	3.2	0	OUTLET
S7_16	0.013	0.15	1.6	3.2	0	OUTLET
S7_17	0.013	0.15	1.6	3.2	0	OUTLET
S7_3	0.013	0.15	1.6	3.2	0	OUTLET
S7_4	0.013	0.15	1.6	3.2	0	OUTLET
S7_7	0.013	0.15	1.6	3.2	0	OUTLET
S7_8	0.013	0.15	1.6	3.2	0	OUTLET
S7_9	0.013	0.15	1.6	3.2	0	OUTLET
S75	0.013	0.15	1.6	3.2	0	OUTLET
S8	0.013	0.15	1.6	3.2	0	OUTLET
S9	0.013	0.15	1.6	3.2	0	OUTLET
S9_1	0.013	0.15	1.6	3.2	0	OUTLET
S9_2	0.013	0.15	1.6	3.2	0	OUTLET
S9_5	0.013	0.15	1.6	3.2	0	OUTLET
S9_6	0.013	0.15	1.6	3.2	0	OUTLET

[INFILTRATION]

;;Subcatchment	Param1	Param2	Param3	Param4	Param5
S1	210	1.02	0.261	0	0
S1_2	210	1.02	0.261	0	0
S1_3	210	1.02	0.261	0	0
S1_4	210	1.02	0.261	0	0
S1_6	210	1.02	0.261	0	0
S1_7	210	1.02	0.261	0	0

S10	210	1.02	0.261	0	0
S103	210	1.02	0.261	0	0
S105	210	1.02	0.261	0	0
S11	210	1.02	0.261	0	0
S111	210	1.02	0.261	0	0
S112	210	1.02	0.261	0	0
S117	210	1.02	0.261	0	0
S12	210	1.02	0.261	0	0
S12_1	210	1.02	0.261	0	0
S122	210	1.02	0.261	0	0
S122_2	210	1.02	0.261	0	0
S122_3	210	1.02	0.261	0	0
S122_4	210	1.02	0.261	0	0
S122_7	210	1.02	0.261	0	0
S127	210	1.02	0.261	0	0
S129_1	210	1.02	0.261	0	0
S13	210	1.02	0.261	0	0
S13_1	210	1.02	0.261	0	0
S13_2	210	1.02	0.261	0	0
S130_4	210	1.02	0.261	0	0
S134_1	210	1.02	0.261	0	0
S134_10	210	1.02	0.261	0	0
S134_11	210	1.02	0.261	0	0
S134_12	210	1.02	0.261	0	0
S134_14	210	1.02	0.261	0	0
S134_15	210	1.02	0.261	0	0
S134_16	210	1.02	0.261	0	0
S134_3	210	1.02	0.261	0	0
S134_4	210	1.02	0.261	0	0
S134_5	210	1.02	0.261	0	0
S134_6	210	1.02	0.261	0	0
S134_8	210	1.02	0.261	0	0
S134_9	210	1.02	0.261	0	0
S135_1	210	1.02	0.261	0	0
S135_2	210	1.02	0.261	0	0
S135_3	210	1.02	0.261	0	0
S135_4	210	1.02	0.261	0	0
S136	210	1.02	0.261	0	0
S14	210	1.02	0.261	0	0
S141	210	1.02	0.261	0	0
S145	210	1.02	0.261	0	0
S147_2	210	1.02	0.261	0	0
S147_3	210	1.02	0.261	0	0
S148	210	1.02	0.261	0	0
S149	210	1.02	0.261	0	0
S15	210	1.02	0.261	0	0
S155	210	1.02	0.261	0	0
S158	210	1.02	0.261	0	0
S16	210	1.02	0.261	0	0
S16_2	210	1.02	0.261	0	0
S160_1	210	1.02	0.261	0	0
S160_3	210	1.02	0.261	0	0
S162_2	210	1.02	0.261	0	0
S17	210	1.02	0.261	0	0
S179_2	210	1.02	0.261	0	0
S18	210	1.02	0.261	0	0
S180	210	1.02	0.261	0	0
S19	210	1.02	0.261	0	0
S19_2	210	1.02	0.261	0	0
S198_1	210	1.02	0.261	0	0
S198_2	210	1.02	0.261	0	0
S2	210	1.02	0.261	0	0
S2_1	210	1.02	0.261	0	0
S20	210	1.02	0.261	0	0
S20_2	210	1.02	0.261	0	0
S206_2	210	1.02	0.261	0	0
S21	210	1.02	0.261	0	0
S215	210	1.02	0.261	0	0
S217	210	1.02	0.261	0	0
S22	210	1.02	0.261	0	0
S225	210	1.02	0.261	0	0
S23	210	1.02	0.261	0	0
S24	210	1.02	0.261	0	0
S24_1	210	1.02	0.261	0	0
S25	210	1.02	0.261	0	0
S26	210	1.02	0.261	0	0
S27	210	1.02	0.261	0	0
S28	210	1.02	0.261	0	0
S3	210	1.02	0.261	0	0
S3_2	210	1.02	0.261	0	0
S4	210	1.02	0.261	0	0
S5	210	1.02	0.261	0	0

```
S5_2             210        1.02       0.261      0          0
S5_4             210        1.02       0.261      0          0
S6               210        1.02       0.261      0          0
S7               210        1.02       0.261      0          0
S7_1             210        1.02       0.261      0          0
S7_10            210        1.02       0.261      0          0
S7_12            210        1.02       0.261      0          0
S7_15            210        1.02       0.261      0          0
S7_16            210        1.02       0.261      0          0
S7_17            210        1.02       0.261      0          0
S7_3             210        1.02       0.261      0          0
S7_4             210        1.02       0.261      0          0
S7_7             210        1.02       0.261      0          0
S7_8             210        1.02       0.261      0          0
S7_9             210        1.02       0.261      0          0
S75              210        1.02       0.261      0          0
S8               210        1.02       0.261      0          0
S9               210        1.02       0.261      0          0
S9_1             210        1.02       0.261      0          0
S9_2             210        1.02       0.261      0          0
S9_5             210        1.02       0.261      0          0
S9_6             210        1.02       0.261      0          0

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
Rural            BC
Rural            SURFACE    27         0.1        0.5        0.5        5
Rural            SOIL       265        0.43       0.38       0.221      1.2        10.0       240
Rural            STORAGE    5          0.75       0.10       0          NO
Rural            DRAIN      0.28       0.1        2          6          0          0

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp    ToPerv     RptFile
DrainTo          FromPerv
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ---------- ------------------
------ ---------------- ----------
S1_2             Rural            1       1032026    1132.637   30         100        0          *
*                0
S1_3             Rural            1       264117     512.957    30         100        0          *
*                0
S1_7             Rural            1       183003     596.367    30         100        0          *

S103             Rural            1       198511     640.42     30         100        0          *
*                0
S105             Rural            1       406045     263.485    30         100        0          *
*                0
S111             Rural            1       121957     179.921    30         100        0          *
*                0
S112             Rural            1       150002     545.152    30         100        0          *
*                0
S117             Rural            1       289265     326.974    30         100        0          *
*                0
S127             Rural            1       172306     650.181    30         100        0          *
*                0
S129_1           Rural            1       218331     688.828    30         100        0          *
*                0
S13              Rural            1       179510     270.88     30         100        0          *
*                0
S130_4           Rural            1       172500     446.838    30         100        0          *
*                0
S134_1           Rural            1       29234      255.228    30         100        0          *
*                0
S134_10          Rural            1       6237       69.814     30         100        0          *
*                0
S136             Rural            1       200560     620.425    30         100        0          *
*                0
S141             Rural            1       344362     843.261    30         100        0          *
*                0
S145             Rural            1       184184     299.277    30         100        0          *
*                0
S147_3           Rural            1       90046      693.997    30         100        0          *
*                0
S148             Rural            1       60377      228.903    30         100        0          *
*                0
S149             Rural            1       227561     429.845    30         100        0          *
*                0
S15              Rural            1       27116      111.711    30         100        0          *
*                0
S155             Rural            1       427668     499.684    30         100        0          *
*                0
S158             Rural            1       340439     500.066    30         100        0          *
*                0
S160_1           Rural            1       335579     1297.769   30         100        0          *
*                0
S160_3           Rural            1       31854      98.6       30         100        0          *
*                0
```

```
S162_2           Rural            1       20883     107.995    30         100        0          *
*                0
S17              Rural            1       319926    315.205    30         100        0          *
*                0
S179_2           Rural            1       240151    363.214    30         100        0          *
*                0
S18              Rural            1       245213    311.991    30         100        0          *
*                0
S180             Rural            1       311692    444.232    30         100        0          *
*                0
S19_2            Rural            1       183594    245.063    30         100        0          *
*                0
S198_1           Rural            1       113965    183.457    30         100        0          *
*                0
S198_2           Rural            1       93132     191.122    30         100        0          *
*                0
S2               Rural            1       106241    162.337    30         100        0          *
*                0
S2_1             Rural            1       33190     37.281     30         100        0          *
*                0
S20              Rural            1       19066     46.519     30         100        0          *
*                0
S206_2           Rural            1       230851    229        30         100        0          *
*                0
S21              Rural            1       15380     60.949     30         100        0          *
*                0
S215             Rural            1       212732    734.691    30         100        0          *
*                0
S217             Rural            1       147080    285.467    30         100        0          *
*                0
S225             Rural            1       149331    293.965    30         100        0          *
*                0
S24              Rural            1       116398    209.472    30         100        0          *
*                0
S24_1            Rural            1       88588     162.128    30         100        0          *
*                0
S25              Rural            1       292026    352.077    30         100        0          *
*                0
S26              Rural            1       566645    400.457    30         100        0          *
*                0
S27              Rural            1       320075    377.66     30         100        0          *
*                0
S28              Rural            1       77786     0          0          0          0          *
*                0
S3               Rural            1       277260    427.486    30         100        0          *
*                0
S3_2             Rural            1       364450    328.859    30         100        0          *
*                0
S4               Rural            1       72686     115.14     30         100        0          *
*                0
S5               Rural            1       26697     225.387    30         100        0          *
*                0
S5_2             Rural            1       70385     109.451    30         100        0          *
*                0
S5_4             Rural            1       23585     37.063     30         100        0          *
*                0
S7               Rural            1       68771     144.79     30         100        0          *
*                0
S75              Rural            1       302666    348.518    30         100        0          *
*                0
S8               Rural            1       59292     194.213    30         100        0          *
*                0
S9_1             Rural            1       32428     135        30         100        0          *
*                0
S9_2             Rural            1       7611      67.078     30         100        0          *
*                0

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
J1               1148.937   0.457      0          0          0
;assumed elev
J10              1164.72    1          0          0          0
J100             1178.521   0.6        0          0          0
J101             1178.524   1          0          0          0
J102             1177.348   0.305      0          0          0
J104             1172.355   2.1        0          0          0
J105             1196.458   1          0          0          0
J106             1173.087   1.475      0          0          100
;100% silt; assumed inv
J107             1173.586   1.512      0          0          0
;95% silt; assumed inv
J108             1173.798   1.3        0          0          100
J11              1184.656   0.592      0          0          0
J110             1173.501   1.3        0          0          100
J111             1178.837   0.6        0          0          0
```

J112	1178.719	0.3	0	0	0
J113	1184.572	0.315	0	0	0
J114	1184.7	0.395	0	0	0
;Rim assumed					
J116	1185.822	1	0	0	100
J117	1174.768	0.825	0	0	0
J118	1179.028	1.1	0	0	0
J119	1179.028	1.1	0	0	0
J12	1178.8	0.3	0	0	0
J120	1174.904	0.15	0	0	0
J121	1177.298	0.17	0	0	0
J122	1182.052	0.3	0	0	0
J123	1178.1	1	0	0	0
J124	1182.411	0.935	0	0	0
J126	1180.451	0.668	0	0	100
J127	1148.233	0.462	0	0	0
J128	1123.953	2.367	0	0	0
J129	1123.985	2.23	0	0	0
J13	1180.489	0.634	0	0	0
;connection(no MH/CB)					
J130	1176.598	0.6	0	0	0
J14	1183.315	0.191	0	0	0
J140	1159.053	2.614	0	0	0
J142	1190.424	1	0	0	0
J15	1186.015	0.73	0	0	100
J150	1163.656	1	0	0	0
J156	1187.653	1	0	0	0
J158	1153.012	1	0	0	0
;assumed elev					
J16	1188.1	1	0	0	0
J160	1146.351	1	0	0	0
J162	1119.968	1	0	0	0
J17	1176.6	1	0	0	0
J172	1162.249	1	0	0	0
J177	1156.189	1	0	0	0
J18	1172.3	1.367	0	0	0
J183	1122.976	1	0	0	0
J185	1151.527	1	0	0	0
J187	1166.603	1	0	0	0
J19	1198.5	1	0	0	0
J196	1166.679	1	0	0	0
J198	1128.805	1	0	0	0
J2	1185.848	0.315	0	0	0
J20	1184.9	0.3	0	0	0
J207	1164.64	1	0	0	0
J209	1143.656	1	0	0	0
J21	1168.3	2	0	0	0
J22	1168.263	2.232	0	0	0
J223	1178.4	1	0	0	0
J23	1184	1	0	0	0
J231	1137.344	0.908	0	0	0
J235	1152.838	1	0	0	0
J239	1140.201	2.228	0	0	0
J24	1169.319	0.592	0	0	0
J25	1180.5	1	0	0	0
J250	1165.251	1	0	0	0
J252	1141.475	1.997	0	0	0
J26	1178.68	1.43	0	0	0
J27	1177.758	0.506	0	0	0
J28	1185.357	1.636	0	0	0
J286	1157.576	3.997	0	0	0
J29	1186.291	0.615	0	0	0
J292	1193.885	1	0	0	0
J3	1186.493	0.807	0	0	0
J30	1137.534	0.901	0	0	0
J31	1174.348	1.05	0	0	0
J32	1149	1	0	0	0
;invert assumed					
J33	1176	1.956	0	0	0
;assumed elev					
J35	1168.7	1	0	0	0
J36	1183.654	0.6	0	0	100
J37	1183.251	1.003	0	0	100
J38	1168	2.3	0	0	0
J39	1179.265	1.854	0	0	0
J4	1173.767	0.595	0	0	0
J40	1170.981	0.655	0	0	0
J41	1171.229	0.424	0	0	0
J42	1169.534	0.464	0	0	0
J43	1169.784	0.41	0	0	0
J44	1164.089	1.238	0	0	0
;assumed elev					

```
J45              1191.601   1          0          0          0
J456             1132.154   1          0          0          0
J46              1169.2     1          0          0          0
J462             1163.796   1          0          0          0
J466             1145.106   1          0          0          0
J47              1169.574   1.342      0          0          10
J472             1139.584   1          0          0          0
J474             1161.796   1          0          0          0
J475             1139.849   1          0          0          0
J48              1176.134   1          0          0          0
J482             1158.868   2.799      0          0          0
J486             1151.577   1          0          0          0
J49              1160.189   1          0          0          0
J491             1125.459   1          0          0          0
J495             1144.926   1          0          0          0
J5               1169.46    0.3        0          0          0
J50              1169.537   1.379      0          0          10
J51              1182.651   0.466      0          0          0
J52              1172.663   1.244      0          0          0
J53              1180.812   1.3        0          0          0
J54              1173.024   1.018      0          0          0
J55              1172.814   1.272      0          0          0
J56              1167.997   0.419      0          0          0
J57              1170.285   0.497      0          0          0
J58              1179.652   1.335      0          0          0
J59              1177.99    0.362      0          0          0
J6               1180.113   1.3        0          0          0
J60              1183.032   0.3        0          0          0
J61              1181.157   1.2        0          0          0
J63              1179.841   2.35       0          0          0
J64              1179.105   0.3        0          0          0
J65              1177.853   0.998      0          0          0
J66              1176.751   2.1        0          0          0
J67              1173.932   1.581      0          0          0
J68              1173.045   1.23       0          0          0
J69              1170.285   0.497      0          0          0
J7               1177.184   0.459      0          0          0
J70              1183.272   0.245      0          0          0
J71              1182.713   0.633      0          0          0
J72              1185.554   0.061      0          0          0
J73              1175.345   0.708      0          0          0
J74              1173.704   1.1        0          0          0
J75              1173.074   1.45       0          0          0
J76              1173.266   1.5        0          0          0
J77              1173.61    1.2        0          0          20
J78              1173.623   1.2        0          0          0
J79              1173.991   1.1        0          0          0
J8               1175.746   1.318      0          0          0
;Pipe East
J80              1174.827   1.1        0          0          0
J81              1170.499   0.406      0          0          0
;Not found; assumed elev
J82              1174.746   1.2        0          0          0
J83              1177.103   1.45       0          0          0
J84              1177.985   1.45       0          0          0
J85              1178.13    1.15       0          0          10
J86              1184.505   0.011      0          0          0
J87              1171.909   1.65       0          0          0
J89              1172.803   1.35       0          0          100
J9               1171.417   0.451      0          0          0
J90              1173.248   1.1        0          0          0
J91              1172.373   1.2        0          0          10
J92              1173.806   1.55       0          0          0
J93              1172.087   1.2        0          0          10
J94              1169.156   0.69       0          0          0
J95              1172.863   0.996      0          0          100
J96              1171.711   2.125      0          0          0
J97              1171.166   2.5        0          0          100
;Outlet not found (estimated)
J98              1170.189   0.45       0          0          0
;has an unknown pipe coming in from school
J99              1172.689   1.175      0          0          100

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
J109             1158.619   FREE                        NO
J488             1119.969   FREE                        NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape       Curve Name/Params            SurDepth Fevap    Psi
Ksat     IMD
```

```
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- -------- --------
-------- --------
J125             1177.008 0.635      0          TABULAR    Driveway                     0        0
J34              1176.266 2.033      0          TABULAR    J34                          0        0
SU1              1167.379 1.835      0.4        TABULAR    SU1                          0        0
SU10             1178.001 0.55       0          TABULAR    Basic.CB                     0        0
SU11             1174.51  0.3        0          TABULAR    Basic.CB                     0        0
SU12             1174.466 0.3        0          TABULAR    Basic.CB                     0        0
SU13             1186.431 0.869      0          TABULAR    SU13                         0        0
SU14             1178.98  0.3        0          TABULAR    Basic.CB                     0        0
SU15             1179.135 0.3        0          TABULAR    Basic.CB                     0        0
SU16             1178.253 0.3        0          TABULAR    Basic.CB                     0        0
SU17             1180.687 0.726      0          TABULAR    Basic.CB                     0        0
SU18             1175.627 0.3        0          TABULAR    Basic.CB                     0        0
SU19             1174.504 0.319      0          TABULAR    Basic.CB                     0        0
;assumed invert
SU2              1166.987 2.227      0.5        TABULAR    SU2                          0        0
SU20             1174.791 0.3        0          TABULAR    Basic.CB                     0        0
SU21             1173.742 0.344      0          TABULAR    Basic.CB                     0        0
SU22             1174.048 0.3        0          TABULAR    Basic.CB                     0        0
SU23             1173.553 0.6        0          TABULAR    Basic.CB                     0        0
SU24             1175.056 0.3        0          TABULAR    Basic.CB                     0        0
SU25             1172.987 0.3        0          TABULAR    SU25                         0        0
SU26             1173.273 0.3        0          TABULAR    Basic.CB                     0        0
SU27             1173.259 0.6        0          TABULAR    Basic.CB                     0        0
SU28             1170.616 0.3        0          TABULAR    Basic.CB                     0        0
SU29             1173.364 0.5        0          TABULAR    Basic.CB                     0        0
SU3              1166.542 2.117      0.258      TABULAR    SU3                          0        0
SU30             1173.236 0.628      0          TABULAR    Basic.CB                     0        0
SU31             1173.066 0.6        0          TABULAR    Basic.CB                     0        0
SU32             1174.155 0.3        0          TABULAR    Basic.CB                     0        0
SU33             1174.262 0.3        0          TABULAR    Basic.CB                     0        0
SU34             1181.812 0.545      0          TABULAR    Basic.CB                     0        0
SU36             1174.201 0.6        0          TABULAR    Basic.CB                     0        0
SU37             1175.293 0.3        0          TABULAR    Basic.CB                     0        0
SU38             1186.693 0.3        0          TABULAR    Basic.CB                     0        0
SU39             1181.113 0.3        0          TABULAR    Basic.CB                     0        0
SU4              1163.018 1.7        0.2        TABULAR    SU4                          0        0
SU40             1174.498 0.6        0          TABULAR    Basic.CB                     0        0
SU41             1186.606 0.3        0          TABULAR    Basic.CB                     0        0
SU42             1173.607 0.3        0          TABULAR    Basic.CB                     0        0
```

```
SU5              1161.116 1.639      0.3        TABULAR    SU5                          0        0
SU6              1175.213 0.3        0          TABULAR    Basic.CB                     0        0
SU7              1173.975 0.3        0          TABULAR    Basic.CB                     0        0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ---------
-
C1               J130             J82              49.502     0.011      0          0          0          0
C1_1             J1               J127             16.049     0.024      0          0          0          0
C1_2             J127             J252             71.532     0.05       0          0          0          0
C10              J14              J70              16.553     0.013      0          0          0          0
C100             J17              J22              241.996    0.035      0          0          0          0
;??
C101             J91              J87              5.3        0.011      0          0          0          0
C102             J177             J185             264.927    0.05       0          0          0          0
C103             J87              J94              58.339     0.024      0          0          0          0
C104             J187             J250             672.289    0.05       0          0          0          0
C105             J95              J96              5.522      0.011      0          0.175      0          0
C106             J96              J97              15.002     0.011      0          0.15       0          0
;Outlet not found
C107             J97              J98              47.4       0.011      0          0          0          0
C108             J99              J96              21.303     0.011      0          0.425      0          0
C109             J100             J102             14.636     0.024      0          0          0          0
C11              J11              J124             92.504     0.024      0          0.193      0          0
C110             J104             J97              103.167    0.011      0          0.175      0          0
C110_1           J102             SU29             62.902     0.035      0          0          0          0
C111             J106             J104             14.907     0.011      0          0.05       0          0
C112             J110             J106             3.634      0.013      0          0.425      0          0
C113             J107             J106             18.756     0.011      0          0.025      0          0
C114             J196             J187             157.595    0.05       0          0          0          0
;Assumed
C115             J108             J107             4.561      0.011      0          0          0          0
C116             J111             J112             12.47      0.013      0          0          0          0
C117             J172             J177             299.497    0.05       0          0          0          0
C118             J18              J94              46.7       0.035      0          0          0          0
C118_1           J112             J7               22.835     0.013      0          0          0          0
C118_2           J7               SU40             57.711     0.013      0.088      0          0          0
C119             J28              J114             14.377     0.011      0          0          0          0
C12              J120             SU40             126.246    0.01       0          0          0          0
;used Culvert Code 1 (headwall but CSP?)
```

C12_2	J124	J13	37.873	0.024	0	0	0	0
C120	J113	J123	176.938	0.035	0	0	0	0
C120_1	J114	J123	215.9	0.035	0	0	0	0
C120_2	J123	J95	202.558	0.035	0	0	0	0
;white pvc pipe? inlet?								
C121	J119	J117	68.302	0.011	0	0	0	0
;outlets to road								
C122	J120	J31	5.051	0.011	0	0.3	0	0
C123	J33	J117	143.022	0.035	0	0	0	0
C124	J150	J172	140.69	0.05	0	0	0	0
C125	J19	SU13	260.378	0.05	0	0	0	0
C126	SU3	J196	246.582	0.05	0.258	0	0	0
C127	J60	J122	13.714	0.013	0	0	0	0
C128	SU10	J59	67.628	0.013	0.1	0	0	0
C129	SU41	J60	99.163	0.013	0.1	0	0	0
C13	J57	SU3	186	0.05	0	0.258	0	0
;NOT FOUND								
C130	J21	J38	32.561	0.024	0	0	0	0
C131	SU32	J196	167.679	0.05	0	0	0	0
C132	J20	SU39	187.017	0.013	0	0	0	0
C133	J23	J235	767.672	0.05	0	0	0	0
C134	J46	J21	188.055	0.05	0	0	0	0
C139	J209	J475	108.169	0.05	0	0	0	0
C14	J482	J109	396.635	0.05	0	0	0	0
C15	J69	SU3	135	0.05	0	0.258	0	0
C16	J140	J482	8	0.01	0	0	0	0
C165	J160	J466	69.401	0.05	0	0	0	0
C17	J48	J49	634.103	0.05	0	0	0	0
C173	J101	J150	555.476	0.05	0	0	0	0
C18	J81	SU3	33	0.05	0	0.258	0	0
C188_1	J156	J11	150.433	0.035	0	0	0	0
C19	J55	J57	67.574	0.024	0	0	0	0
C19_1	J474	J49	517.134	0.05	0	0	0	0
C19_2	J49	J140	155.572	0.05	0	0	0	0
C19_3	J22	J56	24.994	0.024	0	0	0	0
C19_4	J56	SU1	65	0.05	0	0.4	0	0
C192	J235	J456	1044.571	0.05	0	0	0	0
C194	J158	J160	294.504	0.05	0	0	0	0
C196	J292	SU5	561.378	0.05	0	0	0	0
;inlet: steel?, outlet: ribbed plastic?								
C2	J118	J117	70.322	0.011	0	0	0	0
C2_1	J13	J26	48.347	0.035	0	0	0	0
C2_2	J2	J113	60.105	0.035	0	0	0	0
C2_3	J26	J27	19.672	0.024	0	0	0	0
C2_4	J73	J75	43.085	0.024	0	0	0	0
C2_6	J27	J73	63.357	0.035	0	0	0	0
C2_9	J75	J9	48.987	0.011	0	0	0	0
C20	J5	SU3	28	0.05	0	0.258	0	0
C200	J142	J156	151.635	0.05	0	0	0	0
C21	J462	J474	482.484	0.05	0	0	0	0
C214	J105	J101	526.438	0.05	0	0	0	0
C22	SU12	SU7	72.384	0.013	0	0	0	0
C23	J94	SU3	52	0.05	0	0.258	0	0
C24	J50	J24	24.258	0.024	0	0	0	0
C25	J51	J6	41.049	0.024	0	0	0	0
C25_2	J25	J47	261.115	0.035	0	0	0	0
C25_3	J47	J50	4.547	0.024	0	0	0	0
;assumed								
C26	J34	J33	16.339	0.024	0	0	0	0
C27	J162	J488	48.434	0.05	0	0	0	0
;height is actually 0.02m								
C28	J36	J37	9.711	0.013	0	0	0	0
C28_1	J15	J116	23.822	0.024	0	0	0	0
C28_4	J116	J36	59.117	0.035	0	0	0	0
C29	J29	J113	16.769	0.011	0	0	0	0
C3	J3	J2	19.883	0.024	0	0	0	0
C30	J30	J231	20.061	0.024	0	0	0	0
C31	J183	J162	380.453	0.05	0	0	0	0
C32	J32	J30	385.691	0.05	0	0	0	0
C33	J98	J196	115.927	0.05	0	0	0	0
C33_1	J491	J128	103.289	0.05	0	0	0	0
C33_3	J128	J129	21.594	0.024	0	0	0	0
C33_4	J129	J183	211.201	0.05	0	0	0	0
C34	J31	J35	60.807	0.024	0	0	0	0
C35	J198	J491	304.252	0.05	0	0	0	0
C36	SU7	SU21	39.702	0.013	0	0	0	0
;Blocked								
C36_2	J126	J39	18.859	0.024	0	0	0	0
C37	SU16	SU20	87.124	0.013	0	0	0	0
;assumed size; blocked								
C37_2	J37	J126	32.526	0.024	0	0	0	0
C38	J456	J198	306.461	0.05	0	0	0	0

C39	J39	SU37	74.692	0.035	0	0	0	0
C4	J4	J5	46.564	0.011	0	0	0	0
C40	J231	J456	396.767	0.05	0	0	0	0
C41	J472	J231	278.342	0.05	0	0	0	0
C42	J239	J472	68.29	0.05	0	0	0	0
C43	J252	J239	39.313	0.024	0	0	0	0
C44	J117	J31	29.849	0.024	0	0.05	0	0
C45	J495	J252	331.679	0.05	0	0	0	0
C46	J41	J40	13.995	0.024	0	0	0	0
C47	J43	J42	14.387	0.024	0	0	0	0
C48	J24	SU2	82	0.05	0	0.5	0	0
C49	SU2	SU3	60	0.05	0.5	0.258	0	0
C5	SU21	SU42	23.195	0.013	0	0	0	0
C50	J12	SU22	86.308	0.013	0	0	0	0
C51	J486	J495	591.594	0.05	0	0	0	0
C52	J16	J72	128.816	0.035	0	0	0	0
C53	J286	J495	872.88	0.05	0	0	0	0
C54	J45	J43	564.725	0.05	0	0	0	0
C55	J35	J187	89.424	0.05	0	0	0	0
C56	J9	SU3	70	0.05	0	0.258	0	0
C57	J40	SU1	122	0.05	0	0.4	0	0
;assumed size, assumed above water level								
C58	SU1	SU2	26.631	0.024	0.4	0.5	0	0
C59	J42	SU2	82	0.05	0	0.5	0	0
C6	J6	J58	16.473	0.024	0	0	0	0
C60	J52	J47	70.732	0.011	0	0.224	0	0
C61	J54	J52	20.926	0.024	0	0	0	0
C62	SU22	SU23	16.692	0.013	0	0	0	0
C64	SU5	J286	20	0.024	0	3.349	0	0
C65_1	J61	J53	10.981	0.024	0	0	0	0
;Backsloped??								
C65_2	J53	J63	2.339	0.024	0	1.25	0	0
C66	SU37	J120	29.716	0.013	0	0	0	0
;assumed size, inlet								
C66_1	SU4	SU5	35	0.024	0.2	1	0	0
C67	SU24	SU26	37.136	0.013	0.1	0	0	0
C68	J63	J64	43.972	0.011	0	0	0	0
C69	SU26	SU27	12.935	0.013	0.1	0	0	0
C7	J59	J121	16.791	0.013	0	0	0	0
C7_3	J58	J121	86.292	0.035	0	0	0	0
C7_4	J121	J8	31.39	0.035	0	0	0	0

C70	SU11	SU19	70.974	0.013	0	0	0	0
C71	J65	J66	13.566	0.011	0	0.65	0	0
C72	J66	J67	78.453	0.011	0	0	0	0
C73	J67	J68	34.731	0.013	0	0	0	0
C74	J68	J69	59.547	0.011	0	0	0	0
C75	J64	J65	36.909	0.035	0	0	0	0
C76	J70	J71	55.847	0.035	0	0	0	0
C77	SU42	SU28	72.89	0.013	0	0	0	0
C77_1	J71	J124	7	0.024	0	0.114	0	0
C77_3	J223	J41	378.637	0.05	0	0	0	0
C77_4	J22	J10	389.979	0.035	0.637	0	0	0
C77_5	J10	J462	214.317	0.05	0	0	0	0
C78	J475	J491	853.843	0.05	0	0	0	0
C79	J72	J70	76.071	0.013	0	0	0	0
C8	J8	J55	90.095	0.013	0	0	0	0
C80	J38	J44	52.358	0.05	0	0	0	0
C80_1	J207	J44	192.905	0.05	0	0	0	0
C80_2	J44	SU4	374.902	0.05	0	0	0	0
C81	J76	J75	2.381	0.013	0	0.2	0	0
C82	J77	J75	16.478	0.013	0	0.05	0	0
C83	J250	J207	150.291	0.05	0	0	0	0
C84	J466	J475	235.894	0.05	0	0	0	0
C85	J74	J78	2.08	0.011	0	0	0	0
C86	J79	J78	19.696	0.011	0	0	0	0
C87	J82	J78	36.913	0.011	0	0	0	0
C88	J78	J81	65.092	0.024	0	0	0	0
;Outlet??								
C89	J80	J82	3.05	0.011	0	0	0	0
C9	J122	J111	83.27	0.01	0	0	0	0
C90	J83	J130	27.533	0.011	0	0	0	0
C91	J84	J83	16.752	0.011	0	0.1	0	0
C92	J85	J130	32.589	0.011	0	0	0	0
C93	J185	J466	328.193	0.05	0	0	0	0
;Street								
C94	J86	SU14	108.453	0.013	0	0	0	0
C95	SU30	SU25	43.424	0.013	0	0	0	0
C96	J89	J87	17.509	0.011	0	0.3	0	0
C97	J90	J91	20.494	0.011	0	0.2	0	0
C98	J92	J91	36.776	0.011	0	0	0	0
C99	J93	J87	22.664	0.011	0	0	0	0
W1	J26	J65	92.449	0.035	0.7	0	0	0

```
W15              SU15             SU16             24.798     0.013      0          0          0          0
W27              SU13             J3               12.196     0.035      0.569      0.507      0          0
W44              SU36             SU30             110.463    0.011      0.1        0          0          0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff
Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- -------- ----------
---------- ---------- ---------- ----------------
W10              J55              SU21             TRANSVERSE   0.972      1.85       YES      0        0
YES
W11              SU11             SU12             TRANSVERSE   0.1        1.85       NO       0        0
YES
W12              J73              SU12             TRANSVERSE   0.408      1.85       NO       0        0
YES
W13              J84              SU15             TRANSVERSE   1.15       1.85       YES      0        0
YES
W14              J83              SU16             TRANSVERSE   1.15       1.85       YES      0        0
YES
W16              J79              SU20             TRANSVERSE   0.8        1.85       YES      0        0
YES
W17              J74              SU19             TRANSVERSE   0.8        1.85       YES      0        0
YES
W18              J78              SU19             TRANSVERSE   0.9        1.85       YES      0        0
YES
W19              SU20             J4               TRANSVERSE   0          1.85       NO       0        0
YES
W2               J7               J125             TRANSVERSE   0.159      1.85       NO       0        0
YES
W20              J21              J38              TRANSVERSE   1.7        1.85       NO       0        0
YES
W21              J28              SU38             TRANSVERSE   1.336      1.85       YES      0        0
YES
W22              J29              SU41             TRANSVERSE   0.315      1.85       YES      0        0
YES
W23              J100             J102             TRANSVERSE   0.3        1.85       NO       0        0
YES
W24              J71              J124             TRANSVERSE   0.4        1.85       NO       0        0
YES
W26              SU23             SU27             TRANSVERSE   0.1        1.85       NO       0        0
YES
W28              J97              SU31             TRANSVERSE   1.9        1.85       YES      0        0
YES
W29              SU31             J98              TRANSVERSE   0.3        1.85       NO       0        0
YES
W3               J125             SU40             TRANSVERSE   0.088      1.85       NO       0        0
YES
W30              J87              SU27             TRANSVERSE   1.35       1.85       YES      0        0
YES
W31              J4               J5               TRANSVERSE   0.295      1.85       NO       0        0
YES
W32              J15              J116             TRANSVERSE   0.43       1.85       NO       0        0
YES
W33              SU4              SU5              TRANSVERSE   0.268      1.85       NO       0        0
YES
W34              J95              SU30             TRANSVERSE   0.696      1.85       YES      0        0
YES
W35              SU25             J18              TRANSVERSE   0.179      1.85       NO       0        0
YES
W36              SU5              J286             TRANSVERSE   1.339      1.85       NO       0        0
YES
W37              SU38             J114             TRANSVERSE   0.1        1.85       NO       0        0
YES
W38              SU29             SU30             TRANSVERSE   0.1        1.85       NO       0        0
YES
;Overtop curb
W39              SU28             J47              TRANSVERSE   0.1        1.85       YES      0        0
YES
W4               SU39             SU17             TRANSVERSE   0          1.85       NO       0        0
YES
W40              J104             SU32             TRANSVERSE   1.8        1.85       YES      0        0
YES
W41              J110             SU36             TRANSVERSE   0          1.85       YES      0        0
YES
W42              SU40             SU36             TRANSVERSE   0.1        1.85       NO       0        0
YES
W43              J106             SU33             TRANSVERSE   1.175      1.85       YES      0        0
YES
W45              J107             SU40             TRANSVERSE   1.088      1.85       YES      0        0
YES
W46              J108             SU40             TRANSVERSE   0.7        1.85       YES      0        0
YES
W48              J126             J39              TRANSVERSE   0.281      1.85       NO       0        0
YES
W49              J36              J37              TRANSVERSE   0.3        1.85       NO       0        0
YES
```

W5	SU6	SU7	TRANSVERSE	0	1.85	NO	0	0
YES								
W50	J37	J126	TRANSVERSE	0.3	1.85	NO	0	0
YES								
W51	SU36	SU32	TRANSVERSE	0.2	1.85	NO	0	0
YES								
W52	SU36	SU33	TRANSVERSE	0.2	1.85	NO	0	0
YES								
W53	SU30	SU31	TRANSVERSE	0.139	1.85	NO	0	0
YES								
W54	J96	SU30	TRANSVERSE	1.525	1.85	YES	0	0
YES								
W55	SU17	J121	TRANSVERSE	0	1.85	NO	0	0
YES								
W6	SU1	SU2	TRANSVERSE	1.535	1.85	NO	0	0
YES								
W77	SU27	J94	TRANSVERSE	0.1	1.85	YES	0	0
YES								
W8	J65	SU10	TRANSVERSE	0.448	1.85	NO	0	0
YES								
W9	SU40	SU32	TRANSVERSE	0.122	1.85	NO	0	0
YES								

[OUTLETS]

;;Name	From Node	To Node	Offset	Type	QTable/Qcoeff	Qexpon	Gated
OL1	SU28	J50	0	TABULAR/DEPTH	Cinlet		NO
OL10	SU34	J61	0.245	TABULAR/DEPTH	Cinlet		NO
OL11	SU34	J63	0.079	TABULAR/DEPTH	GratedTopMH		NO
OL12	SU10	J66	0	TABULAR/DEPTH	GratedTopMH		NO
OL13	SU14	J85	0	TABULAR/DEPTH	Cinlet		NO
OL14	SU30	J96	0	TABULAR/DEPTH	GratedTopMH		NO
OL15	SU16	J83	0	TABULAR/DEPTH	Cinlet		NO
OL16	SU15	J84	0	TABULAR/DEPTH	TwinK2inlet		NO
OL17	SU29	J99	0	TABULAR/DEPTH	K3inlet		NO
OL18	SU18	J80	0	TABULAR/DEPTH	Cinlet		NO
OL19	SU11	J77	0	TABULAR/DEPTH	Cinlet		NO
OL2	SU42	J52	0	TABULAR/DEPTH	Cinlet		NO
OL20	SU19	J74	0	TABULAR/DEPTH	Cinlet		NO
OL21	SU19	J78	0	TABULAR/DEPTH	GratedTopMH		NO
OL22	SU20	J79	0	TABULAR/DEPTH	Cinlet		NO
OL23	SU22	J90	0	TABULAR/DEPTH	GratedTopMH		NO
OL24	SU23	J89	0	TABULAR/DEPTH	GratedTopMH		NO
OL25	SU27	J87	0	TABULAR/DEPTH	GratedTopMH		NO
OL26	SU26	J91	0	TABULAR/DEPTH	Cinlet		NO
OL27	SU25	J93	0	TABULAR/DEPTH	GratedTopMH		NO
OL28	SU24	J92	0	TABULAR/DEPTH	GratedTopMH		NO
OL29	SU38	J28	0	TABULAR/DEPTH	K2inlet		NO
OL3	SU21	J54	0	TABULAR/DEPTH	K3inlet		NO
OL30	SU41	J29	0	TABULAR/DEPTH	TwinK2inlet		NO
OL31	SU33	J106	0	TABULAR/DEPTH	GratedTopMH		NO
OL32	SU36	J110	0	TABULAR/DEPTH	Cinlet		NO
OL33	SU32	J104	0	TABULAR/DEPTH	K3inlet		NO
OL34	SU40	J107	0.088	TABULAR/DEPTH	GratedTopMH		NO
OL35	SU40	J108	0	TABULAR/DEPTH	TwinK2inlet		NO
OL36	SU37	J117	0	TABULAR/DEPTH	Cinlet		NO
OL37	SU17	J58	0	TABULAR/DEPTH	Cinlet		NO
OL38	SU34	J53	0	TABULAR/DEPTH	GratedTopMH		NO
OL4	SU21	J55	0.041	TABULAR/DEPTH	Cinlet		NO
OL5	SU7	J68	0	TABULAR/DEPTH	K3inlet		NO
OL6	SU6	J67	0	TABULAR/DEPTH	GratedTopMH		NO
OL7	SU12	J76	0	TABULAR/DEPTH	Cinlet		NO
OL8	SU31	J97	0	TABULAR/DEPTH	K3inlet		NO
OL9	SU39	J6	0	TABULAR/DEPTH	TwinK2inlet		NO

[XSECTIONS]

;;Link	Shape	Geom1	Geom2	Geom3	Geom4	Barrels	Culvert
C1	CIRCULAR	0.6	0	0	0	1	
C1_1	CIRCULAR	0.4	0	0	0	1	6
C1_2	TRAPEZOIDAL	1	5	5	5	1	
C10	TRIANGULAR	0.3	10	0	0	1	
C100	TRAPEZOIDAL	1	1	5	5	1	
C101	CIRCULAR	0.525	0	0	0	1	
C102	TRAPEZOIDAL	1	5	5	5	1	
C103	CIRCULAR	0.525	0	0	0	1	6
C104	TRAPEZOIDAL	1	5	5	5	1	
C105	CIRCULAR	0.3	0	0	0	1	6
C106	CIRCULAR	0.45	0	0	0	1	
C107	CIRCULAR	0.45	0	0	0	1	6
C108	CIRCULAR	0.3	0	0	0	1	
C109	CIRCULAR	0.3	0	0	0	1	6
C11	CIRCULAR	0.6	0	0	0	1	5

C110	CIRCULAR	0.6	0	0	0	1	
C110_1	TRAPEZOIDAL	0.5	1	5	5	1	
C111	CIRCULAR	0.3	0	0	0	1	
C112	CIRCULAR	0.3	0	0	0	1	
C113	CIRCULAR	0.3	0	0	0	1	
C114	TRAPEZOIDAL	1	5	5	5	1	
C115	CIRCULAR	0.3	0	0	0	1	
C116	TRAPEZOIDAL	0.3	0.5	15	15	1	
C117	TRAPEZOIDAL	1	5	5	5	1	
C118	TRAPEZOIDAL	0.3	5	10	10	1	
C118_1	IRREGULAR	Street	0	0	0	1	
C118_2	IRREGULAR	Street	0	0	0	1	
C119	CIRCULAR	0.3	0	0	0	1	6
C12	IRREGULAR	Street	0	0	0	1	
C12_2	CIRCULAR	0.6	0	0	0	1	4
C120	TRAPEZOIDAL	1	1	15	15	1	
C120_1	TRAPEZOIDAL	0.5	1	15	7	1	
C120_2	TRAPEZOIDAL	1	1	15	15	1	
C121	CIRCULAR	0.15	0	0	0	1	
C122	CIRCULAR	0.1	0	0	0	1	
C123	TRAPEZOIDAL	1	5	5	5	1	
C124	TRAPEZOIDAL	1	5	5	5	1	
C125	TRAPEZOIDAL	1	5	5	5	1	
C126	TRAPEZOIDAL	1	5	5	5	1	
C127	TRAPEZOIDAL	0.3	0.5	15	15	1	
C128	IRREGULAR	Street	0	0	0	1	
C129	IRREGULAR	Street	0	0	0	1	
C13	TRAPEZOIDAL	1	5	5	5	1	
C130	CIRCULAR	0.6	0	0	0	1	6
C131	TRAPEZOIDAL	0.3	10	5	5	1	
C132	IRREGULAR	Street	0	0	0	1	
C133	TRAPEZOIDAL	1	1	1	3	1	
C134	TRAPEZOIDAL	1	1	1	3	1	
C139	TRAPEZOIDAL	1	5	5	5	1	
C14	TRAPEZOIDAL	1	5	5	5	1	
C15	TRAPEZOIDAL	1	5	5	5	1	
C16	RECT_OPEN	1.9	8	0	0	1	
C165	TRAPEZOIDAL	1	5	5	5	1	
C17	TRAPEZOIDAL	1	5	5	5	1	
C173	TRAPEZOIDAL	1	5	5	5	1	
C18	TRAPEZOIDAL	1	5	5	5	1	
C188_1	TRAPEZOIDAL	1	5	5	5	1	
C19	CIRCULAR	0.45	0	0	0	1	6
C19_1	TRAPEZOIDAL	1	5	5	5	1	
C19_2	TRAPEZOIDAL	1	5	5	5	1	
C19_3	CIRCULAR	0.6	0	0	0	1	6
C19_4	TRAPEZOIDAL	1	5	5	5	1	
C192	TRAPEZOIDAL	1	5	5	5	1	
C194	TRAPEZOIDAL	1	5	5	5	1	
C196	TRAPEZOIDAL	1	5	5	5	1	
C2	CIRCULAR	0.3	0	0	0	1	
C2_1	TRAPEZOIDAL	1	1	5	5	1	
C2_2	TRAPEZOIDAL	1	1	7	15	1	
C2_3	CIRCULAR	0.45	0	0	0	2	5
C2_4	CIRCULAR	0.45	0	0	0	1	6
C2_6	TRAPEZOIDAL	1	1	5	5	1	
C2_9	CIRCULAR	0.45	0	0	0	1	6
C20	TRAPEZOIDAL	1	5	5	5	1	
C200	TRAPEZOIDAL	1	5	5	5	1	
C21	TRAPEZOIDAL	1	5	5	5	1	
C214	TRAPEZOIDAL	1	5	5	5	1	
C22	IRREGULAR	Street	0	0	0	1	
C23	TRAPEZOIDAL	1	5	5	5	1	
C24	CIRCULAR	0.6	0	0	0	1	6
C25	CIRCULAR	0.45	0	0	0	1	6
C25_2	TRAPEZOIDAL	1	5	5	5	1	
C25_3	CIRCULAR	0.6	0	0	0	1	6
C26	CIRCULAR	0.3	0	0	0	1	6
C27	TRAPEZOIDAL	1	5	5	5	1	
C28	TRIANGULAR	0.3	10	0	0	1	
C28_1	CIRCULAR	0.3	0	0	0	1	6
C28_4	TRAPEZOIDAL	1	2	5	5	1	
C29	CIRCULAR	0.3	0	0	0	1	6
C3	CIRCULAR	0.3	0	0	0	1	6
C30	CIRCULAR	0.9	0	0	0	1	6
C31	TRAPEZOIDAL	1	5	5	5	1	
C32	TRAPEZOIDAL	1	5	5	5	1	
C33	TRAPEZOIDAL	1	5	5	5	1	
C33_1	TRAPEZOIDAL	1	5	5	5	1	
C33_3	CIRCULAR	2.5	0	0	0	1	5
C33_4	TRAPEZOIDAL	1	5	5	5	1	
C34	CIRCULAR	0.45	0	0	0	1	6

C35	TRAPEZOIDAL	1	5	5	5	1	
C36	IRREGULAR	Street	0	0	0	1	
C36_2	CIRCULAR	0.25	0	0	0	1	6
C37	IRREGULAR	Street	0	0	0	1	
C37_2	CIRCULAR	0.25	0	0	0	1	6
C38	TRAPEZOIDAL	1	5	5	5	1	
C39	TRAPEZOIDAL	0.3	0.5	5	5	1	
C4	CIRCULAR	0.3	0	0	0	1	6
C40	TRAPEZOIDAL	1	5	5	5	1	
C41	TRAPEZOIDAL	1	5	5	5	1	
C42	TRAPEZOIDAL	1	5	5	5	1	
C43	CIRCULAR	2.27	0	0	0	1	6
C44	CIRCULAR	0.45	0	0	0	1	
C45	TRAPEZOIDAL	1	5	5	5	1	
C46	CIRCULAR	0.4	0	0	0	1	6
C47	CIRCULAR	0.3	0	0	0	1	6
C48	TRAPEZOIDAL	1	5	5	5	1	
C49	TRAPEZOIDAL	1	5	5	5	1	
C5	IRREGULAR	Street	0	0	0	1	
C50	IRREGULAR	Street	0	0	0	1	
C51	TRAPEZOIDAL	1	5	5	5	1	
C52	TRAPEZOIDAL	1	5	5	5	1	
C53	TRAPEZOIDAL	1	5	5	5	1	
C54	TRAPEZOIDAL	1	5	5	5	1	
C55	TRAPEZOIDAL	1	5	5	5	1	
C56	TRAPEZOIDAL	1	5	5	5	1	
C57	TRAPEZOIDAL	1	5	5	5	1	
C58	CIRCULAR	1.2	0	0	0	1	6
C59	TRAPEZOIDAL	1	5	5	5	1	
C6	CIRCULAR	0.45	0	0	0	1	6
C60	CIRCULAR	0.6	0	0	0	1	6
C61	CIRCULAR	0.45	0	0	0	1	
C62	IRREGULAR	Street	0	0	0	1	
C64	CIRCULAR	0.6	0	0	0	1	6
C65_1	CIRCULAR	0.45	0	0	0	1	
C65_2	CIRCULAR	0.45	0	0	0	1	
C66	IRREGULAR	Street	0	0	0	1	
C66_1	CIRCULAR	0.6	0	0	0	1	6
C67	IRREGULAR	Street	0	0	0	1	
C68	CIRCULAR	0.3	0	0	0	1	6
C69	IRREGULAR	Street	0	0	0	1	
C7	TRIANGULAR	0.362	1	0	0	1	
C7_3	TRAPEZOIDAL	1	2	5	5	1	
C7_4	TRAPEZOIDAL	1	5	5	5	1	
C70	IRREGULAR	Street	0	0	0	1	
C71	CIRCULAR	0.3	0	0	0	1	6
C72	CIRCULAR	0.45	0	0	0	1	
C73	CIRCULAR	0.45	0	0	0	1	
C74	CIRCULAR	0.45	0	0	0	1	6
C75	TRAPEZOIDAL	0.5	5	5	5	1	
C76	TRAPEZOIDAL	0.633	1	5	5	1	
C77	IRREGULAR	Street	0	0	0	1	
C77_1	CIRCULAR	0.3	0	0	0	1	6
C77_3	TRAPEZOIDAL	1	5	5	5	1	
C77_4	TRAPEZOIDAL	1	5	5	5	1	
C77_5	TRAPEZOIDAL	1	5	5	5	1	
C78	TRAPEZOIDAL	1	5	5	5	1	
C79	TRIANGULAR	0.3	10	0	0	1	
C8	CIRCULAR	0.45	0	0	0	1	6
C80	TRAPEZOIDAL	1	5	10	10	1	
C80_1	TRAPEZOIDAL	1	5	5	5	1	
C80_2	TRAPEZOIDAL	1	5	5	5	1	
C81	CIRCULAR	0.3	0	0	0	1	
C82	CIRCULAR	0.3	0	0	0	1	
C83	TRAPEZOIDAL	1	5	5	5	1	
C84	TRAPEZOIDAL	1	5	5	5	1	
C85	CIRCULAR	0.3	0	0	0	1	
C86	CIRCULAR	0.25	0	0	0	1	
C87	CIRCULAR	0.6	0	0	0	1	
C88	CIRCULAR	0.6	0	0	0	1	6
C89	CIRCULAR	0.3	0	0	0	1	
C9	IRREGULAR	Street	0	0	0	1	
C90	CIRCULAR	0.25	0	0	0	1	
C91	CIRCULAR	0.25	0	0	0	1	
C92	CIRCULAR	0.25	0	0	0	1	
C93	TRAPEZOIDAL	1	5	5	5	1	
C94	IRREGULAR	Street	0	0	0	1	
C95	IRREGULAR	Street	0	0	0	1	
C96	CIRCULAR	0.3	0	0	0	1	
C97	CIRCULAR	0.3	0	0	0	1	
C98	CIRCULAR	0.525	0	0	0	1	
C99	CIRCULAR	0.3	0	0	0	1	

```
W1              TRAPEZOIDAL  0.5             1          5          5          1
W15             RECT_OPEN    0.3             20         2          0          1
W27             TRAPEZOIDAL  0.3             10         5          5          1
W44             IRREGULAR    Street          0          0          0          1
W10             RECT_OPEN    0.3             20         0          0
W11             RECT_OPEN    0.2             20         0          0
W12             RECT_OPEN    0.3             20         0          0
W13             RECT_OPEN    0.3             20         0          0
W14             RECT_OPEN    0.3             20         0          0
W16             RECT_OPEN    0.3             20         0          0
W17             RECT_OPEN    0.3             20         0          0
W18             RECT_OPEN    0.3             20         0          0
W19             RECT_OPEN    0.3             30         0          0
W2              RECT_OPEN    0.3             10         0          0
W20             RECT_OPEN    0.3             50         0          0
W21             RECT_OPEN    0.3             20         0          0
W22             RECT_OPEN    0.3             20         0          0
W23             RECT_OPEN    0.3             30         0          0
W24             RECT_OPEN    0.3             20         0          0
W26             RECT_OPEN    0.3             50         0          0
W28             RECT_OPEN    0.3             10         0          0
W29             RECT_OPEN    0.3             50         0          0
W3              RECT_OPEN    0.3             10         0          0
W30             RECT_OPEN    0.3             20         0          0
W31             RECT_OPEN    0.3             50         0          0
W32             RECT_OPEN    0.3             30         0          0
W33             RECT_OPEN    0.3             50         0          0
W34             RECT_OPEN    0.3             30         0          0
W35             RECT_OPEN    0.5             50         0          0
W36             RECT_OPEN    0.3             50         0          0
W37             RECT_OPEN    0.3             30         0          0
W38             RECT_OPEN    0.3             30         0          0
W39             RECT_OPEN    0.3             20         0          0
W4              RECT_OPEN    0.3             20         0          0
W40             RECT_OPEN    0.3             20         0          0
W41             RECT_OPEN    0.3             10         0          0
W42             RECT_OPEN    0.3             20         0          0
W43             RECT_OPEN    0.3             10         0          0
W45             RECT_OPEN    0.3             10         0          0
W46             RECT_OPEN    0.3             10         0          0
W48             RECT_OPEN    0.3             30         0          0
```

```
W49             RECT_OPEN    0.3             50         0          0
W5              RECT_OPEN    0.3             20         0          0
W50             RECT_OPEN    0.3             30         0          0
W51             RECT_OPEN    0.3             20         0          0
W52             RECT_OPEN    0.3             20         0          0
W53             RECT_OPEN    0.3             30         0          0
W54             RECT_OPEN    0.3             10         0          0
W55             RECT_OPEN    0.3             20         0          0
W6              RECT_OPEN    0.3             50         0          0
W77             RECT_OPEN    0.3             30         0          0
W8              RECT_OPEN    0.4             30         0          0
W9              RECT_OPEN    0.3             30         0          0

[TRANSECTS]
;;Transect Data in HEC-2 format
;
NC 0.01     0.01     0.01
X1 Street            4        0.0      0.0      0.0      0.0      0.0      0.0      0.0
GR 1        0        0.91     4.5      1.06     4.5      1.13     8

[LOSSES]
;;Link           Kentry     Kexit      Kavg       Flap Gate  Seepage
;;-------------- ---------- ---------- ---------- ---------- ----------
C1              0          0.2        0          NO         0
C105            0          0.42       0          NO         0
C106            0          0.42       0          NO         0
C108            1          1          0          NO         0
C110            0          1          0          NO         0
C111            0          1          0          NO         0
C112            1          0          0          NO         0
C113            0          1          0          NO         0
C115            1          0.83       0          NO         0
C121            0          1          0          NO         0
C2              0          1          0          NO         0
C2_4            0          0.27       0          NO         0
C29             1          0          0          NO         0
C44             0          1          0          NO         0
C65_1           1          0          0          NO         0
C65_2           0          0.61       0          NO         0
C71             0          0.48       0          NO         0
C72             0          0.27       0          NO         0
```

EXISTING RAINFALL

OUTPUT FILES

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

WARNING 04: minimum elevation drop used for Conduit W27
WARNING 10: crest elevation raised to downstream invert for regulator Link W13
WARNING 10: crest elevation raised to downstream invert for regulator Link W21
WARNING 10: crest elevation raised to downstream invert for regulator Link W41
WARNING 02: maximum depth increased for Node J102
WARNING 02: maximum depth increased for Node J11
WARNING 02: maximum depth increased for Node J113
WARNING 02: maximum depth increased for Node J114
WARNING 02: maximum depth increased for Node J117
WARNING 02: maximum depth increased for Node J120
WARNING 02: maximum depth increased for Node J121
WARNING 02: maximum depth increased for Node J127
WARNING 02: maximum depth increased for Node J128
WARNING 02: maximum depth increased for Node J129
WARNING 02: maximum depth increased for Node J13
WARNING 02: maximum depth increased for Node J14
WARNING 02: maximum depth increased for Node J2
WARNING 02: maximum depth increased for Node J231
WARNING 02: maximum depth increased for Node J239
WARNING 02: maximum depth increased for Node J24
WARNING 02: maximum depth increased for Node J252
WARNING 02: maximum depth increased for Node J27
WARNING 02: maximum depth increased for Node J28
WARNING 02: maximum depth increased for Node J30
WARNING 02: maximum depth increased for Node J36
WARNING 02: maximum depth increased for Node J40
WARNING 02: maximum depth increased for Node J41
WARNING 02: maximum depth increased for Node J42
WARNING 02: maximum depth increased for Node J43
WARNING 02: maximum depth increased for Node J5
WARNING 02: maximum depth increased for Node J56
WARNING 02: maximum depth increased for Node J57
WARNING 02: maximum depth increased for Node J64
WARNING 02: maximum depth increased for Node J69
WARNING 02: maximum depth increased for Node J70
WARNING 02: maximum depth increased for Node J71
WARNING 02: maximum depth increased for Node J72

WARNING 02: maximum depth increased for Node J73
WARNING 02: maximum depth increased for Node J78
WARNING 02: maximum depth increased for Node J81
WARNING 02: maximum depth increased for Node J84
WARNING 02: maximum depth increased for Node J86
WARNING 02: maximum depth increased for Node J87
WARNING 02: maximum depth increased for Node J9
WARNING 02: maximum depth increased for Node J94
WARNING 02: maximum depth increased for Node J95
WARNING 02: maximum depth increased for Node J98

****
Element Count
****
Number of rain gages 12
Number of subcatchments ... 110
Number of nodes 200
Number of links 270
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Huff_24h_100y_101.3mm	Huff_24h_100y_101.3mm	INTENSITY	5 min.
Huff_24h_10y_67.6mm	Huff_24h_10y_67.6mm	INTENSITY	5 min.
Huff_24h_25y_81.2mm	Huff_24h_25y_81.2mm	INTENSITY	5 min.
Huff_24h_2y_40.5mm	Huff_24h_2y_40.5mm	INTENSITY	5 min.
Huff_24h_50y_91.3mm	Huff_24h_50y_91.3mm	INTENSITY	5 min.
Huff_24h_5y_56.8mm	Huff_24h_5y_56.8mm	INTENSITY	5 min.
Sundre_4h_100y	Sundre_4h_100y	INTENSITY	5 min.
Sundre_4h_10y	Sundre_4h_10y	INTENSITY	5 min.
Sundre_4h_25y	Sundre_4h_25y	INTENSITY	5 min.
Sundre_4h_2y	Sundre_4h_2y	INTENSITY	5 min.
Sundre_4h_50y	Sundre_4h_50y	INTENSITY	5 min.
Sundre_4h_5y	Sundre_4h_5y	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.41	37.66	52.00	4.0000	Sundre_4h_5y	J100
S1_2	104.20	1132.64	100.00	6.0900	Sundre_4h_5y	J49
S1_3	26.96	512.96	100.00	5.8310	Sundre_4h_5y	J32
S1_4	0.16	9.94	70.00	0.5000	Sundre_4h_5y	J4
S1_6	0.08	9.43	70.00	1.0000	Sundre_4h_5y	SU31
S1_7	19.06	596.37	100.00	5.3890	Sundre_4h_5y	SU3
S10	1.12	55.84	33.00	4.5000	Sundre_4h_5y	SU29
S103	20.16	314.81	100.00	4.3000	Sundre_4h_5y	J142
S105	40.68	263.49	100.00	4.6400	Sundre_4h_5y	J158
S11	0.36	33.66	12.00	5.0000	Sundre_4h_5y	J116
S111	12.29	179.92	100.00	3.4000	Sundre_4h_5y	J142
S112	15.14	545.15	100.00	6.4990	Sundre_4h_5y	J101
S117	29.66	326.97	100.00	5.5000	Sundre_4h_5y	J150
S12	2.53	127.81	20.00	7.0000	Sundre_4h_5y	SU37
S12_1	0.53	40.13	22.00	6.0000	Sundre_4h_5y	J36
S122	0.89	65.59	24.00	5.0000	Sundre_4h_5y	J59
S122_2	0.71	55.85	40.00	3.7300	Sundre_4h_5y	SU21
S122_3	0.34	15.77	60.00	3.5000	Sundre_4h_5y	SU42
S122_4	0.27	20.93	10.00	3.5000	Sundre_4h_5y	J121
S122_7	0.46	39.57	35.00	5.0000	Sundre_4h_5y	J64
S127	17.37	650.18	100.00	4.3430	Sundre_4h_5y	J466
S129_1	22.04	688.83	100.00	4.9600	Sundre_4h_5y	J462
S13	18.50	270.09	100.00	3.7000	Sundre_4h_5y	J46
S13_1	0.45	58.25	45.00	3.5000	Sundre_4h_5y	SU18
S13_2	0.30	40.40	26.91	1.6000	Sundre_4h_5y	SU19
S130_4	21.55	446.84	100.00	4.1470	Sundre_4h_5y	SU1
S134_1	3.44	255.23	100.00	4.4700	Sundre_4h_5y	SU3
S134_10	0.64	69.81	100.00	4.7000	Sundre_4h_5y	J156
S134_11	0.28	39.07	68.00	1.0000	Sundre_4h_5y	J14
S134_12	0.60	37.34	30.00	2.0000	Sundre_4h_5y	J73
S134_14	0.25	32.19	40.00	3.5000	Sundre_4h_5y	SU6
S134_15	0.50	51.72	3.00	2.5000	Sundre_4h_5y	J11
S134_16	1.24	62.93	10.00	2.5000	Sundre_4h_5y	J72
S134_3	0.32	18.16	33.00	2.2000	Sundre_4h_5y	J86
S134_4	0.25	31.00	42.00	4.0000	Sundre_4h_5y	J124
S134_5	0.54	51.89	22.00	4.8000	Sundre_4h_5y	SU14
S134_6	0.95	44.66	37.00	4.0000	Sundre_4h_5y	SU11
S134_8	0.66	63.08	20.00	4.4700	Sundre_4h_5y	J26
S134_9	0.29	38.40	40.00	3.5000	Sundre_4h_5y	SU7
S135_1	2.15	99.80	16.00	6.0000	Sundre_4h_5y	SU38
S135_2	0.83	32.59	13.00	4.0000	Sundre_4h_5y	J12
S135_3	0.52	48.56	25.00	4.0000	Sundre_4h_5y	SU22
S135_4	1.28	39.39	16.27	4.5000	Sundre_4h_5y	SU24
S136	20.21	630.42	100.00	7.0260	Sundre_4h_5y	J150
S14	0.61	57.81	45.00	3.2640	Sundre_4h_5y	SU20
S141	34.79	843.26	100.00	6.8450	Sundre_4h_5y	J475
S145	18.61	299.28	100.00	6.5320	Sundre_4h_5y	J172
S147_2	0.16	9.43	70.00	1.0000	Sundre_4h_5y	SU32
S147_3	9.01	694.00	100.00	5.4310	Sundre_4h_5y	J187
S148	6.10	228.90	100.00	7.5320	Sundre_4h_5y	J185
S149	22.82	429.85	100.00	6.6360	Sundre_4h_5y	J177
S15	2.78	111.71	100.00	4.5000	Sundre_4h_5y	J16
S155	43.07	499.68	100.00	5.2400	Sundre_4h_5y	J209
S158	34.40	500.07	100.00	4.2570	Sundre_4h_5y	J209
S16	0.97	50.82	45.00	3.2000	Sundre_4h_5y	SU39
S16_2	1.00	57.21	40.00	2.5000	Sundre_4h_5y	SU34
S160_1	33.90	1297.77	100.00	7.6670	Sundre_4h_5y	J250
S160_3	3.35	98.60	100.00	5.8000	Sundre_4h_5y	J34
S162_2	2.25	108.00	100.00	2.7000	Sundre_4h_5y	J207
S17	33.29	315.20	100.00	4.0000	Sundre_4h_5y	J105
S179_2	26.12	363.21	100.00	6.6000	Sundre_4h_5y	SU4
S18	25.27	311.99	100.00	4.4000	Sundre_4h_5y	J23
S180	32.47	444.23	100.00	5.8500	Sundre_4h_5y	J250
S19	0.37	15.08	28.22	5.3890	Sundre_4h_5y	J3
S19_2	22.38	245.12	100.00	3.9000	Sundre_4h_5y	J474
S198_1	12.13	183.46	100.00	3.8000	Sundre_4h_5y	J1
S198_2	9.40	191.12	100.00	2.7000	Sundre_4h_5y	J252
S2	10.84	162.34	100.00	4.5000	Sundre_4h_5y	J10
S2_1	3.53	107.57	100.00	4.2500	Sundre_4h_5y	J474
S20	2.12	46.52	100.00	3.3000	Sundre_4h_5y	J25
S20_2	1.99	79.74	18.46	4.9690	Sundre_4h_5y	J47
S206_2	23.56	228.69	100.00	6.0000	Sundre_4h_5y	SU5
S21	1.80	60.95	100.00	5.3000	Sundre_4h_5y	J17
S215	21.71	734.69	100.00	6.4710	Sundre_4h_5y	J486
S217	15.01	285.47	100.00	10.1000	Sundre_4h_5y	J286
S22	0.35	17.36	35.00	4.0000	Sundre_4h_5y	SU36

S225	15.20	293.40	100.00	8.0880	Sundre_4h_5y	J286
S23	0.76	46.04	15.00	4.0000	Sundre_4h_5y	J95
S24	12.38	209.47	100.00	4.3620	Sundre_4h_5y	J41
S24_1	9.63	162.13	100.00	6.6740	Sundre_4h_5y	J43
S25	30.10	352.08	100.00	2.8800	Sundre_4h_5y	J231
S26	57.83	400.46	100.00	5.0220	Sundre_4h_5y	J292
S27	33.01	377.66	100.00	2.0000	Sundre_4h_5y	J495
S28	8.64	172.89	100.00	3.3000	Sundre_4h_5y	J21
S3	28.30	427.49	100.00	7.0000	Sundre_4h_5y	J286
S3_2	38.34	328.86	100.00	5.3000	Sundre_4h_5y	SU4
S4	7.90	115.14	100.00	1.8000	Sundre_4h_5y	J472
S5	3.56	225.39	100.00	5.9340	Sundre_4h_5y	SU2
S5_2	7.05	133.09	100.00	5.8550	Sundre_4h_5y	J51
S5_4	2.39	85.61	100.00	4.0000	Sundre_4h_5y	J20
S6	0.50	28.33	36.00	4.2000	Sundre_4h_5y	SU25
S7	7.17	144.79	100.00	2.3000	Sundre_4h_5y	J15
S7_1	1.58	93.01	30.00	4.0000	Sundre_4h_5y	J111
S7_10	2.29	109.92	35.00	4.5000	Sundre_4h_5y	J123
S7_12	2.64	65.89	26.00	4.8000	Sundre_4h_5y	SU15
S7_15	0.12	7.61	70.00	1.2000	Sundre_4h_5y	J112
S7_16	0.14	24.48	30.00	4.5000	Sundre_4h_5y	SU40
S7_17	0.10	22.59	30.00	5.0000	Sundre_4h_5y	J125
S7_3	1.08	61.52	25.00	3.5000	Sundre_4h_5y	SU40
S7_4	1.41	80.75	15.00	3.3000	Sundre_4h_5y	J60
S7_7	1.96	84.35	12.00	4.6000	Sundre_4h_5y	J22
S7_8	0.09	13.89	15.00	6.0000	Sundre_4h_5y	SU30
S7_9	3.32	134.82	21.00	1.1400	Sundre_4h_5y	J10
S75	31.37	348.52	100.00	4.0000	Sundre_4h_5y	J101
S8	6.74	194.21	99.99	5.0000	Sundre_4h_5y	SU5
S9	1.96	94.41	20.00	2.0000	Sundre_4h_5y	SU41
S9_1	3.38	135.66	100.00	4.6000	Sundre_4h_5y	SU13
S9_2	0.78	67.08	100.00	2.0000	Sundre_4h_5y	J19
S9_5	0.47	17.90	25.00	3.3220	Sundre_4h_5y	SU37
S9_6	0.75	36.38	9.00	5.6000	Sundre_4h_5y	SU38

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
S1_2	Rural	1	1032026.00	1132.64	99.04	100.00	0.00
S1_3	Rural	1	264117.00	512.96	97.96	100.00	0.00
S1_7	Rural	1	183003.00	596.37	96.01	100.00	0.00
S103	Rural	1	198511.00	640.42	98.46	100.00	0.00
S105	Rural	1	406045.00	263.49	99.80	100.00	0.00
S111	Rural	1	121957.00	179.92	99.27	100.00	0.00
S112	Rural	1	150002.00	545.15	99.06	100.00	0.00
S117	Rural	1	289265.00	326.97	97.54	100.00	0.00
S127	Rural	1	172306.00	650.18	99.19	100.00	0.00
S129_1	Rural	1	218331.00	688.83	99.05	100.00	0.00
S13	Rural	1	179510.00	270.88	97.03	100.00	0.00
S130_4	Rural	1	172500.00	446.84	80.05	100.00	0.00
S134_1	Rural	1	29234.00	255.23	84.97	100.00	0.00
S134_10	Rural	1	6237.00	69.81	97.96	100.00	0.00
S136	Rural	1	200560.00	620.42	99.26	100.00	0.00
S141	Rural	1	344362.00	843.26	98.99	100.00	0.00
S145	Rural	1	184184.00	299.28	98.98	100.00	0.00
S147_3	Rural	1	90046.00	694.00	99.89	100.00	0.00
S148	Rural	1	60377.00	228.90	99.02	100.00	0.00
S149	Rural	1	227561.00	429.85	99.74	100.00	0.00
S15	Rural	1	27116.00	111.71	97.48	100.00	0.00
S155	Rural	1	427668.00	499.68	99.30	100.00	0.00
S158	Rural	1	340439.00	500.07	98.95	100.00	0.00
S160_1	Rural	1	335579.00	1297.77	99.00	100.00	0.00
S160_3	Rural	1	31854.00	98.60	95.02	100.00	0.00
S162_2	Rural	1	20883.00	108.00	92.97	100.00	0.00
S17	Rural	1	319926.00	315.20	96.10	100.00	0.00
S179_2	Rural	1	240151.00	363.21	91.96	100.00	0.00
S18	Rural	1	245213.00	311.99	97.03	100.00	0.00
S180	Rural	1	311692.00	444.23	96.00	100.00	0.00
S19_2	Rural	1	183594.00	245.06	82.04	100.00	0.00
S198_1	Rural	1	113965.00	183.46	93.98	100.00	0.00
S198_2	Rural	1	93132.00	191.12	99.04	100.00	0.00
S2	Rural	1	106241.00	162.34	97.97	100.00	0.00
S2_1	Rural	1	33190.00	37.28	94.05	100.00	0.00
S20	Rural	1	19066.00	46.52	90.08	100.00	0.00
S206_2	Rural	1	230851.00	229.00	98.00	100.00	0.00
S21	Rural	1	15380.00	60.95	85.54	100.00	0.00
S215	Rural	1	212732.00	734.69	97.97	100.00	0.00
S217	Rural	1	147080.00	285.47	98.00	100.00	0.00

S225	Rural	1	149331.00	293.96	98.22	100.00	0.00
S24	Rural	1	116398.00	209.47	94.02	100.00	0.00
S24_1	Rural	1	88588.00	162.13	92.00	100.00	0.00
S25	Rural	1	292026.00	352.08	97.01	100.00	0.00
S26	Rural	1	566645.00	400.46	97.98	100.00	0.00
S27	Rural	1	320075.00	377.66	96.97	100.00	0.00
S28	Rural	1	77786.00	0.00	89.98	0.00	0.00
S3	Rural	1	277260.00	427.49	97.97	100.00	0.00
S3_2	Rural	1	364450.00	328.86	95.04	100.00	0.00
S4	Rural	1	72686.00	115.14	92.02	100.00	0.00
S5	Rural	1	26697.00	225.39	75.00	100.00	0.00
S5_2	Rural	1	70385.00	109.45	99.79	100.00	0.00
S5_4	Rural	1	23585.00	37.06	98.74	100.00	0.00
S7	Rural	1	68771.00	144.79	95.95	100.00	0.00
S75	Rural	1	302666.00	348.52	96.49	100.00	0.00
S8	Rural	1	59292.00	194.21	87.98	100.00	0.00
S9_1	Rural	1	32428.00	135.00	96.00	100.00	0.00
S9_2	Rural	1	7611.00	67.08	97.82	100.00	0.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	1148.94	0.46	0.0	
J10	JUNCTION	1164.72	1.00	0.0	
J100	JUNCTION	1178.52	0.60	0.0	
J101	JUNCTION	1178.52	1.00	0.0	
J102	JUNCTION	1177.35	0.50	0.0	
J104	JUNCTION	1172.36	2.10	0.0	
J105	JUNCTION	1196.46	1.00	0.0	
J106	JUNCTION	1173.09	1.48	100.0	
J107	JUNCTION	1173.59	1.51	0.0	
J108	JUNCTION	1173.80	1.30	100.0	
J11	JUNCTION	1184.66	1.00	0.0	
J110	JUNCTION	1173.50	1.30	100.0	
J111	JUNCTION	1178.84	0.60	0.0	
J112	JUNCTION	1178.72	0.30	0.0	
J113	JUNCTION	1184.57	1.00	0.0	
J114	JUNCTION	1184.70	0.50	0.0	
J116	JUNCTION	1185.82	1.00	100.0	
J117	JUNCTION	1174.77	1.00	0.0	
J118	JUNCTION	1179.03	1.10	0.0	
J119	JUNCTION	1179.03	1.10	0.0	
J12	JUNCTION	1178.80	0.30	0.0	
J120	JUNCTION	1174.90	0.22	0.0	
J121	JUNCTION	1177.30	1.00	0.0	
J122	JUNCTION	1182.05	0.30	0.0	
J123	JUNCTION	1178.10	1.00	0.0	
J124	JUNCTION	1182.41	0.94	0.0	
J126	JUNCTION	1180.45	0.67	100.0	
J127	JUNCTION	1148.23	1.00	0.0	
J128	JUNCTION	1123.95	2.50	0.0	
J129	JUNCTION	1123.98	2.50	0.0	
J13	JUNCTION	1180.49	1.00	0.0	
J130	JUNCTION	1176.60	0.60	0.0	
J14	JUNCTION	1183.32	0.30	0.0	
J140	JUNCTION	1159.05	2.61	0.0	
J142	JUNCTION	1190.42	1.00	0.0	
J15	JUNCTION	1186.02	0.73	100.0	
J150	JUNCTION	1163.66	1.00	0.0	
J156	JUNCTION	1187.65	1.00	0.0	
J158	JUNCTION	1153.01	1.00	0.0	
J16	JUNCTION	1188.10	1.00	0.0	
J160	JUNCTION	1146.35	1.00	0.0	
J162	JUNCTION	1119.97	1.00	0.0	
J17	JUNCTION	1176.60	1.00	0.0	
J172	JUNCTION	1162.25	1.00	0.0	
J177	JUNCTION	1156.19	1.00	0.0	
J18	JUNCTION	1172.30	1.37	0.0	
J183	JUNCTION	1122.98	1.00	0.0	
J185	JUNCTION	1151.53	1.00	0.0	
J187	JUNCTION	1166.60	1.00	0.0	
J19	JUNCTION	1198.50	1.00	0.0	
J196	JUNCTION	1166.68	1.00	0.0	
J198	JUNCTION	1128.81	1.00	0.0	
J2	JUNCTION	1185.85	1.00	0.0	
J20	JUNCTION	1184.90	0.30	0.0	
J207	JUNCTION	1164.64	1.00	0.0	
J209	JUNCTION	1143.66	1.00	0.0	

J21	JUNCTION	1168.30	2.00	0.0
J22	JUNCTION	1168.26	2.23	0.0
J223	JUNCTION	1178.40	1.00	0.0
J23	JUNCTION	1184.00	1.00	0.0
J231	JUNCTION	1137.34	1.00	0.0
J235	JUNCTION	1152.84	1.00	0.0
J239	JUNCTION	1140.20	2.27	0.0
J24	JUNCTION	1169.32	1.00	0.0
J25	JUNCTION	1180.50	1.00	0.0
J250	JUNCTION	1165.25	1.00	0.0
J252	JUNCTION	1141.47	2.27	0.0
J26	JUNCTION	1178.68	1.43	0.0
J27	JUNCTION	1177.76	1.00	0.0
J28	JUNCTION	1185.36	1.64	0.0
J286	JUNCTION	1157.58	4.00	0.0
J29	JUNCTION	1186.29	0.61	0.0
J292	JUNCTION	1193.88	1.00	0.0
J3	JUNCTION	1186.49	0.81	0.0
J30	JUNCTION	1137.53	1.00	0.0
J31	JUNCTION	1174.35	1.05	0.0
J32	JUNCTION	1149.00	1.00	0.0
J33	JUNCTION	1176.00	1.96	0.0
J35	JUNCTION	1168.70	1.00	0.0
J36	JUNCTION	1183.65	1.00	100.0
J37	JUNCTION	1183.25	1.00	100.0
J38	JUNCTION	1168.00	2.30	0.0
J39	JUNCTION	1179.27	1.85	0.0
J4	JUNCTION	1173.77	0.59	0.0
J40	JUNCTION	1170.98	1.00	0.0
J41	JUNCTION	1171.23	1.00	0.0
J42	JUNCTION	1169.53	1.00	0.0
J43	JUNCTION	1169.78	1.00	0.0
J44	JUNCTION	1164.09	1.24	0.0
J45	JUNCTION	1191.60	1.00	0.0
J456	JUNCTION	1132.15	1.00	0.0
J46	JUNCTION	1169.20	1.00	0.0
J462	JUNCTION	1163.80	1.00	0.0
J466	JUNCTION	1145.11	1.00	0.0
J47	JUNCTION	1169.57	1.34	10.0
J472	JUNCTION	1139.58	1.00	0.0
J474	JUNCTION	1161.80	1.00	0.0
J475	JUNCTION	1139.85	1.00	0.0
J48	JUNCTION	1176.13	1.00	0.0
J482	JUNCTION	1158.87	2.80	0.0
J486	JUNCTION	1151.58	1.00	0.0
J49	JUNCTION	1160.19	1.00	0.0
J491	JUNCTION	1125.46	1.00	0.0
J495	JUNCTION	1144.93	1.00	0.0
J5	JUNCTION	1169.46	1.00	0.0
J50	JUNCTION	1169.54	1.38	10.0
J51	JUNCTION	1182.65	0.47	0.0
J52	JUNCTION	1172.66	1.24	0.0
J53	JUNCTION	1180.81	1.30	0.0
J54	JUNCTION	1173.02	1.02	0.0
J55	JUNCTION	1172.81	1.27	0.0
J56	JUNCTION	1168.00	1.00	0.0
J57	JUNCTION	1170.29	1.00	0.0
J58	JUNCTION	1179.65	1.33	0.0
J59	JUNCTION	1177.99	0.36	0.0
J6	JUNCTION	1180.11	1.30	0.0
J60	JUNCTION	1183.03	0.30	0.0
J61	JUNCTION	1181.16	1.20	0.0
J63	JUNCTION	1179.84	2.35	0.0
J64	JUNCTION	1179.11	0.50	0.0
J65	JUNCTION	1177.85	1.00	0.0
J66	JUNCTION	1176.75	2.10	0.0
J67	JUNCTION	1173.93	1.58	0.0
J68	JUNCTION	1173.05	1.23	0.0
J69	JUNCTION	1170.29	1.00	0.0
J7	JUNCTION	1177.18	0.46	0.0
J70	JUNCTION	1183.27	0.63	0.0
J71	JUNCTION	1182.71	0.70	0.0
J72	JUNCTION	1185.55	1.00	0.0
J73	JUNCTION	1175.35	1.00	0.0
J74	JUNCTION	1173.70	1.10	0.0
J75	JUNCTION	1173.07	1.45	0.0
J76	JUNCTION	1173.27	1.50	0.0
J77	JUNCTION	1173.61	1.20	20.0
J78	JUNCTION	1173.62	1.20	0.0
J79	JUNCTION	1173.99	1.10	0.0
J8	JUNCTION	1175.75	1.32	0.0
J80	JUNCTION	1174.83	1.10	0.0

J81	JUNCTION	1170.50	1.00	0.0
J82	JUNCTION	1174.75	1.20	0.0
J83	JUNCTION	1177.10	1.45	0.0
J84	JUNCTION	1177.98	1.45	0.0
J85	JUNCTION	1178.13	1.15	10.0
J86	JUNCTION	1184.51	0.22	0.0
J87	JUNCTION	1171.91	1.65	0.0
J89	JUNCTION	1172.80	1.35	100.0
J9	JUNCTION	1171.42	1.00	0.0
J90	JUNCTION	1173.25	1.10	0.0
J91	JUNCTION	1172.37	1.20	10.0
J92	JUNCTION	1173.81	1.55	0.0
J93	JUNCTION	1172.09	1.20	10.0
J94	JUNCTION	1169.16	1.00	0.0
J95	JUNCTION	1172.86	1.00	100.0
J96	JUNCTION	1171.71	2.13	0.0
J97	JUNCTION	1171.17	2.50	100.0
J98	JUNCTION	1170.19	1.00	0.0
J99	JUNCTION	1172.69	1.18	100.0
J109	OUTFALL	1158.62	1.00	0.0
J488	OUTFALL	1119.97	1.00	0.0
J125	STORAGE	1177.01	0.63	0.0
J34	STORAGE	1176.27	2.03	0.0
SU1	STORAGE	1167.38	1.83	0.0
SU10	STORAGE	1178.00	0.55	0.0
SU11	STORAGE	1174.51	0.30	0.0
SU12	STORAGE	1174.47	0.30	0.0
SU13	STORAGE	1186.43	0.87	0.0
SU14	STORAGE	1178.98	0.30	0.0
SU15	STORAGE	1179.13	0.30	0.0
SU16	STORAGE	1178.25	0.30	0.0
SU17	STORAGE	1180.69	0.73	0.0
SU18	STORAGE	1175.63	0.30	0.0
SU19	STORAGE	1174.50	0.32	0.0
SU2	STORAGE	1166.99	2.23	0.0
SU20	STORAGE	1174.79	0.30	0.0
SU21	STORAGE	1173.74	0.34	0.0
SU22	STORAGE	1174.05	0.30	0.0
SU23	STORAGE	1173.55	0.60	0.0
SU24	STORAGE	1175.06	0.30	0.0
SU25	STORAGE	1172.99	0.30	0.0
SU26	STORAGE	1173.27	0.30	0.0
SU27	STORAGE	1173.26	0.60	0.0
SU28	STORAGE	1170.62	0.30	0.0
SU29	STORAGE	1173.36	0.50	0.0
SU3	STORAGE	1166.54	2.12	0.0
SU30	STORAGE	1173.24	0.63	0.0
SU31	STORAGE	1173.07	0.60	0.0
SU32	STORAGE	1174.15	0.30	0.0
SU33	STORAGE	1174.26	0.30	0.0
SU34	STORAGE	1181.81	0.55	0.0
SU36	STORAGE	1174.20	0.60	0.0
SU37	STORAGE	1175.29	0.30	0.0
SU38	STORAGE	1186.69	0.30	0.0
SU39	STORAGE	1181.11	0.30	0.0
SU4	STORAGE	1163.02	1.70	0.0
SU40	STORAGE	1174.50	0.60	0.0
SU41	STORAGE	1186.61	0.30	0.0
SU42	STORAGE	1173.61	0.30	0.0
SU5	STORAGE	1161.12	1.64	0.0
SU6	STORAGE	1175.21	0.30	0.0
SU7	STORAGE	1173.97	0.30	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J130	J82	CONDUIT	49.5	3.7439	0.0110
C1_1	J1	J127	CONDUIT	16.0	4.3908	0.0240
C1_2	J127	J252	CONDUIT	71.5	9.4900	0.0500
C10	J14	J70	CONDUIT	16.6	0.2598	0.0130
C100	J17	J22	CONDUIT	242.0	3.4471	0.0350
C101	J91	J87	CONDUIT	5.3	8.7885	0.0110
C102	J177	J185	CONDUIT	264.9	1.7600	0.0500
C103	J87	J94	CONDUIT	58.3	4.7242	0.0240
C104	J187	J250	CONDUIT	672.3	0.2011	0.0500
C105	J95	J96	CONDUIT	5.5	17.9765	0.0110
C106	J96	J97	CONDUIT	15.0	2.6339	0.0110
C107	J97	J98	CONDUIT	47.4	2.0616	0.0110
C108	J99	J96	CONDUIT	21.3	2.5968	0.0110

C109	J100	J102	CONDUIT	14.6	8.0403	0.0240
C11	J11	J124	CONDUIT	92.5	2.2188	0.0240
C110	J104	J97	CONDUIT	103.2	0.9829	0.0110
C110_1	J102	SU29	CONDUIT	62.9	6.3464	0.0350
C111	J106	J104	CONDUIT	14.9	4.5798	0.0110
C112	J110	J106	CONDUIT	3.6	-0.3027	0.0130
C113	J107	J106	CONDUIT	18.8	2.5280	0.0110
C114	J196	J187	CONDUIT	157.6	0.0482	0.0500
C115	J108	J107	CONDUIT	4.6	4.6531	0.0110
C116	J111	J112	CONDUIT	12.5	0.9463	0.0130
C117	J172	J177	CONDUIT	299.5	2.0238	0.0500
C118	J18	J94	CONDUIT	46.7	6.7476	0.0350
C118_1	J112	J7	CONDUIT	22.8	6.7374	0.0100
C118_2	J7	SU40	CONDUIT	57.7	4.8123	0.0100
C119	J28	J114	CONDUIT	14.4	4.5746	0.0110
C12	J120	SU40	CONDUIT	126.2	0.3216	0.0100
C12_2	J124	J13	CONDUIT	37.9	5.0814	0.0240
C120	J113	J123	CONDUIT	176.9	3.6602	0.0350
C120_1	J114	J123	CONDUIT	215.9	3.0584	0.0350
C120_2	J123	J95	CONDUIT	202.6	2.5863	0.0350
C121	J119	J117	CONDUIT	68.3	6.2492	0.0110
C122	J120	J31	CONDUIT	5.1	5.0748	0.0110
C123	J33	J117	CONDUIT	143.0	0.8614	0.0350
C124	J150	J172	CONDUIT	140.7	1.0001	0.0500
C125	J19	SU13	CONDUIT	260.4	4.6402	0.0500
C126	SU3	J196	CONDUIT	246.6	0.0491	0.0500
C127	J60	J122	CONDUIT	13.7	7.1643	0.0130
C128	SU10	J59	CONDUIT	67.6	0.1641	0.0100
C129	SU41	J60	CONDUIT	99.2	3.7076	0.0100
C13	J57	SU3	CONDUIT	186.0	1.8740	0.0500
C130	J21	J38	CONDUIT	32.6	0.9214	0.0240
C131	SU32	J196	CONDUIT	167.7	4.4630	0.0500
C132	J20	SU39	CONDUIT	187.0	2.0254	0.0100
C133	J23	J235	CONDUIT	767.7	4.0626	0.0500
C134	J46	J21	CONDUIT	188.1	0.4786	0.0500
C139	J209	J475	CONDUIT	108.2	3.5217	0.0500
C14	J482	J109	CONDUIT	396.6	0.0628	0.0500
C15	J69	SU3	CONDUIT	135.0	2.5823	0.0500
C16	J140	J482	CONDUIT	8.0	2.3131	0.0100
C165	J160	J466	CONDUIT	69.4	1.7942	0.0500
C17	J48	J49	CONDUIT	634.1	2.5154	0.0500
C173	J101	J150	CONDUIT	555.5	2.6776	0.0500
C18	J81	SU3	CONDUIT	33.0	11.2802	0.0500
C188_1	J156	J11	CONDUIT	150.4	1.9926	0.0350
C19	J55	J57	CONDUIT	67.6	3.7452	0.0240
C19_1	J474	J49	CONDUIT	517.1	0.3108	0.0500
C19_2	J49	J140	CONDUIT	155.6	0.7302	0.0500
C19_3	J22	J56	CONDUIT	25.0	1.0643	0.0240
C19_4	J56	SU1	CONDUIT	65.0	0.3354	0.0500
C192	J235	J456	CONDUIT	1044.6	1.9805	0.0500
C194	J158	J160	CONDUIT	294.5	2.2623	0.0500
C196	J292	SU5	CONDUIT	561.4	5.8472	0.0500
C2	J118	J117	CONDUIT	70.3	6.0690	0.0110
C2_1	J13	J26	CONDUIT	48.3	3.7443	0.0350
C2_2	J2	J113	CONDUIT	60.1	2.1234	0.0350
C2_3	J26	J27	CONDUIT	19.7	4.6920	0.0240
C2_4	J73	J75	CONDUIT	43.1	5.2783	0.0240
C2_6	J27	J73	CONDUIT	63.4	3.8113	0.0350
C2_9	J75	J9	CONDUIT	49.0	3.3845	0.0110
C20	J5	SU3	CONDUIT	28.0	9.5432	0.0500
C200	J142	J156	CONDUIT	151.6	1.8277	0.0500
C21	J462	J474	CONDUIT	482.5	0.4145	0.0500
C214	J105	J101	CONDUIT	526.4	3.4086	0.0500
C22	SU12	SU7	CONDUIT	72.4	0.6783	0.0100
C23	J94	SU3	CONDUIT	52.0	4.5354	0.0500
C24	J50	J24	CONDUIT	24.3	0.8987	0.0240
C25	J51	J6	CONDUIT	41.0	6.1947	0.0240
C25_2	J25	J47	CONDUIT	261.1	4.1880	0.0350
C25_3	J47	J50	CONDUIT	4.5	0.8138	0.0240
C26	J34	J33	CONDUIT	16.3	1.6282	0.0240
C27	J162	J488	CONDUIT	48.4	-0.0021	0.0500
C28	J36	J37	CONDUIT	9.7	4.1535	0.0130
C28_1	J15	J116	CONDUIT	23.8	0.8102	0.0240
C28_4	J116	J36	CONDUIT	59.1	3.6698	0.0350
C29	J29	J113	CONDUIT	16.8	10.3053	0.0110
C3	J3	J2	CONDUIT	19.9	3.2457	0.0240
C30	J30	J231	CONDUIT	20.1	0.9472	0.0240
C31	J183	J162	CONDUIT	380.5	0.7907	0.0500
C32	J32	J30	CONDUIT	385.7	2.9742	0.0500
C33	J98	J196	CONDUIT	115.9	3.0292	0.0500
C33_1	J491	J128	CONDUIT	103.3	1.4582	0.0500
C33_3	J128	J129	CONDUIT	21.6	-0.1482	0.0240

C33_4	J129	J183	CONDUIT	211.2	0.4777	0.0500
C34	J31	J35	CONDUIT	60.8	9.3287	0.0240
C35	J198	J491	CONDUIT	304.3	1.0998	0.0500
C36	SU7	SU21	CONDUIT	39.7	0.5869	0.0100
C36_2	J126	J39	CONDUIT	18.9	6.3012	0.0240
C37	SU16	SU20	CONDUIT	87.1	3.9768	0.0100
C37_2	J37	J126	CONDUIT	32.5	8.6406	0.0240
C38	J456	J198	CONDUIT	306.5	1.0929	0.0500
C39	J39	SU37	CONDUIT	74.7	5.3254	0.0350
C4	J4	J5	CONDUIT	46.6	9.2895	0.0110
C40	J231	J456	CONDUIT	396.8	1.3082	0.0500
C41	J472	J231	CONDUIT	278.3	0.8048	0.0500
C42	J239	J472	CONDUIT	68.3	0.9035	0.0500
C43	J252	J239	CONDUIT	39.3	3.2424	0.0240
C44	J117	J31	CONDUIT	29.8	1.2397	0.0240
C45	J495	J252	CONDUIT	331.7	1.0405	0.0500
C46	J41	J40	CONDUIT	14.0	1.7723	0.0240
C47	J43	J42	CONDUIT	14.4	1.7379	0.0240
C48	J24	SU2	CONDUIT	82.0	2.2347	0.0500
C49	SU2	SU3	CONDUIT	60.0	1.1451	0.0500
C5	SU21	SU42	CONDUIT	23.2	0.5820	0.0100
C50	J12	SU22	CONDUIT	86.3	5.5142	0.0100
C51	J486	J495	CONDUIT	591.6	1.1243	0.0500
C52	J16	J72	CONDUIT	128.8	1.9768	0.0350
C53	J286	J495	CONDUIT	872.9	1.4494	0.0500
C54	J45	J43	CONDUIT	564.7	3.8662	0.0500
C55	J35	J187	CONDUIT	89.4	2.3457	0.0500
C56	J9	SU3	CONDUIT	70.0	6.6101	0.0500
C57	J40	SU1	CONDUIT	122.0	2.6255	0.0500
C58	SU1	SU2	CONDUIT	26.6	1.0965	0.0240
C59	J42	SU2	CONDUIT	82.0	2.4971	0.0500
C6	J6	J58	CONDUIT	16.5	2.7996	0.0240
C60	J52	J47	CONDUIT	70.7	4.0538	0.0110
C61	J54	J52	CONDUIT	20.9	1.7254	0.0240
C62	SU22	SU23	CONDUIT	16.7	2.9668	0.0100
C64	SU5	J286	CONDUIT	20.0	0.9550	0.0240
C65_1	J61	J53	CONDUIT	11.0	3.1433	0.0240
C65_2	J53	J63	CONDUIT	2.3	-12.0139	0.0240
C66	SU37	J120	CONDUIT	29.7	1.3092	0.0100
C66_1	SU4	SU5	CONDUIT	35.0	3.1501	0.0240
C67	SU24	SU26	CONDUIT	37.1	5.0771	0.0100
C68	J63	J64	CONDUIT	44.0	1.6740	0.0110
C69	SU26	SU27	CONDUIT	12.9	0.8814	0.0100
C7	J59	J121	CONDUIT	16.8	4.1248	0.0130
C7_3	J58	J121	CONDUIT	86.3	2.7290	0.0350
C7_4	J121	J8	CONDUIT	31.4	4.9503	0.0350
C70	SU11	SU19	CONDUIT	71.0	0.0085	0.0100
C71	J65	J66	CONDUIT	13.6	3.3337	0.0110
C72	J66	J67	CONDUIT	78.5	3.5956	0.0110
C73	J67	J68	CONDUIT	34.7	2.5547	0.0130
C74	J68	J69	CONDUIT	59.5	4.6400	0.0110
C75	J64	J65	CONDUIT	36.9	3.3941	0.0350
C76	J70	J71	CONDUIT	55.8	1.0010	0.0350
C77	SU42	SU28	CONDUIT	72.9	4.1069	0.0100
C77_1	J71	J124	CONDUIT	7.0	2.6867	0.0240
C77_3	J223	J41	CONDUIT	378.6	1.8942	0.0500
C77_4	J22	J10	CONDUIT	390.0	1.0719	0.0350
C77_5	J10	J462	CONDUIT	214.3	0.4311	0.0500
C78	J475	J491	CONDUIT	853.8	1.6856	0.0500
C79	J72	J70	CONDUIT	76.1	3.0012	0.0130
C8	J8	J55	CONDUIT	90.1	3.2561	0.0130
C80	J38	J44	CONDUIT	52.4	7.4907	0.0500
C80_1	J207	J44	CONDUIT	192.9	0.2856	0.0500
C80_2	J44	SU4	CONDUIT	374.9	0.2857	0.0500
C81	J76	J75	CONDUIT	2.4	-0.3360	0.0130
C82	J77	J75	CONDUIT	16.5	2.9507	0.0130
C83	J250	J207	CONDUIT	150.3	0.4065	0.0500
C84	J466	J475	CONDUIT	235.9	2.2291	0.0500
C85	J74	J78	CONDUIT	2.1	3.8972	0.0110
C86	J79	J78	CONDUIT	19.7	1.8687	0.0110
C87	J82	J78	CONDUIT	36.9	3.0437	0.0110
C88	J78	J81	CONDUIT	65.1	4.8049	0.0240
C89	J80	J82	CONDUIT	3.0	2.6567	0.0110
C9	J122	J111	CONDUIT	83.3	3.8638	0.0100
C90	J83	J130	CONDUIT	27.5	1.8345	0.0110
C91	J84	J83	CONDUIT	16.8	4.6732	0.0110
C92	J85	J130	CONDUIT	32.6	4.7062	0.0110
C93	J185	J466	CONDUIT	328.2	1.9568	0.0500
C94	J86	SU14	CONDUIT	108.5	5.1010	0.0100
C95	SU30	SU25	CONDUIT	43.4	0.5734	0.0100
C96	J89	J87	CONDUIT	17.5	3.3945	0.0110
C97	J90	J91	CONDUIT	20.5	3.2954	0.0110

C98	J92	J91	CONDUIT	36.8	3.8995	0.0110
C99	J93	J87	CONDUIT	22.7	0.7854	0.0110
W1	J26	J65	CONDUIT	92.4	1.6519	0.0350
W15	SU15	SU16	CONDUIT	24.8	3.5590	0.0130
W27	SU13	J3	CONDUIT	12.2	0.0025	0.0350
W44	SU36	SU30	CONDUIT	110.5	0.9642	0.0100
W10	J55	SU21	WEIR			
W11	SU11	SU12	WEIR			
W12	J73	SU12	WEIR			
W13	J84	SU15	WEIR			
W14	J83	SU16	WEIR			
W16	J79	SU20	WEIR			
W17	J74	SU19	WEIR			
W18	J78	SU19	WEIR			
W19	SU20	J4	WEIR			
W2	J7	J125	WEIR			
W20	J21	J38	WEIR			
W21	J28	SU38	WEIR			
W22	J29	SU41	WEIR			
W23	J100	J102	WEIR			
W24	J71	J124	WEIR			
W26	SU23	SU27	WEIR			
W28	J97	SU31	WEIR			
W29	SU31	J98	WEIR			
W3	J125	SU40	WEIR			
W30	J87	SU27	WEIR			
W31	J4	J5	WEIR			
W32	J15	J116	WEIR			
W33	SU4	SU5	WEIR			
W34	J95	SU30	WEIR			
W35	SU25	J18	WEIR			
W36	SU5	J286	WEIR			
W37	SU38	J114	WEIR			
W38	SU29	SU30	WEIR			
W39	SU28	J47	WEIR			
W4	SU39	SU17	WEIR			
W40	J104	SU32	WEIR			
W41	J110	SU36	WEIR			
W42	SU40	SU36	WEIR			
W43	J106	SU33	WEIR			
W45	J107	SU40	WEIR			

W46	J108	SU40	WEIR
W48	J126	J39	WEIR
W49	J36	J37	WEIR
W5	SU6	SU7	WEIR
W50	J37	J126	WEIR
W51	SU36	SU32	WEIR
W52	SU36	SU33	WEIR
W53	SU30	SU31	WEIR
W54	J96	SU30	WEIR
W55	SU17	J121	WEIR
W6	SU1	SU2	WEIR
W77	SU27	J94	WEIR
W8	J65	SU10	WEIR
W9	SU40	SU32	WEIR
OL1	SU28	J50	OUTLET
OL10	SU34	J61	OUTLET
OL11	SU34	J63	OUTLET
OL12	SU10	J66	OUTLET
OL13	SU14	J85	OUTLET
OL14	SU30	J96	OUTLET
OL15	SU16	J83	OUTLET
OL16	SU15	J84	OUTLET
OL17	SU29	J99	OUTLET
OL18	SU18	J80	OUTLET
OL19	SU11	J77	OUTLET
OL2	SU42	J52	OUTLET
OL20	SU19	J74	OUTLET
OL21	SU19	J78	OUTLET
OL22	SU20	J79	OUTLET
OL23	SU22	J90	OUTLET
OL24	SU23	J89	OUTLET
OL25	SU27	J87	OUTLET
OL26	SU26	J91	OUTLET
OL27	SU25	J93	OUTLET
OL28	SU24	J92	OUTLET
OL29	SU38	J28	OUTLET
OL3	SU21	J54	OUTLET
OL30	SU41	J29	OUTLET
OL31	SU33	J106	OUTLET
OL32	SU36	J110	OUTLET
OL33	SU32	J104	OUTLET

OL34	SU40	J107	OUTLET
OL35	SU40	J108	OUTLET
OL36	SU37	J117	OUTLET
OL37	SU17	J58	OUTLET
OL38	SU34	J53	OUTLET
OL4	SU21	J55	OUTLET
OL5	SU7	J68	OUTLET
OL6	SU6	J67	OUTLET
OL7	SU12	J76	OUTLET
OL8	SU31	J97	OUTLET
OL9	SU39	J6	OUTLET

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	1.40
C1_1	CIRCULAR	0.40	0.13	0.10	0.40	1	0.24
C1_2	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	46.62
C10	TRIANGULAR	0.30	1.50	0.15	10.00	1	1.66
C100	TRAPEZOIDAL	1.00	6.00	0.54	11.00	1	21.00
C101	CIRCULAR	0.53	0.22	0.13	0.53	1	1.51
C102	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.08
C103	CIRCULAR	0.53	0.22	0.13	0.53	1	0.51
C104	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	6.79
C105	CIRCULAR	0.30	0.07	0.07	0.30	1	0.48
C106	CIRCULAR	0.45	0.16	0.11	0.45	1	0.55
C107	CIRCULAR	0.45	0.16	0.11	0.45	1	0.48
C108	CIRCULAR	0.30	0.07	0.07	0.30	1	0.18
C109	CIRCULAR	0.30	0.07	0.07	0.30	1	0.15
C11	CIRCULAR	0.60	0.28	0.15	0.60	1	0.50
C110	CIRCULAR	0.60	0.28	0.15	0.60	1	0.72
C110_1	TRAPEZOIDAL	0.50	1.75	0.29	6.00	1	5.48
C111	CIRCULAR	0.30	0.07	0.07	0.30	1	0.24
C112	CIRCULAR	0.30	0.07	0.07	0.30	1	0.05
C113	CIRCULAR	0.30	0.07	0.07	0.30	1	0.18
C114	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	3.32
C115	CIRCULAR	0.30	0.07	0.07	0.30	1	0.25
C116	TRAPEZOIDAL	0.30	1.50	0.16	9.50	1	3.27
C117	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	21.53
C118	TRAPEZOIDAL	0.30	2.40	0.22	11.00	1	6.44
C118_1	Street	0.22	0.91	0.11	8.00	1	5.41
C118_2	Street	0.22	0.91	0.11	8.00	1	4.57
C119	CIRCULAR	0.30	0.07	0.07	0.30	1	0.24
C12	Street	0.22	0.91	0.11	8.00	1	1.18
C12_2	CIRCULAR	0.60	0.28	0.15	0.60	1	0.75
C120	TRAPEZOIDAL	1.00	16.00	0.52	31.00	1	56.20
C120_1	TRAPEZOIDAL	0.50	3.25	0.27	12.00	1	6.78
C120_2	TRAPEZOIDAL	1.00	16.00	0.52	31.00	1	47.24
C121	CIRCULAR	0.15	0.02	0.04	0.15	1	0.05
C122	CIRCULAR	0.10	0.01	0.03	0.10	1	0.01
C123	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.06
C124	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	15.13
C125	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	32.60
C126	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	3.35
C127	TRAPEZOIDAL	0.30	1.50	0.16	9.50	1	9.01
C128	Street	0.22	0.91	0.11	8.00	1	0.84
C129	Street	0.22	0.91	0.11	8.00	1	4.01
C13	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.72
C130	CIRCULAR	0.60	0.28	0.15	0.60	1	0.32
C131	TRAPEZOIDAL	0.30	3.45	0.26	13.00	1	6.00
C132	Street	0.22	0.91	0.11	8.00	1	2.96
C133	TRAPEZOIDAL	1.00	3.00	0.54	5.00	1	8.00
C134	TRAPEZOIDAL	1.00	3.00	0.54	5.00	1	2.75
C139	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	28.40
C14	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	3.79
C15	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	24.32
C16	RECT_OPEN	1.90	15.20	1.29	8.00	1	273.73
C165	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.27
C17	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	24.00
C173	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	24.76
C18	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	50.82
C188_1	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	30.52
C19	CIRCULAR	0.45	0.16	0.11	0.45	1	0.30
C19_1	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	8.44
C19_2	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	12.93
C19_3	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34
C19_4	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	8.76
C192	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	21.30

C194	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	22.76
C196	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	36.59
C2	CIRCULAR	0.30	0.07	0.07	0.30	1	0.28
C2_1	TRAPEZOIDAL	1.00	6.00	0.54	11.00	1	21.89
C2_2	TRAPEZOIDAL	1.00	12.00	0.52	23.00	1	32.29
C2_3	CIRCULAR	0.45	0.16	0.11	0.45	2	0.33
C2_4	CIRCULAR	0.45	0.16	0.11	0.45	1	0.35
C2_6	TRAPEZOIDAL	1.00	6.00	0.54	11.00	1	22.08
C2_9	CIRCULAR	0.45	0.16	0.11	0.45	1	0.62
C20	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	46.75
C200	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.46
C21	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	9.74
C214	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	27.94
C22	Street	0.22	0.91	0.11	8.00	1	1.72
C23	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	32.23
C24	CIRCULAR	0.60	0.28	0.15	0.60	1	0.32
C25	CIRCULAR	0.45	0.16	0.11	0.45	1	0.38
C25_2	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	44.24
C25_3	CIRCULAR	0.60	0.28	0.15	0.60	1	0.30
C26	CIRCULAR	0.30	0.07	0.07	0.30	1	0.07
C27	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	0.69
C28	TRIANGULAR	0.30	1.50	0.15	10.00	1	6.63
C28_1	CIRCULAR	0.30	0.07	0.07	0.30	1	0.05
C28_4	TRAPEZOIDAL	1.00	7.00	0.57	12.00	1	26.46
C29	CIRCULAR	0.30	0.07	0.07	0.30	1	0.37
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.09
C30	CIRCULAR	0.90	0.64	0.23	0.90	1	0.95
C31	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	13.46
C32	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	26.10
C33	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	26.34
C33_1	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	18.27
C33_3	CIRCULAR	2.50	4.91	0.63	2.50	1	5.76
C33_4	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	10.46
C34	CIRCULAR	0.45	0.16	0.11	0.45	1	0.47
C35	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	15.87
C36	Street	0.22	0.91	0.11	8.00	1	1.60
C36_2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.08
C37	Street	0.22	0.91	0.11	8.00	1	4.15
C37_2	CIRCULAR	0.25	0.05	0.06	0.25	1	0.09
C38	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	15.82
C39	TRAPEZOIDAL	0.30	0.60	0.17	3.50	1	1.21
C4	CIRCULAR	0.30	0.07	0.07	0.30	1	0.35
C40	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	17.31
C41	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	13.58
C42	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	14.38
C43	CIRCULAR	2.27	4.05	0.57	2.27	1	20.82
C44	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17
C45	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	15.44
C46	CIRCULAR	0.40	0.13	0.10	0.40	1	0.15
C47	CIRCULAR	0.30	0.07	0.07	0.30	1	0.07
C48	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	22.62
C49	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	16.19
C5	Street	0.22	0.91	0.11	8.00	1	1.59
C50	Street	0.22	0.91	0.11	8.00	1	4.89
C51	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	16.05
C52	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	30.39
C53	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	18.22
C54	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	29.75
C55	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	23.18
C56	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	38.91
C57	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	24.52
C58	CIRCULAR	1.20	1.13	0.30	1.20	1	2.21
C59	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	23.91
C6	CIRCULAR	0.45	0.16	0.11	0.45	1	0.26
C60	CIRCULAR	0.60	0.28	0.15	0.60	1	1.46
C61	CIRCULAR	0.45	0.16	0.11	0.45	1	0.20
C62	Street	0.22	0.91	0.11	8.00	1	3.59
C64	CIRCULAR	0.60	0.28	0.15	0.60	1	0.33
C65_1	CIRCULAR	0.45	0.16	0.11	0.45	1	0.27
C65_2	CIRCULAR	0.45	0.16	0.11	0.45	1	0.54
C66	Street	0.22	0.91	0.11	8.00	1	2.38
C66_1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.59
C67	Street	0.22	0.91	0.11	8.00	1	4.69
C68	CIRCULAR	0.30	0.07	0.07	0.30	1	0.15
C69	Street	0.22	0.91	0.11	8.00	1	1.95
C7	TRIANGULAR	0.36	0.18	0.15	1.00	1	0.79
C7_3	TRAPEZOIDAL	1.00	7.00	0.57	12.00	1	22.82
C7_4	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	48.10
C70	Street	0.22	0.91	0.11	8.00	1	0.19
C71	CIRCULAR	0.30	0.07	0.07	0.30	1	0.21
C72	CIRCULAR	0.45	0.16	0.11	0.45	1	0.64
C73	CIRCULAR	0.45	0.16	0.11	0.45	1	0.46

C74	CIRCULAR	0.45	0.16	0.11	0.45	1	0.73
C75	TRAPEZOIDAL	0.50	3.75	0.37	10.00	1	10.20
C76	TRAPEZOIDAL	0.63	2.64	0.35	7.33	1	3.77
C77	Street	0.22	0.91	0.11	8.00	1	4.22
C77_1	CIRCULAR	0.30	0.07	0.07	0.30	1	0.09
C77_3	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.83
C77_4	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	22.38
C77_5	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	9.94
C78	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	19.65
C79	TRIANGULAR	0.30	1.50	0.15	10.00	1	5.64
C8	CIRCULAR	0.45	0.16	0.11	0.45	1	0.51
C80	TRAPEZOIDAL	1.00	15.00	0.60	25.00	1	58.26
C80_1	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	8.09
C80_2	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	8.09
C81	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
C82	CIRCULAR	0.30	0.07	0.07	0.30	1	0.17
C83	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	9.65
C84	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	22.59
C85	CIRCULAR	0.30	0.07	0.07	0.30	1	0.23
C86	CIRCULAR	0.25	0.05	0.06	0.25	1	0.10
C87	CIRCULAR	0.60	0.28	0.15	0.60	1	1.27
C88	CIRCULAR	0.60	0.28	0.15	0.60	1	0.73
C89	CIRCULAR	0.30	0.07	0.07	0.30	1	0.19
C9	Street	0.22	0.91	0.11	8.00	1	4.09
C90	CIRCULAR	0.25	0.05	0.06	0.25	1	0.10
C91	CIRCULAR	0.25	0.05	0.06	0.25	1	0.15
C92	CIRCULAR	0.25	0.05	0.06	0.25	1	0.15
C93	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	21.17
C94	Street	0.22	0.91	0.11	8.00	1	4.70
C95	Street	0.22	0.91	0.11	8.00	1	1.58
C96	CIRCULAR	0.30	0.07	0.07	0.30	1	0.21
C97	CIRCULAR	0.30	0.07	0.07	0.30	1	0.21
C98	CIRCULAR	0.53	0.22	0.13	0.53	1	1.00
C99	CIRCULAR	0.30	0.07	0.07	0.30	1	0.10
W1	TRAPEZOIDAL	0.50	1.75	0.29	6.00	1	2.80
W15	RECT_OPEN	0.30	6.00	0.30	20.00	1	39.03
W27	TRAPEZOIDAL	0.30	3.45	0.26	13.00	1	0.20
W44	Street	0.22	0.91	0.11	8.00	1	2.04

****
Transect Summary
****

Transect Street
Area:

0.0005	0.0021	0.0048	0.0085	0.0133
0.0191	0.0261	0.0340	0.0431	0.0532
0.0644	0.0766	0.0899	0.1042	0.1197
0.1362	0.1537	0.1723	0.1920	0.2127
0.2344	0.2562	0.2779	0.2997	0.3214
0.3432	0.3649	0.3867	0.4085	0.4302
0.4520	0.4737	0.4955	0.5173	0.5395
0.5627	0.5870	0.6124	0.6389	0.6664
0.6949	0.7246	0.7553	0.7871	0.8199
0.8538	0.8887	0.9248	0.9619	1.0000

Hrad:

0.0196	0.0393	0.0589	0.0785	0.0981
0.1178	0.1374	0.1570	0.1766	0.1963
0.2159	0.2355	0.2551	0.2748	0.2944
0.3140	0.3336	0.3533	0.3729	0.3925
0.4224	0.4607	0.4989	0.5369	0.5748
0.6126	0.6502	0.6876	0.7250	0.7621
0.7992	0.8361	0.8728	0.9095	0.9090
0.9067	0.9064	0.9076	0.9102	0.9141
0.9191	0.9252	0.9321	0.9399	0.9484
0.9576	0.9674	0.9778	0.9886	1.0000

Width:

0.0275	0.0550	0.0825	0.1100	0.1375
0.1650	0.1925	0.2200	0.2475	0.2750
0.3025	0.3300	0.3575	0.3850	0.4125
0.4400	0.4675	0.4950	0.5225	0.5500
0.5625	0.5625	0.5625	0.5625	0.5625
0.5625	0.5625	0.5625	0.5625	0.5625
0.5625	0.5625	0.5625	0.5625	0.5875
0.6150	0.6425	0.6700	0.6975	0.7250
0.7525	0.7800	0.8075	0.8350	0.8625
0.8900	0.9175	0.9450	0.9725	1.0000

****

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
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 ..... GREEN_AMPT
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 06/03/2022 00:00:00
Ending Date 06/04/2022 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 10
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Initial LID Storage	82.533	70.526
Total Precipitation	44.468	37.999
Evaporation Loss	0.000	0.000
Infiltration Loss	3.399	2.904
Surface Runoff	0.894	0.764
LID Drainage	7.748	6.620
Final Storage	114.975	98.249
Continuity Error (%)	-0.011	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	8.638	86.379
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	6.798	67.984
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.501	5.014
Final Stored Volume	2.386	23.864
Continuity Error (%)	-0.497	

****
Highest Continuity Errors
****
Node SU13 (88.07%)
Node J43 (21.47%)
Node J41 (11.26%)
Node J30 (9.14%)
Node J99 (-7.76%)

****
Time-Step Critical Elements
****
Link C85 (1.83%)
Link C65_2 (1.77%)

****
Highest Flow Instability Indexes

```
  ********************************
  Link C43 (57)
  Link C42 (56)
  Link C26 (51)
  Link C25 (49)
  Link C6 (48)


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :     0.50 sec
  Average Time Step           :     0.99 sec
  Maximum Time Step           :     1.00 sec
  Percent in Steady State     :    -0.00
  Average Iterations per Step :     2.23
  Percent Not Converging      :     3.44
  Time Step Frequencies       :
      1.000 -  0.871 sec      :    96.60 %
      0.871 -  0.758 sec      :     1.50 %
      0.758 -  0.660 sec      :     1.22 %
      0.660 -  0.574 sec      :     0.25 %
      0.574 -  0.500 sec      :     0.43 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------------------------------------------
-------------
                           Total      Total      Total      Total     Imperv       Perv      Total      Total
Peak  Runoff
                          Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff     Runoff
Runoff   Coeff
  Subcatchment              mm         mm         mm         mm         mm         mm         mm    10^6 ltr
CMS
  ---------------------------------------------------------------------------------------------------------------
-------------
  S1                      38.00       0.00       0.00      10.89      18.95       7.36      26.31       0.11
0.09   0.693
  S1_2                    38.00       0.00       0.00       2.38       0.35       0.00       7.01       7.31
  S1_3                    38.00       0.00       0.00       2.35       0.74       0.00       6.98       1.88
0.03   0.184
  S1_4                    38.00       0.00       0.00       7.23      25.49       4.18      29.66       0.05
0.03   0.781
  S1_6                    38.00       0.00       0.00       6.78      25.50       4.62      30.12       0.02
0.02   0.793
  S1_7                    38.00       0.00       0.00       2.30       1.45       0.00       6.93       1.32
0.02   0.182
  S10                     38.00       0.00       0.00      16.05      12.03       9.42      21.44       0.24
0.16   0.564
  S103                    38.00       0.00       0.00       2.36       0.56       0.00       7.00       1.41
0.03   0.184
  S105                    38.00       0.00       0.00       2.40       0.07       0.00       7.03       2.86
0.05   0.185
  S11                     38.00       0.00       0.00      20.49       4.38      12.96      17.33       0.06
0.03   0.456
  S111                    38.00       0.00       0.00       2.38       0.27       0.00       7.01       0.86
0.02   0.185
  S112                    38.00       0.00       0.00       2.38       0.34       0.00       7.01       1.06
0.02   0.185
  S117                    38.00       0.00       0.00       2.34       0.90       0.00       6.97       2.07
0.04   0.183
  S12                     38.00       0.00       0.00      19.08       7.29      11.32      18.62       0.47
0.26   0.490
  S12_1                   38.00       0.00       0.00      18.16       8.02      11.49      19.51       0.10
0.06   0.513
  S122                    38.00       0.00       0.00      17.79       8.75      11.09      19.84       0.18
0.11   0.522
  S122_2                  38.00       0.00       0.00      13.91      14.58       8.90      23.48       0.17
0.12   0.618
  S122_3                  38.00       0.00       0.00       9.36      21.86       5.85      27.70       0.09
0.07   0.729
  S122_4                  38.00       0.00       0.00      21.51       3.65      12.69      16.34       0.04
0.02   0.430
  S122_7                  38.00       0.00       0.00      14.93      12.76       9.78      22.54       0.10
0.08   0.593
  S127                    38.00       0.00       0.00       2.38       0.29       0.00       7.01       1.22
0.02   0.185
  S129_1                  38.00       0.00       0.00       2.38       0.35       0.00       7.01       1.55
0.03   0.184
  S13                     38.00       0.00       0.00       2.33       1.08       0.00       6.95       1.29
0.02   0.183
  S13_1                   38.00       0.00       0.00      12.39      16.41       8.52      24.93       0.11
0.09   0.656
```

S13_2	38.00	0.00	0.00	17.04	9.81	10.74	20.55	0.06
0.04	0.541							
S130_4	38.00	0.00	0.00	1.92	7.27	0.00	6.39	1.38
0.02	0.168							
S134_1	38.00	0.00	0.00	2.04	5.48	0.00	6.59	0.23
0.00	0.173							
S134_10	38.00	0.00	0.00	2.35	0.74	0.00	6.98	0.04
0.00	0.184							
S134_11	38.00	0.00	0.00	7.21	24.78	4.96	29.73	0.08
0.07	0.782							
S134_12	38.00	0.00	0.00	17.08	10.93	9.52	20.45	0.12
0.07	0.538							
S134_14	38.00	0.00	0.00	13.57	14.58	9.24	23.82	0.06
0.05	0.627							
S134_15	38.00	0.00	0.00	23.11	1.09	13.76	14.85	0.07
0.03	0.391							
S134_16	38.00	0.00	0.00	22.71	3.65	11.49	15.14	0.19
0.07	0.398							
S134_3	38.00	0.00	0.00	16.37	12.03	9.10	21.12	0.07
0.04	0.556							
S134_4	38.00	0.00	0.00	13.08	15.31	8.97	24.29	0.06
0.05	0.639							
S134_5	38.00	0.00	0.00	18.01	8.02	11.64	19.66	0.11
0.07	0.517							
S134_6	38.00	0.00	0.00	15.16	13.48	8.78	22.26	0.21
0.14	0.586							
S134_8	38.00	0.00	0.00	18.55	7.30	11.86	19.15	0.13
0.08	0.504							
S134_9	38.00	0.00	0.00	13.56	14.58	9.25	23.84	0.07
0.06	0.627							
S135_1	38.00	0.00	0.00	20.37	5.83	11.55	17.39	0.37
0.18	0.458							
S135_2	38.00	0.00	0.00	21.93	4.74	11.13	15.87	0.13
0.05	0.418							
S135_3	38.00	0.00	0.00	17.41	9.12	11.10	20.21	0.11
0.07	0.532							
S135_4	38.00	0.00	0.00	21.43	5.93	10.39	16.32	0.21
0.09	0.429							
S136	38.00	0.00	0.00	2.38	0.27	0.00	7.01	1.42
0.03	0.185							
S14	38.00	0.00	0.00	12.60	16.40	8.31	24.71	0.15
0.12	0.650							
S141	38.00	0.00	0.00	2.38	0.37	0.00	7.01	2.44
0.05	0.184							

S145	38.00	0.00	0.00	2.38	0.37	0.00	7.01	1.30
0.02	0.184							
S147_2	38.00	0.00	0.00	7.06	25.49	4.34	29.83	0.05
0.03	0.785							
S147_3	38.00	0.00	0.00	2.40	0.04	0.00	7.03	0.63
0.01	0.185							
S148	38.00	0.00	0.00	2.38	0.36	0.00	7.01	0.43
0.01	0.184							
S149	38.00	0.00	0.00	2.39	0.10	0.00	7.03	1.60
0.03	0.185							
S15	38.00	0.00	0.00	2.34	0.92	0.00	6.97	0.19
0.00	0.183							
S155	38.00	0.00	0.00	2.38	0.25	0.00	7.02	3.02
0.06	0.185							
S158	38.00	0.00	0.00	2.37	0.38	0.00	7.01	2.41
0.04	0.184							
S16	38.00	0.00	0.00	13.10	16.40	7.80	24.20	0.23
0.17	0.637							
S16_2	38.00	0.00	0.00	14.43	14.57	8.38	22.95	0.23
0.16	0.604							
S160_1	38.00	0.00	0.00	2.38	0.37	0.00	7.01	2.38
0.04	0.184							
S160_3	38.00	0.00	0.00	2.28	1.82	0.00	6.89	0.23
0.00	0.181							
S162_2	38.00	0.00	0.00	2.23	2.57	0.00	6.81	0.15
0.00	0.179							
S17	38.00	0.00	0.00	2.31	1.42	0.00	6.93	2.31
0.04	0.182							
S179_2	38.00	0.00	0.00	2.21	2.93	0.00	6.77	1.77
0.03	0.178							
S18	38.00	0.00	0.00	2.33	1.08	0.00	6.95	1.76
0.03	0.183							
S180	38.00	0.00	0.00	2.30	1.46	0.00	6.92	2.25
0.04	0.182							
S19	38.00	0.00	0.00	17.46	10.28	9.82	20.10	0.07
0.04	0.529							
S19_2	38.00	0.00	0.00	1.97	6.54	0.00	6.34	1.42
0.02	0.167							
S198_1	38.00	0.00	0.00	2.26	2.19	0.00	6.85	0.83
0.02	0.180							
S198_2	38.00	0.00	0.00	2.38	0.35	0.00	7.01	0.66
0.01	0.184							
S2	38.00	0.00	0.00	2.35	0.74	0.00	6.98	0.76
0.01	0.184							

S2_1	38.00	0.00	0.00	2.26	2.17	0.00	6.85	0.24
0.00	0.180							
S20	38.00	0.00	0.00	2.16	3.62	0.00	6.69	0.14
0.00	0.176							
S20_2	38.00	0.00	0.00	20.16	6.73	10.83	17.56	0.35
0.17	0.462							
S206_2	38.00	0.00	0.00	2.35	0.73	0.00	6.98	1.65
0.03	0.184							
S21	38.00	0.00	0.00	2.05	5.27	0.00	6.52	0.12
0.00	0.172							
S215	38.00	0.00	0.00	2.35	0.74	0.00	6.98	1.52
0.03	0.184							
S217	38.00	0.00	0.00	2.35	0.73	0.00	6.98	1.05
0.02	0.184							
S22	38.00	0.00	0.00	15.62	12.75	9.09	21.84	0.08
0.05	0.575							
S225	38.00	0.00	0.00	2.36	0.65	0.00	6.99	1.06
0.02	0.184							
S23	38.00	0.00	0.00	20.52	5.47	11.78	17.26	0.13
0.06	0.454							
S24	38.00	0.00	0.00	2.26	2.18	0.00	6.85	0.85
0.02	0.180							
S24_1	38.00	0.00	0.00	2.21	2.92	0.00	6.77	0.65
0.01	0.178							
S25	38.00	0.00	0.00	2.33	1.09	0.00	6.95	2.09
0.04	0.183							
S26	38.00	0.00	0.00	2.35	0.74	0.00	6.98	4.04
0.07	0.184							
S27	38.00	0.00	0.00	2.33	1.10	0.00	6.95	2.29
0.04	0.183							
S28	38.00	0.00	0.00	0.00	3.65	0.00	3.65	0.32
0.31	0.096							
S3	38.00	0.00	0.00	2.35	0.74	0.00	6.98	1.98
0.04	0.184							
S3_2	38.00	0.00	0.00	2.28	1.81	0.00	6.89	2.64
0.05	0.181							
S4	38.00	0.00	0.00	2.21	2.91	0.00	6.77	0.53
0.01	0.178							
S5	38.00	0.00	0.00	1.80	9.12	0.00	7.40	0.26
0.01	0.195							
S5_2	38.00	0.00	0.00	2.39	0.08	0.00	7.03	0.50
0.01	0.185							
S5_4	38.00	0.00	0.00	2.37	0.46	0.00	7.01	0.17
0.00	0.184							

S6	38.00	0.00	0.00	15.18	13.12	9.14	22.26	0.11
0.08	0.586							
S7	38.00	0.00	0.00	2.30	1.48	0.00	6.92	0.50
0.01	0.182							
S7_1	38.00	0.00	0.00	16.69	10.94	9.92	20.85	0.33
0.21	0.549							
S7_10	38.00	0.00	0.00	15.58	12.76	9.12	21.88	0.50
0.33	0.576							
S7_12	38.00	0.00	0.00	19.05	9.47	9.07	18.54	0.49
0.26	0.488							
S7_15	38.00	0.00	0.00	7.01	25.49	4.40	29.89	0.04
0.03	0.787							
S7_16	38.00	0.00	0.00	15.66	10.94	10.96	21.90	0.03
0.03	0.576							
S7_17	38.00	0.00	0.00	15.51	10.95	11.11	22.06	0.02
0.02	0.580							
S7_3	38.00	0.00	0.00	18.12	9.11	10.39	19.50	0.21
0.12	0.513							
S7_4	38.00	0.00	0.00	20.80	5.47	11.51	16.98	0.24
0.11	0.447							
S7_7	38.00	0.00	0.00	21.84	4.38	11.60	15.98	0.31
0.13	0.420							
S7_8	38.00	0.00	0.00	19.12	5.47	13.20	18.67	0.02
0.01	0.491							
S7_9	38.00	0.00	0.00	21.06	7.65	8.96	16.62	0.55
0.27	0.437							
S75	38.00	0.00	0.00	2.32	1.28	0.00	6.94	2.18
0.04	0.183							
S8	38.00	0.00	0.00	2.11	4.38	0.00	6.60	0.44
0.01	0.174							
S9	38.00	0.00	0.00	20.29	7.29	10.11	17.40	0.34
0.17	0.458							
S9_1	38.00	0.00	0.00	2.30	1.46	0.00	6.92	0.23
0.00	0.182							
S9_2	38.00	0.00	0.00	2.35	0.80	0.00	6.98	0.05
0.00	0.184							
S9_5	38.00	0.00	0.00	18.83	9.11	9.67	18.78	0.09
0.05	0.494							
S9_6	38.00	0.00	0.00	22.21	3.28	12.38	15.66	0.12
0.04	0.412							

****

LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
S1_2	Rural	38.35	0.00	2.40	0.00	7.08	75.82	104.71	-0.01
S1_3	Rural	38.76	0.00	2.40	0.00	7.13	75.82	105.07	-0.01
S1_7	Rural	39.51	0.00	2.40	0.00	7.21	75.82	105.73	-0.01
S103	Rural	38.57	0.00	2.40	0.00	7.11	75.82	104.89	-0.01
S105	Rural	38.07	0.00	2.40	0.00	7.04	75.82	104.46	-0.01
S111	Rural	38.27	0.00	2.40	0.00	7.07	75.82	104.64	-0.01
S112	Rural	38.35	0.00	2.40	0.00	7.08	75.82	104.70	-0.01
S117	Rural	38.92	0.00	2.40	0.00	7.15	75.82	105.21	-0.01
S127	Rural	38.30	0.00	2.40	0.00	7.07	75.82	104.66	-0.01
S129_1	Rural	38.35	0.00	2.40	0.00	7.08	75.82	104.71	-0.01
S13	Rural	39.12	0.00	2.40	0.00	7.17	75.82	105.38	-0.01
S130_4	Rural	47.08	0.00	2.40	0.30	7.68	75.82	112.53	-0.01
S134_1	Rural	44.45	0.00	2.40	0.18	7.58	75.82	110.12	-0.01
S134_10	Rural	38.76	0.00	2.40	0.00	7.13	75.82	105.06	-0.01
S136	Rural	38.27	0.00	2.40	0.00	7.07	75.82	104.64	-0.01
S141	Rural	38.37	0.00	2.40	0.00	7.08	75.82	104.72	-0.01
S145	Rural	38.38	0.00	2.40	0.00	7.08	75.82	104.73	-0.01
S147_3	Rural	38.04	0.00	2.40	0.00	7.04	75.82	104.43	-0.01
S148	Rural	38.36	0.00	2.40	0.00	7.08	75.82	104.71	-0.01
S149	Rural	38.10	0.00	2.40	0.00	7.05	75.82	104.48	-0.01
S15	Rural	38.94	0.00	2.40	0.00	7.15	75.82	105.22	-0.01
S155	Rural	38.25	0.00	2.40	0.00	7.06	75.82	104.62	-0.01
S158	Rural	38.38	0.00	2.40	0.00	7.08	75.82	104.74	-0.01
S160_1	Rural	38.37	0.00	2.40	0.00	7.08	75.82	104.72	-0.01
S160_3	Rural	39.91	0.00	2.40	0.00	7.25	75.82	106.10	-0.01
S162_2	Rural	40.76	0.00	2.40	0.00	7.33	75.82	106.87	-0.01
S17	Rural	39.48	0.00	2.40	0.00	7.21	75.82	105.71	-0.01
S179_2	Rural	41.19	0.00	2.40	0.00	7.36	75.82	107.26	-0.01
S18	Rural	39.11	0.00	2.40	0.00	7.17	75.82	105.38	-0.01
S180	Rural	39.52	0.00	2.40	0.00	7.21	75.82	105.74	-0.01
S19_2	Rural	45.97	0.00	2.40	0.09	7.64	75.82	111.67	-0.01
S198_1	Rural	40.33	0.00	2.40	0.00	7.29	75.82	106.48	-0.01
S198_2	Rural	38.35	0.00	2.40	0.00	7.08	75.82	104.71	-0.01
S2	Rural	38.75	0.00	2.40	0.00	7.13	75.82	105.06	-0.01
S2_1	Rural	40.31	0.00	2.40	0.00	7.29	75.82	106.46	-0.01
S20	Rural	42.01	0.00	2.40	0.00	7.42	75.82	108.03	-0.01
S206_2	Rural	38.74	0.00	2.40	0.00	7.13	75.82	105.05	-0.01

S21	Rural	44.16	0.00	2.40	0.06	7.56	75.82	109.97	- 0.01
S215	Rural	38.75	0.00	2.40	0.00	7.13	75.82	105.06	- 0.01
S217	Rural	38.74	0.00	2.40	0.00	7.13	75.82	105.05	- 0.01
S225	Rural	38.66	0.00	2.40	0.00	7.12	75.82	104.98	- 0.01
S24	Rural	40.32	0.00	2.40	0.00	7.29	75.82	106.46	- 0.01
S24_1	Rural	41.17	0.00	2.40	0.00	7.36	75.82	107.24	- 0.01
S25	Rural	39.12	0.00	2.40	0.00	7.17	75.82	105.39	- 0.01
S26	Rural	38.75	0.00	2.40	0.00	7.13	75.82	105.06	- 0.01
S27	Rural	39.14	0.00	2.40	0.00	7.17	75.82	105.40	- 0.01
S28	Rural	38.00	0.00	0.00	0.00	0.00	58.56	96.57	- 0.00
S3	Rural	38.75	0.00	2.40	0.00	7.13	75.82	105.06	- 0.01
S3_2	Rural	39.90	0.00	2.40	0.00	7.25	75.82	106.09	- 0.01
S4	Rural	41.16	0.00	2.40	0.00	7.36	75.82	107.23	- 0.01
S5	Rural	50.15	0.00	2.40	2.13	7.74	75.82	113.73	- 0.01
S5_2	Rural	38.08	0.00	2.40	0.00	7.04	75.82	104.47	- 0.01
S5_4	Rural	38.46	0.00	2.40	0.00	7.09	75.82	104.80	- 0.01
S7	Rural	39.54	0.00	2.40	0.00	7.22	75.82	105.76	- 0.01
S75	Rural	39.32	0.00	2.40	0.00	7.19	75.82	105.57	- 0.01
S8	Rural	42.98	0.00	2.40	0.01	7.49	75.82	108.91	- 0.01
S9_1	Rural	39.52	0.00	2.40	0.00	7.21	75.82	105.74	- 0.01
S9_2	Rural	38.81	0.00	2.40	0.00	7.14	75.82	105.11	- 0.01

****
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
J1	JUNCTION	0.06	0.10	1149.03	0 11:47	0.10
J10	JUNCTION	0.02	0.11	1164.83	0 01:46	0.11
J100	JUNCTION	0.01	0.31	1178.83	0 01:25	0.31
J101	JUNCTION	0.03	0.05	1178.57	0 11:47	0.05
J102	JUNCTION	0.00	0.07	1177.41	0 01:25	0.07
J104	JUNCTION	0.05	0.82	1173.18	0 01:45	0.82
J105	JUNCTION	0.02	0.03	1196.48	0 11:37	0.03
J106	JUNCTION	0.05	1.09	1174.17	0 01:43	1.08
J107	JUNCTION	0.05	0.88	1174.46	0 01:30	0.87
J108	JUNCTION	0.05	0.86	1174.66	0 01:30	0.84
J11	JUNCTION	0.20	0.31	1184.97	0 16:52	0.31
J110	JUNCTION	0.05	0.89	1174.39	0 01:31	0.89
J111	JUNCTION	0.01	0.12	1178.96	0 01:25	0.12
J112	JUNCTION	0.01	0.07	1178.79	0 01:25	0.07
J113	JUNCTION	0.01	0.07	1184.65	0 01:28	0.07
J114	JUNCTION	0.01	0.10	1184.80	0 01:26	0.10
J116	JUNCTION	0.01	0.03	1185.85	0 01:25	0.03
J117	JUNCTION	0.08	0.20	1174.96	0 01:49	0.20
J118	JUNCTION	0.00	0.00	1179.03	0 00:00	0.00
J119	JUNCTION	0.00	0.00	1179.03	0 00:00	0.00
J12	JUNCTION	0.00	0.04	1178.84	0 01:25	0.04
J120	JUNCTION	0.01	0.10	1175.01	0 01:26	0.10
J121	JUNCTION	0.01	0.05	1177.35	0 01:25	0.05
J122	JUNCTION	0.00	0.06	1182.11	0 01:26	0.06
J123	JUNCTION	0.01	0.15	1178.25	0 01:32	0.15
J124	JUNCTION	0.12	0.24	1182.65	0 01:40	0.24
J126	JUNCTION	0.07	0.29	1180.74	0 01:25	0.29
J127	JUNCTION	0.01	0.01	1148.24	0 11:48	0.01
J128	JUNCTION	0.42	0.58	1124.54	0 19:35	0.58
J129	JUNCTION	0.23	0.34	1124.32	0 19:37	0.34
J13	JUNCTION	0.04	0.08	1180.57	0 01:40	0.08
J130	JUNCTION	0.01	0.14	1176.74	0 01:26	0.14

J14	JUNCTION	0.01	0.09	1183.41	0	01:25	0.09
J140	JUNCTION	0.05	0.13	1159.18	0	11:25	0.13
J142	JUNCTION	0.02	0.04	1190.46	0	10:01	0.04
J15	JUNCTION	0.07	0.10	1186.11	0	11:27	0.10
J150	JUNCTION	0.06	0.09	1163.75	0	11:50	0.09
J156	JUNCTION	0.02	0.02	1187.68	0	11:13	0.02
J158	JUNCTION	0.02	0.03	1153.05	0	10:57	0.03
J16	JUNCTION	0.00	0.01	1188.11	0	11:19	0.01
J160	JUNCTION	0.02	0.04	1146.39	0	11:06	0.04
J162	JUNCTION	0.30	0.44	1120.41	0	19:51	0.44
J17	JUNCTION	0.01	0.01	1176.61	0	13:29	0.01
J172	JUNCTION	0.05	0.07	1162.32	0	11:54	0.07
J177	JUNCTION	0.05	0.08	1156.27	0	11:52	0.08
J18	JUNCTION	0.00	0.05	1172.35	0	01:32	0.05
J183	JUNCTION	0.18	0.27	1123.24	0	19:46	0.27
J185	JUNCTION	0.05	0.08	1151.61	0	12:03	0.08
J187	JUNCTION	0.12	0.36	1166.96	0	02:39	0.36
J19	JUNCTION	0.00	0.00	1198.50	0	11:39	0.00
J196	JUNCTION	0.16	0.40	1167.08	0	02:37	0.40
J198	JUNCTION	0.13	0.18	1128.99	0	22:05	0.18
J2	JUNCTION	0.00	0.05	1185.90	0	01:25	0.05
J20	JUNCTION	0.01	0.02	1184.92	0	11:04	0.02
J207	JUNCTION	0.13	0.30	1164.94	0	02:49	0.30
J209	JUNCTION	0.03	0.04	1143.70	0	10:59	0.04
J21	JUNCTION	0.11	0.42	1168.72	0	01:26	0.42
J22	JUNCTION	0.05	0.23	1168.49	0	01:40	0.23
J223	JUNCTION	0.00	0.00	1178.40	0	00:00	0.00
J23	JUNCTION	0.04	0.06	1184.06	0	11:22	0.06
J231	JUNCTION	0.12	0.17	1137.51	0	21:56	0.17
J235	JUNCTION	0.02	0.03	1152.86	0	12:24	0.03
J239	JUNCTION	0.13	0.18	1140.38	0	22:24	0.18
J24	JUNCTION	0.01	0.06	1169.38	0	01:46	0.06
J25	JUNCTION	0.00	0.00	1180.50	0	12:41	0.00
J250	JUNCTION	0.11	0.25	1165.50	0	03:02	0.25
J252	JUNCTION	0.31	0.39	1141.87	0	13:25	0.39
J26	JUNCTION	0.12	0.41	1179.09	0	01:36	0.41
J27	JUNCTION	0.04	0.10	1177.86	0	01:37	0.10
J28	JUNCTION	0.03	0.57	1185.92	0	01:25	0.57
J286	JUNCTION	0.11	0.14	1157.72	0	22:50	0.14
J29	JUNCTION	0.03	0.45	1186.74	0	01:25	0.44
J292	JUNCTION	0.02	0.03	1193.92	0	11:18	0.03
J3	JUNCTION	0.01	0.26	1186.75	0	01:25	0.26
J30	JUNCTION	0.10	0.16	1137.70	0	14:05	0.16
J31	JUNCTION	0.08	0.24	1174.59	0	01:42	0.24
J32	JUNCTION	0.02	0.02	1149.02	0	11:18	0.02
J33	JUNCTION	0.01	0.01	1176.01	0	11:45	0.01
J35	JUNCTION	0.01	0.05	1168.75	0	01:35	0.05
J36	JUNCTION	0.02	0.06	1183.71	0	01:25	0.06
J37	JUNCTION	0.07	0.27	1183.52	0	01:24	0.26
J38	JUNCTION	0.01	0.05	1168.05	0	01:26	0.05
J39	JUNCTION	0.03	0.09	1179.35	0	01:25	0.09
J4	JUNCTION	0.02	0.31	1174.08	0	01:25	0.31
J40	JUNCTION	0.01	0.02	1171.00	0	14:24	0.02
J41	JUNCTION	0.06	0.10	1171.33	0	14:20	0.10
J42	JUNCTION	0.01	0.01	1169.55	0	18:20	0.01
J43	JUNCTION	0.05	0.09	1169.88	0	18:17	0.09
J44	JUNCTION	0.13	0.27	1164.36	0	03:16	0.27
J45	JUNCTION	0.00	0.00	1191.60	0	00:00	0.00
J456	JUNCTION	0.13	0.19	1132.34	0	21:55	0.19
J46	JUNCTION	0.05	0.08	1169.28	0	11:22	0.08
J462	JUNCTION	0.04	0.10	1163.90	0	02:20	0.10
J466	JUNCTION	0.06	0.09	1145.20	0	12:02	0.09
J47	JUNCTION	0.06	0.30	1169.87	0	01:51	0.30
J472	JUNCTION	0.14	0.20	1139.78	0	22:39	0.20
J474	JUNCTION	0.06	0.09	1161.89	0	03:12	0.09
J475	JUNCTION	0.08	0.13	1139.98	0	12:05	0.13
J48	JUNCTION	0.00	0.00	1176.13	0	00:00	0.00
J482	JUNCTION	0.20	0.32	1159.19	0	11:25	0.32
J486	JUNCTION	0.02	0.03	1151.61	0	11:37	0.03
J49	JUNCTION	0.09	0.14	1160.33	0	10:19	0.14
J491	JUNCTION	0.15	0.22	1125.68	0	19:37	0.22
J495	JUNCTION	0.12	0.17	1145.09	0	22:32	0.17
J5	JUNCTION	0.00	0.05	1169.51	0	01:25	0.05
J50	JUNCTION	0.06	0.32	1169.85	0	01:57	0.32
J51	JUNCTION	0.06	0.08	1182.74	0	10:49	0.08
J52	JUNCTION	0.02	0.26	1172.92	0	01:25	0.26
J53	JUNCTION	0.28	0.50	1181.31	0	01:26	0.50
J54	JUNCTION	0.01	0.16	1173.18	0	01:25	0.16
J55	JUNCTION	0.09	0.52	1173.33	0	01:31	0.51
J56	JUNCTION	0.01	0.11	1168.10	0	01:45	0.11
J57	JUNCTION	0.01	0.07	1170.35	0	01:34	0.07
J58	JUNCTION	0.02	0.05	1179.70	0	01:25	0.05

J59	JUNCTION	0.01	0.15	1178.14	0	01:30	0.15
J6	JUNCTION	0.07	0.16	1180.28	0	01:25	0.16
J60	JUNCTION	0.00	0.05	1183.09	0	01:25	0.05
J61	JUNCTION	0.00	0.16	1181.31	0	01:26	0.16
J63	JUNCTION	0.02	0.66	1180.51	0	01:27	0.66
J64	JUNCTION	0.00	0.05	1179.15	0	01:25	0.05
J65	JUNCTION	0.03	0.42	1178.27	0	01:41	0.42
J66	JUNCTION	0.01	0.12	1176.87	0	01:37	0.12
J67	JUNCTION	0.01	0.14	1174.07	0	01:37	0.14
J68	JUNCTION	0.03	0.39	1173.43	0	01:36	0.39
J69	JUNCTION	0.00	0.05	1170.34	0	01:38	0.05
J7	JUNCTION	0.09	0.16	1177.35	0	01:26	0.16
J70	JUNCTION	0.02	0.11	1183.38	0	01:30	0.11
J71	JUNCTION	0.06	0.37	1183.09	0	01:39	0.37
J72	JUNCTION	0.02	0.05	1185.61	0	01:35	0.05
J73	JUNCTION	0.15	0.42	1175.76	0	01:35	0.42
J74	JUNCTION	0.02	0.56	1174.26	0	01:26	0.55
J75	JUNCTION	0.16	0.63	1173.71	0	01:35	0.63
J76	JUNCTION	0.02	0.46	1173.72	0	01:34	0.45
J77	JUNCTION	0.01	0.46	1174.07	0	01:26	0.30
J78	JUNCTION	0.03	0.62	1174.25	0	01:26	0.62
J79	JUNCTION	0.01	0.31	1174.30	0	01:26	0.30
J8	JUNCTION	0.09	0.45	1176.20	0	01:31	0.45
J80	JUNCTION	0.01	0.23	1175.06	0	01:25	0.23
J81	JUNCTION	0.00	0.06	1170.56	0	01:26	0.06
J82	JUNCTION	0.01	0.18	1174.93	0	01:25	0.18
J83	JUNCTION	0.02	0.21	1177.32	0	01:25	0.21
J84	JUNCTION	0.01	0.08	1178.06	0	01:25	0.08
J85	JUNCTION	0.01	0.14	1178.27	0	01:27	0.14
J86	JUNCTION	0.00	0.03	1184.54	0	01:25	0.03
J87	JUNCTION	0.03	0.53	1172.44	0	01:27	0.53
J89	JUNCTION	0.01	0.12	1172.92	0	01:25	0.12
J9	JUNCTION	0.02	0.06	1171.48	0	01:35	0.06
J90	JUNCTION	0.01	0.08	1173.33	0	01:25	0.08
J91	JUNCTION	0.01	0.09	1172.47	0	01:26	0.09
J92	JUNCTION	0.01	0.09	1173.89	0	01:25	0.09
J93	JUNCTION	0.02	0.50	1172.59	0	01:30	0.49
J94	JUNCTION	0.00	0.10	1169.25	0	01:33	0.10
J95	JUNCTION	0.06	0.64	1173.51	0	02:06	0.64
J96	JUNCTION	0.10	1.50	1173.21	0	01:48	1.50
J97	JUNCTION	0.15	1.88	1173.05	0	01:47	1.88
J98	JUNCTION	0.01	0.11	1170.30	0	01:47	0.11
J99	JUNCTION	0.03	1.18	1173.86	0	01:52	1.18
J109	OUTFALL	0.03	0.06	1158.68	0	11:25	0.06
J488	OUTFALL	0.10	0.16	1120.13	0	19:51	0.16
J125	STORAGE	0.08	0.10	1177.11	0	01:25	0.10
J34	STORAGE	0.04	0.06	1176.33	0	09:46	0.06
SU1	STORAGE	0.46	0.52	1167.90	1	00:00	0.52
SU10	STORAGE	0.00	0.03	1178.04	0	01:31	0.03
SU11	STORAGE	0.00	0.09	1174.60	0	01:25	0.09
SU12	STORAGE	0.00	0.03	1174.49	0	01:36	0.03
SU13	STORAGE	0.11	0.31	1186.74	1	00:00	0.31
SU14	STORAGE	0.00	0.07	1179.05	0	01:26	0.07
SU15	STORAGE	0.00	0.01	1179.15	0	01:25	0.01
SU16	STORAGE	0.00	0.06	1178.32	0	01:25	0.06
SU17	STORAGE	0.00	0.02	1180.71	0	01:25	0.02
SU18	STORAGE	0.00	0.08	1175.71	0	01:25	0.08
SU19	STORAGE	0.00	0.03	1174.54	0	01:25	0.03
SU2	STORAGE	0.52	0.54	1167.53	0	02:57	0.54
SU20	STORAGE	0.00	0.02	1174.82	0	01:25	0.02
SU21	STORAGE	0.00	0.07	1173.81	0	01:25	0.07
SU22	STORAGE	0.00	0.05	1174.10	0	01:25	0.05
SU23	STORAGE	0.00	0.10	1173.66	0	01:25	0.10
SU24	STORAGE	0.01	0.13	1175.18	0	01:25	0.13
SU25	STORAGE	0.01	0.20	1173.18	0	01:32	0.20
SU26	STORAGE	0.00	0.02	1173.29	0	01:26	0.02
SU27	STORAGE	0.00	0.04	1173.30	0	01:26	0.04
SU28	STORAGE	0.00	0.07	1170.68	0	01:27	0.07
SU29	STORAGE	0.01	0.12	1173.48	0	01:25	0.12
SU3	STORAGE	0.41	0.58	1167.12	0	02:37	0.58
SU30	STORAGE	0.00	0.10	1173.34	0	01:31	0.10
SU31	STORAGE	0.00	0.02	1173.09	0	01:25	0.02
SU32	STORAGE	0.00	0.03	1174.19	0	01:29	0.03
SU33	STORAGE	0.00	0.00	1174.26	0	00:00	0.00
SU34	STORAGE	0.01	0.18	1181.99	0	01:26	0.17
SU36	STORAGE	0.01	0.19	1174.39	0	01:27	0.19
SU37	STORAGE	0.01	0.09	1175.38	0	01:25	0.09
SU38	STORAGE	0.01	0.12	1186.81	0	01:25	0.12
SU39	STORAGE	0.00	0.02	1181.14	0	01:25	0.02
SU4	STORAGE	0.28	0.30	1163.32	0	03:25	0.30
SU40	STORAGE	0.01	0.15	1174.64	0	01:26	0.15
SU41	STORAGE	0.00	0.14	1186.75	0	01:25	0.14

SU42	STORAGE	0.00	0.05	1173.65	0	01:25	0.05	
SU5	STORAGE	0.56	0.75	1161.86	0	23:34	0.75	
SU6	STORAGE	0.00	0.01	1175.22	0	01:25	0.01	
SU7	STORAGE	0.00	0.05	1174.03	0	01:25	0.05	

****
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	
J1	JUNCTION	0.015	0.015	0	11:47	0.83	0.83	0.105	
J10	JUNCTION	0.266	0.266	0	01:25	1.31	1.31	2.638	
J100	JUNCTION	0.092	0.092	0	01:25	0.109	0.109	-0.026	
J101	JUNCTION	0.060	0.102	0	11:29	3.24	5.51	2.301	
J102	JUNCTION	0.000	0.092	0	01:25	0	0.109	-0.111	
J104	JUNCTION	0.000	0.281	0	01:28	0	0.976	0.066	
J105	JUNCTION	0.042	0.042	0	11:26	2.3	2.3	1.431	
J106	JUNCTION	0.000	0.257	0	01:26	0	0.937	0.224	
J107	JUNCTION	0.000	0.161	0	01:23	0	0.64	0.025	
J108	JUNCTION	0.000	0.244	0	01:26	0	0.724	-1.715	
J11	JUNCTION	0.029	0.043	0	11:13	0.0737	2.36	8.245	
J110	JUNCTION	0.000	0.145	0	01:27	0	0.315	-0.467	
J111	JUNCTION	0.210	0.330	0	01:25	0.33	0.591	-0.032	
J112	JUNCTION	0.026	0.345	0	01:25	0.0368	0.628	-0.028	
J113	JUNCTION	0.000	0.131	0	01:25	0	0.394	-0.046	
J114	JUNCTION	0.000	0.218	0	01:25	0	0.49	-0.208	
J116	JUNCTION	0.031	0.031	0	01:25	0.063	0.559	0.148	
J117	JUNCTION	0.000	0.097	0	01:25	0	1.05	3.221	
J118	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
J119	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
J12	JUNCTION	0.054	0.054	0	01:25	0.132	0.132	0.031	
J120	JUNCTION	0.000	0.270	0	01:25	0	0.398	-0.059	
J121	JUNCTION	0.018	0.226	0	01:25	0.0438	1.1	0.102	
J122	JUNCTION	0.000	0.151	0	01:25	0	0.262	0.082	
J123	JUNCTION	0.331	0.579	0	01:25	0.5	1.39	-2.152	
J124	JUNCTION	0.050	0.098	0	01:39	0.0602	2.69	-0.662	
J126	JUNCTION	0.000	0.094	0	01:24	0	0.66	0.040	
J127	JUNCTION	0.000	0.015	0	11:47	0	0.829	0.156	
J128	JUNCTION	0.000	1.086	0	19:37	0	58.9	0.393	
J129	JUNCTION	0.000	1.104	0	19:36	0	58.7	0.399	
J13	JUNCTION	0.000	0.100	0	01:40	0	2.71	-0.167	
J130	JUNCTION	0.000	0.175	0	01:25	0	0.509	0.003	
J14	JUNCTION	0.071	0.071	0	01:25	0.0825	0.0825	-0.301	
J140	JUNCTION	0.000	1.151	0	11:24	0	24.6	0.470	
J142	JUNCTION	0.042	0.042	0	11:03	2.27	2.27	0.589	
J15	JUNCTION	0.009	0.009	0	11:27	0.496	0.496	0.041	
J150	JUNCTION	0.064	0.166	0	11:39	3.48	8.87	1.874	
J156	JUNCTION	0.001	0.043	0	11:07	0.0444	2.3	0.781	
J158	JUNCTION	0.053	0.053	0	10:51	2.86	2.86	0.808	
J16	JUNCTION	0.004	0.004	0	11:12	0.194	0.194	0.877	
J160	JUNCTION	0.000	0.053	0	10:57	0	2.84	1.103	
J162	JUNCTION	0.000	1.086	0	19:46	0	57.9	1.143	
J17	JUNCTION	0.002	0.002	0	13:22	0.117	0.117	1.023	
J172	JUNCTION	0.024	0.190	0	11:49	1.3	10	0.816	
J177	JUNCTION	0.030	0.219	0	11:51	1.6	11.5	1.041	
J18	JUNCTION	0.000	0.229	0	01:32	0	0.161	-0.000	
J183	JUNCTION	0.000	1.089	0	19:41	0	58.4	0.874	
J185	JUNCTION	0.008	0.227	0	11:56	0.427	11.8	1.056	
J187	JUNCTION	0.012	0.688	0	02:21	0.633	13.4	2.219	
J19	JUNCTION	0.001	0.001	0	11:09	0.0543	0.0543	2.870	
J196	JUNCTION	0.000	0.691	0	02:14	0	12.1	3.375	
J198	JUNCTION	0.000	0.672	0	22:00	0	37	0.904	
J2	JUNCTION	0.000	0.044	0	01:25	0	0.0748	-0.162	
J20	JUNCTION	0.003	0.003	0	11:01	0.167	0.167	0.382	
J207	JUNCTION	0.003	0.679	0	03:02	0.153	17.6	0.778	
J209	JUNCTION	0.101	0.101	0	10:59	5.43	5.43	0.202	
J21	JUNCTION	0.311	0.311	0	01:25	0.316	1.59	1.155	
J22	JUNCTION	0.125	0.125	0	01:25	0.313	0.429	1.411	
J223	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
J23	JUNCTION	0.032	0.032	0	11:17	1.76	1.76	1.356	
J231	JUNCTION	0.038	0.642	0	21:49	2.09	36.6	0.930	
J235	JUNCTION	0.000	0.032	0	11:27	0	1.73	4.733	
J239	JUNCTION	0.000	0.627	0	23:04	0	32.1	-1.299	
J24	JUNCTION	0.000	0.125	0	01:39	0	0.737	1.907	
J25	JUNCTION	0.003	0.003	0	12:29	0.141	0.141	1.680	
J250	JUNCTION	0.085	0.696	0	02:52	4.62	17.8	1.832	

J252	JUNCTION	0.012	0.566	0	22:20	0.659	33.1	3.099	
J26	JUNCTION	0.076	0.144	0	01:35	0.127	2.84	0.132	
J27	JUNCTION	0.000	0.142	0	01:36	0	2.84	0.089	
J28	JUNCTION	0.000	0.107	0	01:25	0	0.414	0.000	
J286	JUNCTION	0.075	0.478	0	22:42	4.09	29.1	1.194	
J29	JUNCTION	0.000	0.239	0	01:25	0	0.408	0.179	
J292	JUNCTION	0.074	0.074	0	11:08	4.04	4.04	1.270	
J3	JUNCTION	0.045	0.045	0	01:25	0.0748	0.0748	0.001	
J30	JUNCTION	0.000	0.035	0	11:18	0	1.86	10.063	
J31	JUNCTION	0.000	0.076	0	01:45	0	1.07	0.421	
J32	JUNCTION	0.035	0.035	0	11:08	1.88	1.88	1.173	
J33	JUNCTION	0.000	0.005	0	11:42	0	0.229	0.326	
J35	JUNCTION	0.000	0.080	0	01:42	0	1.07	-0.181	
J36	JUNCTION	0.063	0.091	0	01:25	0.104	0.662	0.223	
J37	JUNCTION	0.000	0.087	0	01:25	0	0.661	0.119	
J38	JUNCTION	0.000	0.182	0	01:26	0	1.57	-0.098	
J39	JUNCTION	0.000	0.098	0	01:25	0	0.66	0.138	
J4	JUNCTION	0.028	0.244	0	01:25	0.0472	0.299	-0.003	
J40	JUNCTION	0.000	0.015	0	14:20	0	0.752	0.615	
J41	JUNCTION	0.015	0.015	0	11:46	0.848	0.848	12.687	
J42	JUNCTION	0.000	0.011	0	18:17	0	0.512	0.524	
J43	JUNCTION	0.012	0.012	0	12:08	0.651	0.651	27.344	
J44	JUNCTION	0.000	0.719	0	03:02	0	19	1.503	
J45	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
J456	JUNCTION	0.000	0.672	0	21:43	0	38	2.525	
J46	JUNCTION	0.024	0.024	0	11:17	1.29	1.29	0.670	
J462	JUNCTION	0.029	0.122	0	02:05	1.54	2.82	2.923	
J466	JUNCTION	0.023	0.302	0	11:55	1.22	15.7	0.968	
J47	JUNCTION	0.172	0.280	0	01:25	0.349	0.715	4.560	
J472	JUNCTION	0.010	0.577	0	22:13	0.534	33.1	0.620	
J474	JUNCTION	0.029	0.099	0	02:44	1.66	4.4	4.406	
J475	JUNCTION	0.045	0.447	0	11:51	2.44	23.4	1.773	
J48	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
J482	JUNCTION	0.000	1.915	0	11:25	0	24.4	1.099	
J486	JUNCTION	0.028	0.028	0	11:08	1.52	1.52	2.815	
J49	JUNCTION	0.135	0.204	0	12:40	7.3	11.5	3.713	
J491	JUNCTION	0.000	1.086	0	19:28	0	59.7	1.433	
J495	JUNCTION	0.042	0.542	0	22:14	2.29	32.5	2.738	
J5	JUNCTION	0.000	0.244	0	01:25	0	0.299	0.846	
J50	JUNCTION	0.000	0.126	0	01:57	0	0.741	0.011	
J51	JUNCTION	0.009	0.009	0	10:51	0.495	0.495	-1.446	

J52	JUNCTION	0.000	0.105	0	01:25	0	0.224	0.152	
J53	JUNCTION	0.000	0.069	0	01:26	0	0.196	1.741	
J54	JUNCTION	0.000	0.053	0	01:25	0	0.124	-0.005	
J55	JUNCTION	0.000	0.216	0	01:30	0	1.1	0.441	
J56	JUNCTION	0.000	0.082	0	01:40	0	0.423	4.048	
J57	JUNCTION	0.000	0.182	0	01:31	0	1.1	0.157	
J58	JUNCTION	0.000	0.064	0	01:25	0	0.76	-0.470	
J59	JUNCTION	0.109	0.109	0	01:25	0.177	0.177	-0.030	
J6	JUNCTION	0.000	0.043	0	01:25	0	0.7	1.953	
J60	JUNCTION	0.109	0.157	0	01:25	0.239	0.262	-0.034	
J61	JUNCTION	0.000	0.002	0	01:21	0	0.000322	0.031	
J63	JUNCTION	0.000	0.119	0	01:26	0	0.228	-1.152	
J64	JUNCTION	0.076	0.178	0	01:25	0.103	0.333	-0.150	
J65	JUNCTION	0.000	0.176	0	01:25	0	0.333	0.144	
J66	JUNCTION	0.000	0.097	0	01:37	0	0.352	0.027	
J67	JUNCTION	0.000	0.099	0	01:37	0	0.364	0.006	
J68	JUNCTION	0.000	0.128	0	01:36	0	0.449	-0.024	
J69	JUNCTION	0.000	0.128	0	01:36	0	0.45	-0.389	
J7	JUNCTION	0.000	0.345	0	01:25	0	0.628	0.226	
J70	JUNCTION	0.000	0.101	0	01:25	0	0.456	-0.006	
J71	JUNCTION	0.000	0.088	0	01:30	0	0.456	1.161	
J72	JUNCTION	0.067	0.067	0	01:25	0.188	0.38	1.739	
J73	JUNCTION	0.074	0.177	0	01:35	0.122	2.96	0.220	
J74	JUNCTION	0.000	0.037	0	01:25	0	0.0512	0.011	
J75	JUNCTION	0.000	0.232	0	01:34	0	3.14	0.375	
J76	JUNCTION	0.000	0.029	0	01:36	0	0.0211	-0.011	
J77	JUNCTION	0.000	0.096	0	01:25	0	0.199	0.037	
J78	JUNCTION	0.000	0.338	0	01:25	0	0.75	-0.040	
J79	JUNCTION	0.000	0.027	0	01:25	0	0.0538	0.008	
J8	JUNCTION	0.000	0.220	0	01:25	0	1.09	0.706	
J80	JUNCTION	0.000	0.087	0	01:25	0	0.112	0.014	
J81	JUNCTION	0.000	0.331	0	01:26	0	0.75	0.694	
J82	JUNCTION	0.000	0.259	0	01:25	0	0.621	-0.006	
J83	JUNCTION	0.000	0.096	0	01:25	0	0.335	0.001	
J84	JUNCTION	0.000	0.027	0	01:25	0	0.09	0.037	
J85	JUNCTION	0.000	0.081	0	01:26	0	0.174	0.003	
J86	JUNCTION	0.043	0.043	0	01:25	0.0679	0.0679	-0.257	
J87	JUNCTION	0.000	0.230	0	01:26	0	0.685	-0.015	
J89	JUNCTION	0.000	0.053	0	01:25	0	0.125	0.084	
J9	JUNCTION	0.000	0.233	0	01:34	0	3.13	0.189	
J90	JUNCTION	0.000	0.026	0	01:25	0	0.106	0.003	

J91	JUNCTION	0.000	0.101	0	01:26	0	0.315	-0.002	
J92	JUNCTION	0.000	0.059	0	01:25	0	0.203	0.005	
J93	JUNCTION	0.000	0.074	0	01:32	0	0.238	0.002	
J94	JUNCTION	0.000	0.447	0	01:32	0	0.845	0.446	
J95	JUNCTION	0.061	0.495	0	01:32	0.13	1.55	2.138	
J96	JUNCTION	0.000	0.317	0	01:28	0	1.84	-0.035	
J97	JUNCTION	0.000	0.565	0	01:29	0	2.84	-0.077	
J98	JUNCTION	0.000	0.479	0	01:47	0	2.85	-0.169	
J99	JUNCTION	0.000	0.084	0	01:25	0	0.223	-7.204	
J109	OUTFALL	0.000	0.235	0	11:25	0	10.7	0.000	
J488	OUTFALL	0.000	1.086	0	19:51	0	57.3	0.000	
J125	STORAGE	0.020	0.021	0	01:25	0.0229	0.0234	-0.008	
J34	STORAGE	0.004	0.004	0	11:36	0.231	0.231	0.905	
SU1	STORAGE	0.023	0.078	0	01:45	1.38	3.22	1.909	
SU10	STORAGE	0.000	0.018	0	01:30	0	0.0197	0.005	
SU11	STORAGE	0.141	0.141	0	01:25	0.212	0.212	-0.010	
SU12	STORAGE	0.000	0.037	0	01:35	0	0.0245	0.661	
SU13	STORAGE	0.004	0.005	0	11:27	0.234	0.287	738.547	
SU14	STORAGE	0.067	0.107	0	01:25	0.106	0.174	0.105	
SU15	STORAGE	0.263	0.263	0	01:25	0.489	0.489	-0.032	
SU16	STORAGE	0.000	0.233	0	01:25	0	0.399	-0.113	
SU17	STORAGE	0.000	0.121	0	01:25	0	0.204	-0.002	
SU18	STORAGE	0.094	0.094	0	01:25	0.112	0.112	-0.011	
SU19	STORAGE	0.040	0.060	0	01:25	0.0623	0.0755	-0.040	
SU2	STORAGE	0.007	0.118	0	01:46	0.263	4.25	0.294	
SU20	STORAGE	0.120	0.245	0	01:25	0.151	0.305	-0.056	
SU21	STORAGE	0.124	0.172	0	01:25	0.167	0.202	-0.010	
SU22	STORAGE	0.068	0.120	0	01:25	0.106	0.238	-0.055	
SU23	STORAGE	0.000	0.088	0	01:25	0	0.132	0.077	
SU24	STORAGE	0.093	0.093	0	01:25	0.209	0.209	-0.008	
SU25	STORAGE	0.077	0.310	0	01:30	0.112	0.4	0.424	
SU26	STORAGE	0.000	0.020	0	01:25	0	0.00542	0.300	
SU27	STORAGE	0.000	0.031	0	01:25	0	0.00693	0.139	
SU28	STORAGE	0.000	0.094	0	01:25	0	0.0572	0.493	
SU29	STORAGE	0.156	0.244	0	01:25	0.239	0.349	0.200	
SU3	STORAGE	0.028	1.319	0	01:33	1.55	11	3.444	
SU30	STORAGE	0.011	0.323	0	01:30	0.0163	0.375	-0.685	
SU31	STORAGE	0.020	0.020	0	01:25	0.0236	0.0236	-0.040	
SU32	STORAGE	0.031	0.232	0	01:26	0.047	0.181	-0.772	
SU33	STORAGE	0.000	0.000	0	00:00	0	0	0.000	ltr
SU34	STORAGE	0.156	0.156	0	01:25	0.23	0.23	-0.003	
SU36	STORAGE	0.050	0.540	0	01:30	0.0766	0.551	0.364	
SU37	STORAGE	0.305	0.382	0	01:25	0.559	1.22	-0.019	
SU38	STORAGE	0.221	0.221	0	01:25	0.49	0.49	-0.003	
SU39	STORAGE	0.166	0.166	0	01:25	0.235	0.401	-0.011	
SU4	STORAGE	0.080	0.686	0	03:16	4.41	23.8	0.520	
SU40	STORAGE	0.147	0.969	0	01:26	0.241	1.38	0.982	
SU41	STORAGE	0.169	0.482	0	01:38	0.342	0.431	-0.205	
SU42	STORAGE	0.069	0.149	0	01:25	0.0931	0.157	-0.204	
SU5	STORAGE	0.038	0.670	0	03:25	2.09	28.9	4.093	
SU6	STORAGE	0.048	0.048	0	01:25	0.0598	0.0598	-0.015	
SU7	STORAGE	0.057	0.099	0	01:25	0.0696	0.122	-0.141	

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J53	JUNCTION	0.29	0.051	0.799
J75	JUNCTION	0.41	0.134	0.816
J76	JUNCTION	0.42	0.158	1.042
J77	JUNCTION	0.01	0.158	0.742
J93	JUNCTION	0.58	0.200	0.700
J99	JUNCTION	0.51	0.875	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters

J99	0.04	0.045	0	01:47	0.002	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days	hr:min	Maximum Outflow CMS
J125	0.001	5	0	0	0.001	6	0	01:25	0.021
J34	0.000	0	0	0	0.000	0	0	00:00	0.005
SU1	1.417	3	0	0	2.282	5	1	00:00	0.024
SU10	0.000	0	0	0	0.001	0	0	01:31	0.018
SU11	0.000	0	0	0	0.003	9	0	01:25	0.119
SU12	0.000	0	0	0	0.000	1	0	01:36	0.036
SU13	0.009	3	0	0	0.034	12	1	00:00	0.000
SU14	0.000	0	0	0	0.002	6	0	01:26	0.081
SU15	0.000	0	0	0	0.000	0	0	01:25	0.260
SU16	0.000	0	0	0	0.002	5	0	01:25	0.207
SU17	0.000	0	0	0	0.000	0	0	01:25	0.121
SU18	0.000	0	0	0	0.003	7	0	01:25	0.087
SU19	0.000	0	0	0	0.001	1	0	01:25	0.054
SU2	2.035	6	0	0	2.161	7	0	02:57	0.058
SU20	0.000	0	0	0	0.000	1	0	01:25	0.244
SU21	0.000	0	0	0	0.002	4	0	01:25	0.165
SU22	0.000	0	0	0	0.001	3	0	01:25	0.114
SU23	0.000	0	0	0	0.005	3	0	01:25	0.085
SU24	0.000	0	0	0	0.007	19	0	01:25	0.078
SU25	0.002	2	0	0	0.063	46	0	01:32	0.303
SU26	0.000	0	0	0	0.000	0	0	01:26	0.018
SU27	0.000	0	0	0	0.001	1	0	01:26	0.021
SU28	0.000	0	0	0	0.002	6	0	01:27	0.075
SU29	0.000	0	0	0	0.006	6	0	01:25	0.241
SU3	1.441	9	0	0	2.316	14	0	02:37	0.300
SU30	0.000	0	0	0	0.004	3	0	01:31	0.319
SU31	0.000	0	0	0	0.000	0	0	01:25	0.019
SU32	0.000	0	0	0	0.001	1	0	01:29	0.174
SU33	0.000	0	0	0	0.000	0	0	00:00	0.000
SU34	0.000	0	0	0	0.013	11	0	01:26	0.119
SU36	0.000	0	0	0	0.015	10	0	01:27	0.373
SU37	0.000	0	0	0	0.003	9	0	01:25	0.366
SU38	0.000	1	0	0	0.006	15	0	01:25	0.218
SU39	0.000	0	0	0	0.000	1	0	01:25	0.164
SU4	1.175	2	0	0	1.378	3	0	03:25	0.670
SU40	0.000	0	0	0	0.009	6	0	01:26	0.841
SU41	0.000	0	0	0	0.009	23	0	01:25	0.297
SU42	0.000	0	0	0	0.001	3	0	01:25	0.146
SU5	1.673	9	0	0	2.751	16	0	23:34	0.412
SU6	0.000	0	0	0	0.000	0	0	01:25	0.048
SU7	0.000	0	0	0	0.001	4	0	01:25	0.091

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J109	86.56	0.142	0.235	10.723
J488	77.80	0.844	1.086	57.261
System	82.18	0.986	1.299	67.984

****
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
C1	CONDUIT	0.174	0	01:26	2.85	0.12	0.27
C1_1	CONDUIT	0.015	0	11:47	1.55	0.06	0.13

C1_2	CONDUIT	0.015	0	11:48	0.01	0.00	0.20
C10	CONDUIT	0.070	0	01:25	0.64	0.04	0.31
C100	CONDUIT	0.002	0	13:29	0.09	0.00	0.12
C101	CONDUIT	0.101	0	01:26	1.23	0.07	0.59
C102	CONDUIT	0.219	0	11:57	0.48	0.01	0.08
C103	CONDUIT	0.228	0	01:27	2.15	0.45	0.58
C104	CONDUIT	0.696	0	02:52	0.36	0.10	0.30
C105	CONDUIT	0.297	0	02:40	4.20	0.61	1.00
C106	CONDUIT	0.317	0	01:29	2.01	0.58	1.00
C107	CONDUIT	0.479	0	01:47	4.57	0.99	0.63
C108	CONDUIT	0.085	0	01:26	2.04	0.46	1.00
C109	CONDUIT	0.060	0	01:25	1.57	0.40	0.61
C11	CONDUIT	0.062	0	16:52	0.85	0.12	0.38
C110	CONDUIT	0.274	0	01:26	1.43	0.38	1.00
C110_1	CONDUIT	0.089	0	01:25	0.65	0.02	0.19
C111	CONDUIT	0.255	0	01:28	3.62	1.04	1.00
C112	CONDUIT	0.140	0	01:28	1.98	2.63	1.00
C113	CONDUIT	0.154	0	02:12	2.31	0.85	1.00
C114	CONDUIT	0.640	0	02:35	0.29	0.19	0.38
C115	CONDUIT	0.160	0	01:23	2.26	0.65	1.00
C116	CONDUIT	0.321	0	01:25	1.77	0.10	0.32
C117	CONDUIT	0.190	0	11:54	0.44	0.01	0.08
C118	CONDUIT	0.229	0	01:32	0.58	0.04	0.24
C118_1	CHANNEL	0.345	0	01:25	1.07	0.06	0.53
C118_2	CHANNEL	0.339	0	01:26	1.71	0.07	0.50
C119	CONDUIT	0.106	0	01:25	2.31	0.44	0.67
C12	CHANNEL	0.221	0	01:26	0.62	0.19	0.57
C12_2	CONDUIT	0.100	0	01:40	1.80	0.13	0.27
C120	CONDUIT	0.116	0	01:28	0.43	0.00	0.11
C120_1	CONDUIT	0.174	0	01:26	0.67	0.03	0.25
C120_2	CONDUIT	0.451	0	01:32	0.51	0.01	0.38
C121	CONDUIT	0.000	0	00:00	0.00	0.00	0.50
C122	CONDUIT	0.015	0	01:27	2.00	1.07	1.00
C123	CONDUIT	0.004	0	11:45	0.02	0.00	0.10
C124	CONDUIT	0.166	0	11:52	0.37	0.01	0.08
C125	CONDUIT	0.001	0	11:39	0.01	0.00	0.16
C126	CONDUIT	0.300	0	03:09	0.14	0.09	0.36
C127	CONDUIT	0.151	0	01:25	2.08	0.02	0.18
C128	CHANNEL	0.018	0	01:30	0.08	0.02	0.44
C129	CHANNEL	0.058	0	01:25	1.04	0.01	0.22
C13	CONDUIT	0.162	0	01:34	0.33	0.01	0.17
C130	CONDUIT	0.182	0	01:26	2.09	0.57	0.39
C131	CONDUIT	0.148	0	01:29	0.25	0.02	0.52
C132	CHANNEL	0.003	0	11:04	1.18	0.00	0.05
C133	CONDUIT	0.032	0	11:27	0.70	0.00	0.04
C134	CONDUIT	0.024	0	11:22	0.20	0.01	0.21
C139	CONDUIT	0.100	0	10:59	0.48	0.00	0.09
C14	CONDUIT	0.235	0	11:25	0.21	0.06	0.19
C15	CONDUIT	0.127	0	01:38	0.29	0.01	0.17
C16	CONDUIT	1.915	0	11:25	1.22	0.01	0.11
C165	CONDUIT	0.053	0	11:06	0.24	0.00	0.07
C17	CONDUIT	0.000	0	00:00	0.00	0.00	0.07
C173	CONDUIT	0.102	0	11:47	0.27	0.00	0.07
C18	CONDUIT	0.329	0	01:26	1.01	0.01	0.17
C188_1	CONDUIT	0.043	0	11:13	0.17	0.00	0.17
C19	CONDUIT	0.182	0	01:31	2.02	0.61	0.58
C19_1	CONDUIT	0.071	0	13:39	0.18	0.01	0.10
C19_2	CONDUIT	0.286	0	11:05	0.40	0.02	0.13
C19_3	CONDUIT	0.082	0	01:40	1.66	0.24	0.28
C19_4	CONDUIT	0.077	0	01:45	0.21	0.01	0.07
C192	CONDUIT	0.032	0	12:24	0.06	0.00	0.10
C194	CONDUIT	0.053	0	10:57	0.30	0.00	0.03
C196	CONDUIT	0.074	0	11:18	0.04	0.00	0.39
C2	CONDUIT	0.000	0	00:00	0.00	0.00	0.33
C2_1	CONDUIT	0.098	0	01:40	0.48	0.00	0.24
C2_2	CONDUIT	0.041	0	01:25	0.40	0.00	0.06
C2_3	CONDUIT	0.142	0	01:36	2.34	0.21	0.56
C2_4	CONDUIT	0.142	0	01:34	0.91	0.40	0.96
C2_6	CONDUIT	0.142	0	01:37	0.72	0.01	0.26
C2_9	CONDUIT	0.233	0	01:34	2.52	0.38	0.57
C20	CONDUIT	0.240	0	01:25	0.85	0.01	0.16
C200	CONDUIT	0.042	0	11:07	0.26	0.00	0.03
C21	CONDUIT	0.096	0	02:44	0.23	0.01	0.08
C214	CONDUIT	0.042	0	11:37	0.23	0.00	0.04
C22	CHANNEL	0.007	0	01:36	0.30	0.00	0.15
C23	CONDUIT	0.439	0	01:33	0.77	0.01	0.17
C24	CONDUIT	0.125	0	01:39	1.80	0.40	0.32
C25	CONDUIT	0.010	0	10:49	0.70	0.03	0.18
C25_2	CONDUIT	0.003	0	12:41	0.02	0.00	0.15
C25_3	CONDUIT	0.125	0	01:57	0.89	0.42	0.51
C26	CONDUIT	0.005	0	11:42	1.00	0.07	0.12
C27	CONDUIT	1.086	0	19:51	0.55	1.58	0.30

C28	CONDUIT	0.087	0	01:25	0.37	0.01	0.54
C28_1	CONDUIT	0.009	0	11:27	0.98	0.19	0.19
C28_4	CONDUIT	0.029	0	01:25	0.31	0.00	0.04
C29	CONDUIT	0.090	0	01:25	1.97	0.24	0.62
C3	CONDUIT	0.044	0	01:25	1.44	0.47	0.52
C30	CONDUIT	0.034	0	14:05	0.45	0.04	0.18
C31	CONDUIT	1.086	0	19:46	0.45	0.08	0.35
C32	CONDUIT	0.035	0	11:18	0.25	0.00	0.09
C33	CONDUIT	0.479	0	01:47	0.76	0.02	0.25
C33_1	CONDUIT	1.086	0	19:37	0.38	0.06	0.40
C33_3	CONDUIT	1.104	0	19:36	1.78	0.19	0.18
C33_4	CONDUIT	1.089	0	19:41	0.55	0.10	0.30
C34	CONDUIT	0.080	0	01:42	1.87	0.17	0.32
C35	CONDUIT	0.672	0	22:05	0.55	0.04	0.20
C36	CHANNEL	0.049	0	01:25	0.53	0.03	0.28
C36_2	CONDUIT	0.044	0	01:25	1.42	0.54	0.68
C37	CHANNEL	0.137	0	01:25	2.87	0.03	0.20
C37_2	CONDUIT	0.094	0	01:24	1.92	0.99	1.00
C38	CONDUIT	0.672	0	22:00	0.61	0.04	0.18
C39	CONDUIT	0.084	0	01:25	1.03	0.07	0.29
C4	CONDUIT	0.061	0	01:25	1.75	0.18	0.59
C40	CONDUIT	0.642	0	21:56	0.61	0.04	0.18
C41	CONDUIT	0.575	0	22:20	0.53	0.04	0.18
C42	CONDUIT	0.568	0	22:24	0.51	0.04	0.19
C43	CONDUIT	0.627	0	23:04	2.22	0.03	0.13
C44	CONDUIT	0.063	0	01:49	0.95	0.37	0.43
C45	CONDUIT	0.542	0	22:32	0.30	0.04	0.28
C46	CONDUIT	0.015	0	14:20	1.40	0.10	0.14
C47	CONDUIT	0.011	0	18:17	1.33	0.17	0.18
C48	CONDUIT	0.115	0	01:46	0.43	0.01	0.05
C49	CONDUIT	0.058	0	02:57	0.07	0.00	0.18
C5	CHANNEL	0.083	0	01:25	0.99	0.05	0.26
C50	CHANNEL	0.052	0	01:25	1.16	0.01	0.19
C51	CONDUIT	0.028	0	11:37	0.06	0.00	0.10
C52	CONDUIT	0.004	0	11:19	0.06	0.00	0.03
C53	CONDUIT	0.478	0	22:50	0.54	0.03	0.15
C54	CONDUIT	0.000	0	00:00	0.00	0.00	0.05
C55	CONDUIT	0.082	0	01:40	0.44	0.00	0.19
C56	CONDUIT	0.232	0	01:35	0.65	0.01	0.17
C57	CONDUIT	0.015	0	14:24	0.07	0.00	0.07
C58	CONDUIT	0.024	0	18:51	0.63	0.01	0.08
C59	CONDUIT	0.011	0	18:20	0.11	0.00	0.02
C6	CONDUIT	0.043	0	01:25	1.52	0.16	0.23
C60	CONDUIT	0.104	0	01:25	1.43	0.07	0.30
C61	CONDUIT	0.053	0	01:25	0.85	0.26	0.46
C62	CHANNEL	0.088	0	01:25	1.24	0.02	0.35
C64	CONDUIT	0.412	0	23:34	1.61	1.27	0.85
C65_1	CONDUIT	0.002	0	01:21	0.02	0.01	0.67
C65_2	CONDUIT	0.069	0	01:26	0.66	0.13	0.62
C66	CHANNEL	0.270	0	01:25	1.27	0.11	0.43
C66_1	CONDUIT	0.023	0	03:25	0.82	0.04	0.15
C67	CHANNEL	0.020	0	01:25	1.81	0.00	0.10
C68	CONDUIT	0.118	0	01:27	2.78	0.80	0.58
C69	CHANNEL	0.000	0	00:00	0.00	0.00	0.09
C7	CONDUIT	0.056	0	01:30	4.15	0.07	0.28
C7_3	CONDUIT	0.061	0	01:25	0.56	0.00	0.05
C7_4	CONDUIT	0.220	0	01:25	0.23	0.00	0.25
C70	CHANNEL	0.023	0	01:25	0.25	0.12	0.27
C71	CONDUIT	0.085	0	01:41	1.55	0.41	0.72
C72	CONDUIT	0.097	0	01:37	2.52	0.15	0.29
C73	CONDUIT	0.099	0	01:37	1.02	0.22	0.59
C74	CONDUIT	0.128	0	01:36	1.96	0.18	0.49
C75	CONDUIT	0.176	0	01:25	0.26	0.02	0.45
C76	CONDUIT	0.088	0	01:30	0.31	0.02	0.37
C77	CHANNEL	0.094	0	01:25	1.82	0.02	0.26
C77_1	CONDUIT	0.073	0	01:39	1.14	0.85	0.85
C77_3	CONDUIT	0.000	0	00:00	0.00	0.00	0.05
C77_4	CONDUIT	0.000	0	00:00	0.00	0.00	0.06
C77_5	CONDUIT	0.122	0	02:05	0.25	0.01	0.09
C78	CONDUIT	0.446	0	12:05	0.45	0.02	0.17
C79	CONDUIT	0.052	0	01:35	0.63	0.01	0.26
C8	CONDUIT	0.201	0	01:30	1.26	0.39	1.00
C80	CONDUIT	0.184	0	01:27	0.82	0.00	0.14
C80_1	CONDUIT	0.710	0	03:02	0.41	0.09	0.28
C80_2	CONDUIT	0.686	0	03:16	0.37	0.08	0.29
C81	CONDUIT	0.029	0	01:36	0.57	0.51	1.00
C82	CONDUIT	0.096	0	01:25	1.39	0.58	1.00
C83	CONDUIT	0.679	0	03:02	0.41	0.07	0.27
C84	CONDUIT	0.302	0	12:02	0.49	0.01	0.11
C85	CONDUIT	0.036	0	01:26	0.51	0.16	1.00
C86	CONDUIT	0.026	0	01:25	0.57	0.27	1.00
C87	CONDUIT	0.258	0	01:25	1.47	0.20	0.65

C88	CONDUIT	0.331	0	01:26	2.32	0.45	0.55
C89	CONDUIT	0.087	0	01:25	1.67	0.47	0.69
C9	CHANNEL	0.146	0	01:26	0.77	0.04	0.40
C90	CONDUIT	0.096	0	01:25	2.58	1.01	0.71
C91	CONDUIT	0.027	0	01:25	1.98	0.18	0.38
C92	CONDUIT	0.080	0	01:27	2.82	0.53	0.57
C93	CONDUIT	0.227	0	12:03	0.47	0.01	0.09
C94	CHANNEL	0.041	0	01:25	1.22	0.01	0.24
C95	CHANNEL	0.266	0	01:31	0.73	0.17	0.68
C96	CONDUIT	0.054	0	01:25	2.22	0.25	0.57
C97	CONDUIT	0.026	0	01:25	1.89	0.13	0.25
C98	CONDUIT	0.059	0	01:25	2.52	0.06	0.17
C99	CONDUIT	0.074	0	01:32	1.04	0.73	1.00
W1	CONDUIT	0.000	0	00:00	0.00	0.00	0.42
W15	CONDUIT	0.233	0	01:25	0.31	0.01	0.13
W27	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
W44	CHANNEL	0.228	0	01:27	1.08	0.11	0.42
W10	WEIR	0.000	0	00:00			0.00
W11	WEIR	0.000	0	00:00			0.00
W12	WEIR	0.037	0	01:35			0.03
W13	WEIR	0.000	0	00:00			0.00
W14	WEIR	0.000	0	00:00			0.00
W16	WEIR	0.000	0	00:00			0.00
W17	WEIR	0.000	0	00:00			0.00
W18	WEIR	0.000	0	00:00			0.00
W19	WEIR	0.217	0	01:25			0.08
W2	WEIR	0.005	0	01:26			0.01
W20	WEIR	0.000	0	00:00			0.00
W21	WEIR	0.000	0	00:00			0.00
W22	WEIR	0.400	0	01:38			0.43
W23	WEIR	0.032	0	01:25			0.02
W24	WEIR	0.000	0	00:00			0.00
W26	WEIR	0.031	0	01:25			0.02
W28	WEIR	0.000	0	00:00			0.00
W29	WEIR	0.000	0	00:00			0.00
W3	WEIR	0.021	0	01:25			0.04
W30	WEIR	0.000	0	00:00			0.00
W31	WEIR	0.183	0	01:25			0.05
W32	WEIR	0.000	0	00:00			0.00
W33	WEIR	0.647	0	03:25			0.12
W34	WEIR	0.000	0	00:00			0.00
W35	WEIR	0.229	0	01:32			0.04
W36	WEIR	0.000	0	00:00			0.00
W37	WEIR	0.111	0	01:25			0.05
W38	WEIR	0.156	0	01:25			0.07
W39	WEIR	0.000	0	00:00			0.00
W4	WEIR	0.121	0	01:25			0.07
W40	WEIR	0.000	0	00:00			0.00
W41	WEIR	0.206	0	01:30			0.63
W42	WEIR	0.363	0	01:26			0.15
W43	WEIR	0.000	0	00:00			0.00
W45	WEIR	0.000	0	00:00			0.00
W46	WEIR	0.347	0	01:31			0.55
W48	WEIR	0.054	0	01:25			0.03
W49	WEIR	0.000	0	00:00			0.00
W5	WEIR	0.043	0	01:25			0.04
W50	WEIR	0.000	0	00:00			0.00
W51	WEIR	0.000	0	00:00			0.00
W52	WEIR	0.000	0	00:00			0.00
W53	WEIR	0.000	0	00:00			0.00
W54	WEIR	0.000	0	00:00			0.00
W55	WEIR	0.100	0	01:25			0.06
W6	WEIR	0.000	0	00:00			0.00
W77	WEIR	0.000	0	00:00			0.00
W8	WEIR	0.000	0	00:00			0.00
W9	WEIR	0.204	0	01:26			0.08
OL1	DUMMY	0.075	0	01:27			
OL10	DUMMY	0.000	0	00:00			
OL11	DUMMY	0.050	0	01:26			
OL12	DUMMY	0.018	0	01:31			
OL13	DUMMY	0.081	0	01:26			
OL14	DUMMY	0.052	0	01:31			
OL15	DUMMY	0.070	0	01:25			
OL16	DUMMY	0.027	0	01:25			
OL17	DUMMY	0.084	0	01:25			
OL18	DUMMY	0.087	0	01:25			
OL19	DUMMY	0.096	0	01:25			
OL2	DUMMY	0.053	0	01:25			
OL20	DUMMY	0.037	0	01:25			
OL21	DUMMY	0.017	0	01:25			
OL22	DUMMY	0.027	0	01:25			
OL23	DUMMY	0.026	0	01:25			

OL24	DUMMY	0.053	0	01:25
OL25	DUMMY	0.021	0	01:26
OL26	DUMMY	0.018	0	01:26
OL27	DUMMY	0.074	0	01:32
OL28	DUMMY	0.059	0	01:25
OL29	DUMMY	0.107	0	01:25
OL3	DUMMY	0.053	0	01:25
OL30	DUMMY	0.239	0	01:25
OL31	DUMMY	0.000	0	00:00
OL32	DUMMY	0.145	0	01:27
OL33	DUMMY	0.026	0	01:29
OL34	DUMMY	0.030	0	01:26
OL35	DUMMY	0.244	0	01:26
OL36	DUMMY	0.097	0	01:25
OL37	DUMMY	0.021	0	01:25
OL38	DUMMY	0.069	0	01:26
OL4	DUMMY	0.030	0	01:25
OL5	DUMMY	0.042	0	01:25
OL6	DUMMY	0.006	0	01:25
OL7	DUMMY	0.029	0	01:36
OL8	DUMMY	0.019	0	01:25
OL9	DUMMY	0.043	0	01:25

****
Flow Classification Summary
****

	Adjusted	Fraction of Time in Flow Class								
Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.03	0.00	0.00	0.00	0.97	0.00	0.00	0.97	0.00
C1_1	1.00	0.30	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.70
C1_2	1.00	0.01	0.29	0.00	0.69	0.00	0.00	0.00	0.70	0.00
C10	1.00	0.03	0.00	0.00	0.95	0.03	0.00	0.00	0.79	0.00
C100	1.00	0.03	0.06	0.00	0.91	0.00	0.00	0.00	0.92	0.00
C101	1.00	0.03	0.51	0.00	0.39	0.07	0.00	0.00	0.97	0.00
C102	1.00	0.31	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.00
C103	1.00	0.03	0.00	0.00	0.70	0.27	0.00	0.00	0.00	0.32
C104	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.68	0.00
C105	1.00	0.03	0.00	0.00	0.07	0.00	0.00	0.90	0.00	0.91
C106	1.00	0.03	0.00	0.00	0.08	0.04	0.00	0.86	0.01	0.00
C107	1.00	0.03	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.97
C108	1.00	0.03	0.00	0.00	0.07	0.00	0.00	0.90	0.02	0.00
C109	1.00	0.03	0.00	0.00	0.63	0.34	0.00	0.00	0.00	0.76
C11	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.51
C110	1.00	0.03	0.00	0.00	0.10	0.02	0.00	0.85	0.06	0.00
C110_1	1.00	0.40	0.01	0.00	0.45	0.14	0.00	0.00	0.11	0.00
C111	1.00	0.03	0.00	0.00	0.04	0.01	0.00	0.92	0.00	0.00
C112	1.00	0.03	0.00	0.00	0.04	0.00	0.93	0.00	0.00	0.00
C113	1.00	0.03	0.00	0.00	0.04	0.00	0.00	0.93	0.00	0.00
C114	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C115	1.00	0.03	0.00	0.00	0.05	0.93	0.00	0.00	0.79	0.00
C116	1.00	0.03	0.04	0.00	0.79	0.15	0.00	0.00	0.83	0.00
C117	1.00	0.31	0.00	0.00	0.69	0.00	0.00	0.00	0.69	0.00
C118	1.00	0.33	0.59	0.00	0.08	0.00	0.00	0.00	0.94	0.00
C118_1	1.00	0.03	0.00	0.00	0.96	0.02	0.00	0.00	0.97	0.00
C118_2	1.00	0.03	0.01	0.00	0.39	0.58	0.00	0.00	0.05	0.00
C119	1.00	0.03	0.00	0.00	0.63	0.35	0.00	0.00	0.00	0.96
C12	1.00	0.03	0.00	0.00	0.23	0.74	0.00	0.00	0.06	0.00
C12_2	1.00	0.03	0.00	0.00	0.03	0.94	0.00	0.00	0.00	0.88
C120	1.00	0.03	0.01	0.00	0.97	0.00	0.00	0.00	0.97	0.00
C120_1	1.00	0.03	0.22	0.00	0.75	0.00	0.00	0.00	0.96	0.00
C120_2	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.96	0.00
C121	1.00	0.03	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C122	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
C123	1.00	0.03	0.28	0.00	0.69	0.00	0.00	0.00	0.70	0.00
C124	1.00	0.31	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.00
C125	1.00	0.31	0.00	0.00	0.69	0.00	0.00	0.00	0.70	0.00
C126	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.65	0.00
C127	1.00	0.03	0.39	0.00	0.44	0.15	0.00	0.00	0.97	0.00
C128	1.00	0.03	0.93	0.00	0.00	0.00	0.04	0.00	0.00	0.00
C129	1.00	0.41	0.57	0.00	0.01	0.01	0.00	0.00	0.94	0.00
C13	1.00	0.03	0.01	0.00	0.96	0.00	0.00	0.00	0.96	0.00
C130	1.00	0.03	0.00	0.00	0.03	0.95	0.00	0.00	0.00	0.23
C131	1.00	0.03	0.65	0.00	0.33	0.00	0.00	0.00	0.97	0.00
C132	1.00	0.06	0.24	0.00	0.00	0.69	0.00	0.00	0.00	0.00
C133	1.00	0.31	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.00
C134	1.00	0.03	0.28	0.00	0.69	0.00	0.00	0.00	0.69	0.00
C139	1.00	0.31	0.00	0.00	0.69	0.01	0.00	0.00	0.68	0.00

C65_1	1.00	0.03	0.90	0.00	0.07	0.00	0.00	0.00	0.90	0.00
C65_2	1.00	0.03	0.01	0.00	0.00	0.00	0.97	0.00	0.00	0.00
C66	1.00	0.03	0.03	0.00	0.11	0.83	0.00	0.00	0.92	0.00
C66_1	1.00	0.05	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.92
C67	1.00	0.98	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
C68	1.00	0.03	0.01	0.00	0.53	0.44	0.00	0.00	0.00	0.28
C69	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.03	0.00	0.00	0.69	0.28	0.00	0.00	0.69	0.00
C7_3	1.00	0.03	0.00	0.00	0.28	0.69	0.00	0.00	0.04	0.00
C7_4	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.96	0.00
C70	1.00	0.71	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00
C71	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.87
C72	1.00	0.03	0.01	0.00	0.01	0.96	0.00	0.00	0.97	0.00
C73	1.00	0.03	0.00	0.00	0.49	0.49	0.00	0.00	0.68	0.00
C74	1.00	0.03	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.97
C75	1.00	0.03	0.25	0.00	0.72	0.00	0.00	0.00	0.96	0.00
C76	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.96	0.00
C77	1.00	0.70	0.00	0.00	0.18	0.13	0.00	0.00	0.01	0.00
C77_1	1.00	0.03	0.00	0.00	0.12	0.00	0.00	0.85	0.00	0.72
C77_3	1.00	0.30	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C77_4	1.00	0.03	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C77_5	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.91	0.00
C78	1.00	0.12	0.19	0.00	0.69	0.00	0.00	0.00	0.70	0.00
C79	1.00	0.03	0.00	0.00	0.06	0.92	0.00	0.00	0.14	0.00
C8	1.00	0.03	0.00	0.00	0.96	0.01	0.00	0.00	0.00	0.96
C80	1.00	0.03	0.00	0.00	0.94	0.03	0.00	0.00	0.94	0.00
C80_1	1.00	0.04	0.04	0.00	0.92	0.00	0.00	0.00	0.87	0.00
C80_2	1.00	0.00	0.04	0.00	0.96	0.00	0.00	0.00	0.96	0.00
C81	1.00	0.06	0.00	0.00	0.07	0.00	0.87	0.00	0.00	0.00
C82	1.00	0.03	0.01	0.00	0.80	0.04	0.00	0.12	0.82	0.00
C83	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.89	0.00
C84	1.00	0.31	0.00	0.00	0.69	0.00	0.00	0.00	0.70	0.00
C85	1.00	0.03	0.54	0.00	0.44	0.00	0.00	0.00	0.84	0.00
C86	1.00	0.03	0.06	0.00	0.91	0.00	0.00	0.00	0.96	0.00
C87	1.00	0.03	0.00	0.00	0.88	0.09	0.00	0.00	0.97	0.00
C88	1.00	0.03	0.00	0.00	0.19	0.79	0.00	0.00	0.00	0.14
C89	1.00	0.03	0.09	0.00	0.84	0.04	0.00	0.00	0.85	0.00
C9	1.00	0.03	0.00	0.00	0.67	0.30	0.00	0.00	0.16	0.00
C90	1.00	0.03	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.00
C91	1.00	0.03	0.00	0.00	0.00	0.02	0.00	0.96	0.00	0.00
C92	1.00	0.03	0.00	0.00	0.78	0.20	0.00	0.00	0.81	0.00
C93	1.00	0.31	0.00	0.00	0.69	0.00	0.00	0.00	0.70	0.00
C94	1.00	0.03	0.00	0.00	0.70	0.27	0.00	0.00	0.03	0.00
C95	1.00	0.73	0.11	0.00	0.16	0.00	0.00	0.00	0.97	0.00
C96	1.00	0.03	0.00	0.00	0.00	0.03	0.00	0.94	0.00	0.00
C97	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
C98	1.00	0.03	0.00	0.00	0.63	0.34	0.00	0.00	0.25	0.00
C99	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.85	0.00
W1	1.00	0.03	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W15	1.00	0.48	0.25	0.00	0.23	0.04	0.00	0.00	0.16	0.00
W27	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W44	1.00	0.84	0.13	0.00	0.00	0.03	0.00	0.00	0.94	0.00

****
Conduit Surcharge Summary
****

	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C101	0.01	0.01	0.02	0.01	0.01
C103	0.01	0.02	0.01	0.01	0.01
C105	1.41	1.52	1.47	0.01	0.01
C106	1.48	1.48	1.53	0.01	0.01
C107	0.01	1.57	0.01	0.01	0.01
C108	0.41	0.41	1.45	0.01	0.12
C109	0.01	0.09	0.01	0.01	0.01
C110	0.65	0.65	1.50	0.01	0.01
C111	0.80	0.85	0.89	0.07	0.65
C112	0.66	0.66	0.67	0.66	0.01
C113	0.84	0.85	0.84	0.01	0.16
C115	0.85	0.92	0.85	0.01	0.26
C119	0.01	0.84	0.01	0.01	0.01
C122	0.04	0.04	0.32	0.33	0.04
C131	0.01	0.01	2.06	0.01	0.01
C19	0.01	0.15	0.01	0.01	0.01
C2_4	0.01	0.01	0.57	0.01	0.01
C2_9	0.01	0.57	0.01	0.01	0.01
C27	0.01	0.01	0.01	13.87	0.01

C29	0.01	0.53	0.01	0.01	0.01
C36_2	0.01	0.44	0.01	0.01	0.01
C37_2	0.25	0.26	0.44	0.01	0.01
C4	0.01	0.28	0.01	0.01	0.01
C64	0.01	11.64	0.01	10.74	0.01
C65_1	0.01	0.01	0.29	0.01	0.01
C65_2	0.01	0.01	0.29	0.01	0.01
C68	0.01	0.33	0.01	0.01	0.01
C71	0.01	0.68	0.01	0.01	0.01
C77_1	0.01	0.45	0.01	0.01	0.01
C8	0.02	0.02	0.15	0.01	0.01
C81	0.41	0.41	0.42	0.01	0.01
C82	0.01	0.01	0.81	0.01	0.01
C85	0.34	0.34	0.53	0.01	0.01
C86	0.06	0.06	0.72	0.01	0.01
C87	0.01	0.01	0.04	0.01	0.01
C88	0.01	0.04	0.01	0.01	0.01
C90	0.01	0.01	0.01	0.01	0.01
C99	0.58	0.58	0.80	0.01	0.01

Analysis begun on: Mon Nov 6 10:29:11 2023
Analysis ended on: Mon Nov 6 10:29:21 2023
Total elapsed time: 00:00:10

PROPOSED RAINFALL

INPUT FILES

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CMS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        YES
SKIP_STEADY_STATE    NO

START_DATE           06/03/2022
START_TIME           00:00:00
REPORT_START_DATE    06/03/2022
REPORT_START_TIME    00:00:00
END_DATE             06/04/2022
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:01:00
DRY_STEP             00:01:00
ROUTING_STEP         1
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              10

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
Huff_24h_100y_101.3mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_100y_101.3mm
Huff_24h_10y_67.6mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_10y_67.6mm
Huff_24h_25y_81.2mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_25y_81.2mm
Huff_24h_2y_40.5mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_2y_40.5mm
Huff_24h_50y_91.3mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_50y_91.3mm
Huff_24h_5y_56.8mm INTENSITY 0:05     1.0      TIMESERIES Huff_24h_5y_56.8mm
Sundre_4h_100y   INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_100y
Sundre_4h_10y    INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_10y
Sundre_4h_25y    INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_25y
Sundre_4h_2y     INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_2y
Sundre_4h_50y    INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_50y
Sundre_4h_5y     INTENSITY 0:05     1.0      TIMESERIES Sundre_4h_5y

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
S1               Sundre_4h_100y   J100             0.4143   52       37.664   4        0
S1_1             Sundre_4h_100y   SU46             0.0563   70       9.383    0.5      0
S1_2             Sundre_4h_100y   J49              104.202639 100    1132.637 6.09     0
S1_3             Sundre_4h_100y   J32              26.9617  100      512.957  5.831    0
S1_5             Sundre_4h_100y   J4               0.1027   70       10.27    0.5      0
S1_6             Sundre_4h_100y   SU31             0.0783   70       9.434    1        0
S1_7             Sundre_4h_100y   SU3              19.0603  100      596.367  5.389    0
S10              Sundre_4h_100y   SU29             1.1169   33       55.845   4.5      0
S103             Sundre_4h_100y   J142             20.1611  100      314.811  4.3      0
S105             Sundre_4h_100y   J158             40.6845  100      263.485  4.64     0
S11              Sundre_4h_100y   J116             0.3635   12       33.657   5        0
S111             Sundre_4h_100y   J142             12.2857  100      179.921  3.4      0
S112             Sundre_4h_100y   J101             15.1432  100      545.152  6.499    0
S117             Sundre_4h_100y   J150             29.6565  100      326.974  5.5      0
S12              Sundre_4h_100y   SU43             2.5307   20       127.813  7        0
S12_1            Sundre_4h_100y   J36              0.5337   22       40.128   6        0
```

S122	Sundre_4h_100y	J59	0.8907	24	65.589	5	0
S122_2	Sundre_4h_100y	SU21	0.7093	40	55.85	3.73	0
S122_3	Sundre_4h_100y	SU42	0.3359	60	15.77	3.5	0
S122_4	Sundre_4h_100y	J121	0.2679	10	20.93	3.5	0
S122_7	Sundre_4h_100y	J64	0.459	35	39.569	5	0
S127	Sundre_4h_100y	J466	17.3706	100	650.181	4.343	0
S129_1	Sundre_4h_100y	J462	22.0431	100	688.828	4.96	0
S13	Sundre_4h_100y	J46	18.501	100	270.088	3.7	0
S13_1	Sundre_4h_100y	SU18	0.4485	45	58.247	3.5	0
S13_2	Sundre_4h_100y	SU19	0.303	26.915	40.4	1.6	0
S130_4	Sundre_4h_100y	SU1	21.55	100	446.838	4.147	0
S134_1	Sundre_4h_100y	SU3	3.4404	100	255.228	4.47	0
S134_10	Sundre_4h_100y	J156	0.6367	100	69.814	4.7	0
S134_11	Sundre_4h_100y	J14	0.2774	68	39.07	1	0
S134_12	Sundre_4h_100y	J73	0.5975	30	37.344	2	0
S134_14	Sundre_4h_100y	SU6	0.2511	40	32.192	3.5	0
S134_15	Sundre_4h_100y	J11	0.4965	3	51.719	2.5	0
S134_16	Sundre_4h_100y	J72	1.2397	10	62.929	2.5	0
S134_3	Sundre_4h_100y	J86	0.3215	33	18.164	2.2	0
S134_4	Sundre_4h_100y	J124	0.248	42	31	4	0
S134_5	Sundre_4h_100y	SU14	0.5397	22	51.894	4.8	0
S134_6	Sundre_4h_100y	SU11	0.9513	37	44.662	4	0
S134_8	Sundre_4h_100y	J26	0.6623	20	63.076	4.47	0
S134_9	Sundre_4h_100y	SU7	0.2918	40	38.395	3.5	0
S135_1	Sundre_4h_100y	SU38	2.1457	16	99.8	6	0
S135_2	Sundre_4h_100y	J12	0.833	13	32.589	4	0
S135_3	Sundre_4h_100y	SU22	0.5244	25	48.556	4	0
S135_4	Sundre_4h_100y	SU24	1.2801	16.27	39.388	4.5	0
S136	Sundre_4h_100y	J150	20.206	100	630.425	7.026	0
S14	Sundre_4h_100y	SU20	0.6106	45	57.806	3.264	0
S141	Sundre_4h_100y	J475	34.7862	100	843.261	6.845	0
S145	Sundre_4h_100y	J172	18.6084	100	299.277	6.532	0
S147_2	Sundre_4h_100y	SU47	0.1574	70	9.425	1	0
S147_3	Sundre_4h_100y	J187	9.0146	100	693.997	5.431	0
S148	Sundre_4h_100y	J185	6.0977	100	228.903	7.532	0
S149	Sundre_4h_100y	J177	22.8161	100	429.845	6.636	0
S15	Sundre_4h_100y	J16	2.7816	100	111.711	4.5	0
S155	Sundre_4h_100y	J209	43.0668	100	499.684	5.24	0
S158	Sundre_4h_100y	J209	34.4039	100	500.066	4.257	0
S16	Sundre_4h_100y	SU39	0.9707	45	50.822	3.2	0
S16_2	Sundre_4h_100y	SU34	1.0012	40	57.211	2.5	0
S160_1	Sundre_4h_100y	J250	33.8979	100	1297.769	7.667	0
S160_3	Sundre_4h_100y	J34	3.3524	100	98.6	5.8	0
S162_2	Sundre_4h_100y	J207	2.2463	100	107.995	2.7	0
S17	Sundre_4h_100y	J105	33.2926	100	315.205	4	0
S179_2	Sundre_4h_100y	SU4	26.1151	100	363.214	6.6	0
S18	Sundre_4h_100y	J23	25.2713	100	311.991	4.4	0
S180	Sundre_4h_100y	J250	32.4692	100	444.232	5.85	0
S19	Sundre_4h_100y	J3	0.3719	28.218	15.079	5.389	0
S19_2	Sundre_4h_100y	J474	22.3794	100	245.119	3.9	0
S198_1	Sundre_4h_100y	J1	12.1265	100	183.457	3.8	0
S198_2	Sundre_4h_100y	J252	9.4032	100	191.122	2.7	0
S2	Sundre_4h_100y	J10	10.8441	100	162.337	4.5	0
S2_1	Sundre_4h_100y	J474	3.529	100	107.572	4.25	0
S20	Sundre_4h_100y	J25	2.1166	100	46.519	3.3	0
S20_2	Sundre_4h_100y	J47	1.9866	18.459	79.738	4.969	0
S206_2	Sundre_4h_100y	SU5	23.5551	100	228.69	6	0
S21	Sundre_4h_100y	J17	1.798	100	60.949	5.3	0
S215	Sundre_4h_100y	J486	21.7132	100	734.691	6.471	0
S217	Sundre_4h_100y	J286	15.008	100	285.467	10.1	0
S22	Sundre_4h_100y	SU45	0.3506	35	17.356	4	0
S225	Sundre_4h_100y	J286	15.2036	100	293.396	8.088	0
S23	Sundre_4h_100y	J95	0.7551	15	46.043	4	0
S24	Sundre_4h_100y	J41	12.3798	100	209.472	4.362	0
S24_1	Sundre_4h_100y	J43	9.6288	100	162.128	6.674	0
S25	Sundre_4h_100y	J231	30.1026	100	352.077	2.88	0
S26	Sundre_4h_100y	J292	57.8345	100	400.457	5.022	0
S27	Sundre_4h_100y	J495	33.0075	100	377.66	2	0
S28	Sundre_4h_100y	J21	8.6446	100	172.892	3.3	0
S3	Sundre_4h_100y	J286	28.2996	100	427.486	7	0
S3_2	Sundre_4h_100y	SU4	38.345	100	328.859	5.3	0
S4	Sundre_4h_100y	J472	7.8986	100	115.14	1.8	0
S5	Sundre_4h_100y	SU2	3.5597	100	225.387	5.934	0
S5_2	Sundre_4h_100y	J51	7.0535	100	133.085	5.855	0
S5_4	Sundre_4h_100y	J20	2.3885	100	85.609	4	0
S6	Sundre_4h_100y	SU25	0.5043	36	28.331	4.2	0
S7	Sundre_4h_100y	J15	7.1671	100	144.79	2.3	0
S7_1	Sundre_4h_100y	SU44	1.5812	30	93.012	4	0
S7_10	Sundre_4h_100y	J123	2.2864	35	109.923	4.5	0
S7_12	Sundre_4h_100y	SU15	2.6356	26	65.89	4.8	0
S7_15	Sundre_4h_100y	SU9	0.1232	70	7.605	1.2	0
S7_16	Sundre_4h_100y	SU40	0.142	30	24.483	4.5	0

S7_17	Sundre_4h_100y	J125	0.1039	30	22.587	5	0
S7_3	Sundre_4h_100y	SU40	1.0766	25	61.52	3.5	0
S7_4	Sundre_4h_100y	J60	1.4051	15	80.753	3.3	0
S7_7	Sundre_4h_100y	J22	1.9568	12	84.345	4.6	0
S7_8	Sundre_4h_100y	SU30	0.0875	15	13.889	6	0
S7_9	Sundre_4h_100y	J10	3.3166	21	134.821	1.14	0
S75	Sundre_4h_100y	J101	31.3666	100	348.518	4	0
S8	Sundre_4h_100y	SU5	6.7392	99.994	194.213	5	0
S9	Sundre_4h_100y	SU41	1.9638	20	94.413	2	0
S9_1	Sundre_4h_100y	SU13	3.3778	100	135.655	4.6	0
S9_2	Sundre_4h_100y	J19	0.7781	100	67.078	2	0
S9_5	Sundre_4h_100y	SU35	0.4655	25	17.904	3.322	0
S9_6	Sundre_4h_100y	SU38	0.7494	9	36.379	5.6	0

[SUBAREAS]

;;Subcatchment	N-Imperv	N-Perv	S-Imperv	S-Perv	PctZero	RouteTo	PctRouted
S1	0.013	0.15	1.6	3.2	0	OUTLET	
S1_1	0.013	0.15	1.6	3.2	0	OUTLET	
S1_2	0.013	0.15	1.6	3.2	0	OUTLET	
S1_3	0.013	0.15	1.6	3.2	0	OUTLET	
S1_5	0.013	0.15	1.6	3.2	0	OUTLET	
S1_6	0.013	0.15	1.6	3.2	0	OUTLET	
S1_7	0.013	0.15	1.6	3.2	0	OUTLET	
S10	0.013	0.15	1.6	3.2	0	OUTLET	
S103	0.013	0.15	1.6	3.2	0	OUTLET	
S105	0.013	0.15	1.6	3.2	0	OUTLET	
S11	0.013	0.15	1.6	3.2	0	OUTLET	
S111	0.013	0.15	1.6	3.2	0	OUTLET	
S112	0.013	0.15	1.6	3.2	0	OUTLET	
S117	0.013	0.15	1.6	3.2	0	OUTLET	
S12	0.013	0.15	1.6	3.2	0	OUTLET	
S12_1	0.013	0.15	1.6	3.2	0	OUTLET	
S122	0.013	0.15	1.6	3.2	0	OUTLET	
S122_2	0.013	0.15	1.6	3.2	0	OUTLET	
S122_3	0.013	0.15	1.6	3.2	0	OUTLET	
S122_4	0.013	0.15	1.6	3.2	0	OUTLET	
S122_7	0.013	0.15	1.6	3.2	0	OUTLET	
S127	0.013	0.15	1.6	3.2	0	OUTLET	
S129_1	0.013	0.15	1.6	3.2	0	OUTLET	
S13	0.013	0.15	1.6	3.2	0	OUTLET	
S13_1	0.013	0.15	1.6	3.2	0	OUTLET	
S13_2	0.013	0.15	1.6	3.2	0	OUTLET	
S130_4	0.013	0.15	1.6	3.2	0	OUTLET	
S134_1	0.013	0.15	1.6	3.2	0	OUTLET	
S134_10	0.013	0.15	1.6	3.2	0	OUTLET	
S134_11	0.013	0.15	1.6	3.2	0	OUTLET	
S134_12	0.013	0.15	1.6	3.2	0	OUTLET	
S134_14	0.013	0.15	1.6	3.2	0	OUTLET	
S134_15	0.013	0.15	1.6	3.2	0	OUTLET	
S134_16	0.013	0.15	1.6	3.2	0	OUTLET	
S134_3	0.013	0.15	1.6	3.2	0	OUTLET	
S134_4	0.013	0.15	1.6	3.2	0	OUTLET	
S134_5	0.013	0.15	1.6	3.2	0	OUTLET	
S134_6	0.013	0.15	1.6	3.2	0	OUTLET	
S134_8	0.013	0.15	1.6	3.2	0	OUTLET	
S134_9	0.013	0.15	1.6	3.2	0	OUTLET	
S135_1	0.013	0.15	1.6	3.2	0	OUTLET	
S135_2	0.013	0.15	1.6	3.2	0	OUTLET	
S135_3	0.013	0.15	1.6	3.2	0	OUTLET	
S135_4	0.013	0.15	1.6	3.2	0	OUTLET	
S136	0.013	0.15	1.6	3.2	0	OUTLET	
S14	0.013	0.15	1.6	3.2	0	OUTLET	
S141	0.013	0.15	1.6	3.2	0	OUTLET	
S145	0.013	0.15	1.6	3.2	0	OUTLET	
S147_2	0.013	0.15	1.6	3.2	0	OUTLET	
S147_3	0.013	0.15	1.6	3.2	0	OUTLET	
S148	0.013	0.15	1.6	3.2	0	OUTLET	
S149	0.013	0.15	1.6	3.2	0	OUTLET	
S15	0.013	0.15	1.6	3.2	0	OUTLET	
S155	0.013	0.15	1.6	3.2	0	OUTLET	
S158	0.013	0.15	1.6	3.2	0	OUTLET	
S16	0.013	0.15	1.6	3.2	0	OUTLET	
S16_2	0.013	0.15	1.6	3.2	0	OUTLET	
S160_1	0.013	0.15	1.6	3.2	0	OUTLET	
S160_3	0.013	0.15	1.6	3.2	0	OUTLET	
S162_2	0.013	0.15	1.6	3.2	0	OUTLET	
S17	0.013	0.15	1.6	3.2	0	OUTLET	
S179_2	0.013	0.15	1.6	3.2	0	OUTLET	
S18	0.013	0.15	1.6	3.2	0	OUTLET	
S180	0.013	0.15	1.6	3.2	0	OUTLET	
S19	0.013	0.15	1.6	3.2	0	OUTLET	

S19_2	0.013	0.15	1.6	3.2	0	OUTLET
S198_1	0.013	0.15	1.6	3.2	0	OUTLET
S198_2	0.013	0.15	1.6	3.2	0	OUTLET
S2	0.013	0.15	1.6	3.2	0	OUTLET
S2_1	0.013	0.15	1.6	3.2	0	OUTLET
S20	0.013	0.15	1.6	3.2	0	OUTLET
S20_2	0.013	0.15	1.6	3.2	0	OUTLET
S206_2	0.013	0.15	1.6	3.2	0	OUTLET
S21	0.013	0.15	1.6	3.2	0	OUTLET
S215	0.013	0.15	1.6	3.2	0	OUTLET
S217	0.013	0.15	1.6	3.2	0	OUTLET
S22	0.013	0.15	1.6	3.2	0	OUTLET
S225	0.013	0.15	1.6	3.2	0	OUTLET
S23	0.013	0.15	1.6	3.2	0	OUTLET
S24	0.013	0.15	1.6	3.2	0	OUTLET
S24_1	0.013	0.15	1.6	3.2	0	OUTLET
S25	0.013	0.15	1.6	3.2	0	OUTLET
S26	0.013	0.15	1.6	3.2	0	OUTLET
S27	0.013	0.15	1.6	3.2	0	OUTLET
S28	0.013	0.15	1.6	3.2	0	OUTLET
S3	0.013	0.15	1.6	3.2	0	OUTLET
S3_2	0.013	0.15	1.6	3.2	0	OUTLET
S4	0.013	0.15	1.6	3.2	0	OUTLET
S5	0.013	0.15	1.6	3.2	0	OUTLET
S5_2	0.013	0.15	1.6	3.2	0	OUTLET
S5_4	0.013	0.15	1.6	3.2	0	OUTLET
S6	0.013	0.15	1.6	3.2	0	OUTLET
S7	0.013	0.15	1.6	3.2	0	OUTLET
S7_1	0.013	0.15	1.6	3.2	0	OUTLET
S7_10	0.013	0.15	1.6	3.2	0	OUTLET
S7_12	0.013	0.15	1.6	3.2	0	OUTLET
S7_15	0.013	0.15	1.6	3.2	0	OUTLET
S7_16	0.013	0.15	1.6	3.2	0	OUTLET
S7_17	0.013	0.15	1.6	3.2	0	OUTLET
S7_3	0.013	0.15	1.6	3.2	0	OUTLET
S7_4	0.013	0.15	1.6	3.2	0	OUTLET
S7_7	0.013	0.15	1.6	3.2	0	OUTLET
S7_8	0.013	0.15	1.6	3.2	0	OUTLET
S7_9	0.013	0.15	1.6	3.2	0	OUTLET
S75	0.013	0.15	1.6	3.2	0	OUTLET
S8	0.013	0.15	1.6	3.2	0	OUTLET
S9	0.013	0.15	1.6	3.2	0	OUTLET
S9_1	0.013	0.15	1.6	3.2	0	OUTLET
S9_2	0.013	0.15	1.6	3.2	0	OUTLET
S9_5	0.013	0.15	1.6	3.2	0	OUTLET
S9_6	0.013	0.15	1.6	3.2	0	OUTLET

[INFILTRATION]

;;Subcatchment	Param1	Param2	Param3	Param4	Param5
S1	210	1.02	0.261	0	0
S1_1	210	1.02	0.261	0	0
S1_2	210	1.02	0.261	0	0
S1_3	210	1.02	0.261	0	0
S1_5	210	1.02	0.261	0	0
S1_6	210	1.02	0.261	0	0
S1_7	210	1.02	0.261	0	0
S10	210	1.02	0.261	0	0
S103	210	1.02	0.261	0	0
S105	210	1.02	0.261	0	0
S11	210	1.02	0.261	0	0
S111	210	1.02	0.261	0	0
S112	210	1.02	0.261	0	0
S117	210	1.02	0.261	0	0
S12	210	1.02	0.261	0	0
S12_1	210	1.02	0.261	0	0
S122	210	1.02	0.261	0	0
S122_2	210	1.02	0.261	0	0
S122_3	210	1.02	0.261	0	0
S122_4	210	1.02	0.261	0	0
S122_7	210	1.02	0.261	0	0
S127	210	1.02	0.261	0	0
S129_1	210	1.02	0.261	0	0
S13	210	1.02	0.261	0	0
S13_1	210	1.02	0.261	0	0
S13_2	210	1.02	0.261	0	0
S130_4	210	1.02	0.261	0	0
S134_1	210	1.02	0.261	0	0
S134_10	210	1.02	0.261	0	0
S134_11	210	1.02	0.261	0	0
S134_12	210	1.02	0.261	0	0
S134_14	210	1.02	0.261	0	0

```
S134_15          210        1.02       0.261      0          0
S134_16          210        1.02       0.261      0          0
S134_3           210        1.02       0.261      0          0
S134_4           210        1.02       0.261      0          0
S134_5           210        1.02       0.261      0          0
S134_6           210        1.02       0.261      0          0
S134_8           210        1.02       0.261      0          0
S134_9           210        1.02       0.261      0          0
S135_1           210        1.02       0.261      0          0
S135_2           210        1.02       0.261      0          0
S135_3           210        1.02       0.261      0          0
S135_4           210        1.02       0.261      0          0
S136             210        1.02       0.261      0          0
S14              210        1.02       0.261      0          0
S141             210        1.02       0.261      0          0
S145             210        1.02       0.261      0          0
S147_2           210        1.02       0.261      0          0
S147_3           210        1.02       0.261      0          0
S148             210        1.02       0.261      0          0
S149             210        1.02       0.261      0          0
S15              210        1.02       0.261      0          0
S155             210        1.02       0.261      0          0
S158             210        1.02       0.261      0          0
S16              210        1.02       0.261      0          0
S16_2            210        1.02       0.261      0          0
S160_1           210        1.02       0.261      0          0
S160_3           210        1.02       0.261      0          0
S162_2           210        1.02       0.261      0          0
S17              210        1.02       0.261      0          0
S179_2           210        1.02       0.261      0          0
S18              210        1.02       0.261      0          0
S180             210        1.02       0.261      0          0
S19              210        1.02       0.261      0          0
S19_2            210        1.02       0.261      0          0
S198_1           210        1.02       0.261      0          0
S198_2           210        1.02       0.261      0          0
S2               210        1.02       0.261      0          0
S2_1             210        1.02       0.261      0          0
S20              210        1.02       0.261      0          0
S20_2            210        1.02       0.261      0          0
S206_2           210        1.02       0.261      0          0
```

```
S21              210        1.02       0.261      0          0
S215             210        1.02       0.261      0          0
S217             210        1.02       0.261      0          0
S22              210        1.02       0.261      0          0
S225             210        1.02       0.261      0          0
S23              210        1.02       0.261      0          0
S24              210        1.02       0.261      0          0
S24_1            210        1.02       0.261      0          0
S25              210        1.02       0.261      0          0
S26              210        1.02       0.261      0          0
S27              210        1.02       0.261      0          0
S28              210        1.02       0.261      0          0
S3               210        1.02       0.261      0          0
S3_2             210        1.02       0.261      0          0
S4               210        1.02       0.261      0          0
S5               210        1.02       0.261      0          0
S5_2             210        1.02       0.261      0          0
S5_4             210        1.02       0.261      0          0
S6               210        1.02       0.261      0          0
S7               210        1.02       0.261      0          0
S7_1             210        1.02       0.261      0          0
S7_10            210        1.02       0.261      0          0
S7_12            210        1.02       0.261      0          0
S7_15            210        1.02       0.261      0          0
S7_16            210        1.02       0.261      0          0
S7_17            210        1.02       0.261      0          0
S7_3             210        1.02       0.261      0          0
S7_4             210        1.02       0.261      0          0
S7_7             210        1.02       0.261      0          0
S7_8             210        1.02       0.261      0          0
S7_9             210        1.02       0.261      0          0
S75              210        1.02       0.261      0          0
S8               210        1.02       0.261      0          0
S9               210        1.02       0.261      0          0
S9_1             210        1.02       0.261      0          0
S9_2             210        1.02       0.261      0          0
S9_5             210        1.02       0.261      0          0
S9_6             210        1.02       0.261      0          0

[LID_CONTROLS]
;;Name           Type/Layer Parameters
```

```
;;-------------- ---------- ----------
Rural            BC
Rural            SURFACE    27         0.1        0.5        0.5        5
Rural            SOIL       265        0.43       0.38       0.221      1.2        10.0       240
Rural            STORAGE    5          0.75       0.10       0          NO
Rural            DRAIN      0.28       0.1        2          6          0          0

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp    ToPerv     RptFile
DrainTo          FromPerv
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ---------- ------------------
------ ---------------- ----------
S1_2             Rural            1       1032026    1132.637   30         100        0          *
*                0
S1_3             Rural            1       264117     512.957    30         100        0          *
*                0
S1_7             Rural            1       183003     596.367    30         100        0          *
*                0
S103             Rural            1       198511     640.42     30         100        0          *
*                0
S105             Rural            1       406045     263.485    30         100        0          *
*                0
S111             Rural            1       121957     179.921    30         100        0          *
*                0
S112             Rural            1       150002     545.152    30         100        0          *
*                0
S117             Rural            1       289265     326.974    30         100        0          *
*                0
S127             Rural            1       172306     650.181    30         100        0          *
*                0
S129_1           Rural            1       218331     688.828    30         100        0          *
*                0
S13              Rural            1       179510     270.88     30         100        0          *
*                0
S130_4           Rural            1       172500     446.838    30         100        0          *
*                0
S134_1           Rural            1       29234      255.228    30         100        0          *
*                0
S134_10          Rural            1       6237       69.814     30         100        0          *
*                0
S136             Rural            1       200560     620.425    30         100        0          *
*                0
S141             Rural            1       344362     843.261    30         100        0          *
*                0
S145             Rural            1       184184     299.277    30         100        0          *
*                0
S147_3           Rural            1       90046      693.997    30         100        0          *
*                0
S148             Rural            1       60377      228.903    30         100        0          *
*                0
S149             Rural            1       227561     429.845    30         100        0          *
*                0
S15              Rural            1       27116      111.711    30         100        0          *
*                0
S155             Rural            1       427668     499.684    30         100        0          *
*                0
S158             Rural            1       340439     500.066    30         100        0          *
*                0
S160_1           Rural            1       335579     1297.769   30         100        0          *
*                0
S160_3           Rural            1       31854      98.6       30         100        0          *
*                0
S162_2           Rural            1       20883      107.995    30         100        0          *
*                0
S17              Rural            1       319926     315.205    30         100        0          *
*                0
S179_2           Rural            1       240151     363.214    30         100        0          *
*                0
S18              Rural            1       245213     311.991    30         100        0          *
*                0
S180             Rural            1       311692     444.232    30         100        0          *
*                0
S19_2            Rural            1       183594     245.063    30         100        0          *
*                0
S198_1           Rural            1       113965     183.457    30         100        0          *
*                0
S198_2           Rural            1       93132      191.122    30         100        0          *
*                0
S2               Rural            1       106241     162.337    30         100        0          *
*                0
S2_1             Rural            1       33190      37.281     30         100        0          *
*                0
S20              Rural            1       19066      46.519     30         100        0          *
*                0
S206_2           Rural            1       230851     229        30         100        0          *
*                0
S21              Rural            1       15380      60.949     30         100        0          *
*                0
```

```
S215             Rural           1       212732     734.691    30         100        0          *
*                0
S217             Rural           1       147080     285.467    30         100        0          *
*                0
S225             Rural           1       149331     293.965    30         100        0          *
*                0
S24              Rural           1       116398     209.472    30         100        0          *
*                0
S24_1            Rural           1       88588      162.128    30         100        0          *
*                0
S25              Rural           1       292026     352.077    30         100        0          *
*                0
S26              Rural           1       566645     400.457    30         100        0          *
*                0
S27              Rural           1       320075     377.66     30         100        0          *
*                0
S28              Rural           1       77786      0          0          0          0          *
*                0
S3               Rural           1       277260     427.486    30         100        0          *
*                0
S3_2             Rural           1       364450     328.859    30         100        0          *
*                0
S4               Rural           1       72686      115.14     30         100        0          *
*                0
S5               Rural           1       26697      225.387    30         100        0          *
*                0
S5_2             Rural           1       70385      109.451    30         100        0          *
*                0
S5_4             Rural           1       23585      37.063     30         100        0          *
*                0
S7               Rural           1       68771      144.79     30         100        0          *
*                0
S75              Rural           1       302666     348.518    30         100        0          *
*                0
S8               Rural           1       59292      194.213    30         100        0          *
*                0
S9_1             Rural           1       32428      135        30         100        0          *
*                0
S9_2             Rural           1       7611       67.078     30         100        0          *
*                0

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded

;;-------------- ---------- ---------- ---------- ---------- ----------
J1               1148.937   0.457      0          0          0
;assumed elev
J10              1164.72    1          0          0          0
J100             1178.521   0.6        0          0          0
J101             1178.524   1          0          0          0
J102             1177.348   0.305      0          0          0
J104             1172.355   2.1        0          0          0
J105             1196.458   1          0          0          0
J106             1173.087   1.475      0          0          100
;100% silt; assumed inv
J107             1173.586   1.512      0          0          0
;95% silt; assumed inv
J108             1173.798   1.3        0          0          100
J11              1184.656   0.592      0          0          0
J110             1173.501   1.3        0          0          100
J111             1177.337   1.8        0          0          0
J112             1177.219   1.8        0          0          0
J113             1184.572   0.315      0          0          0
J114             1184.7     0.395      0          0          0
J115             1172.287   1.3        0          0          0
;Rim assumed
J116             1185.822   1          0          0          100
J117             1173.9     1.8        0          0          10
J118             1180.923   1.8        0          0          0
J119             1178.53    1.8        0          0          0
J12              1178.8     0.3        0          0          0
J120             1173.404   1.8        0          0          10
J121             1177.298   0.17       0          0          0
J122             1182.052   0.3        0          0          0
J123             1178.1     1          0          0          0
J124             1182.411   0.788      0          0          0
J126             1173.6     1.8        0          0          10
J127             1148.233   0.462      0          0          0
J128             1123.953   2.367      0          0          0
J129             1123.985   2.23       0          0          0
J13              1180.489   0.634      0          0          0
;connection( no MH/CB)
J130             1176.598   0.6        0          0          0
J131             1173.8     1.8        0          0          0
J133             1179.034   1.8        0          0          0
```

J134	1173.8	1.5	0	0	0
J135	1172.8	1.5	0	0	10
J136	1176.8	1.8	0	0	0
J14	1183.315	0.191	0	0	0
J140	1159.053	2.614	0	0	0
J142	1190.424	1	0	0	0
J15	1186.015	0.73	0	0	100
J150	1163.656	1	0	0	0
J156	1187.653	1	0	0	0
J158	1153.012	1	0	0	0
;assumed elev					
J16	1188.1	1	0	0	0
J160	1146.351	1	0	0	0
J162	1119.968	1	0	0	0
J17	1176.6	1	0	0	0
J172	1162.249	1	0	0	0
J177	1156.189	1	0	0	0
J18	1171.07	1.5	0	0	0
J183	1122.976	1	0	0	0
J185	1151.527	1	0	0	0
J187	1166.603	1	0	0	0
J19	1198.5	1	0	0	0
J196	1166.679	1	0	0	0
J198	1128.805	1	0	0	0
J2	1185.848	0.315	0	0	0
J20	1184.9	0.3	0	0	0
J207	1164.64	1	0	0	0
J209	1143.656	1	0	0	0
J21	1168.3	2	0	0	0
J22	1168.263	2.232	0	0	0
J223	1178.4	1	0	0	0
J23	1184	1	0	0	0
J231	1137.344	0.908	0	0	0
J235	1152.838	1	0	0	0
J239	1140.201	2.228	0	0	0
J24	1169.319	0.592	0	0	0
J25	1180.5	1	0	0	0
J250	1165.251	1	0	0	0
J252	1141.475	1.997	0	0	0
J26	1178.68	1.43	0	0	0
J27	1177.758	0.506	0	0	0
J28	1185.357	1.936	0	0	0
J286	1157.576	3.997	0	0	0
J29	1186.291	0.615	0	0	0
J292	1193.885	1	0	0	0
J3	1186.493	0.807	0	0	0
J30	1137.534	0.901	0	0	0
J31	1173.3	2.098	0	0	0
J32	1149	1	0	0	0
;invert assumed					
J33	1176	1.956	0	0	0
;assumed elev					
J35	1168.7	1	0	0	0
J36	1183.654	0.6	0	0	100
J38	1168	2.3	0	0	0
J39	1181.751	1.8	0	0	0
J4	1173.767	0.595	0	0	0
J40	1170.981	0.655	0	0	0
J41	1171.229	0.424	0	0	0
J42	1169.534	0.464	0	0	0
J43	1169.784	0.41	0	0	0
J44	1164.089	1.238	0	0	0
;assumed elev					
J45	1191.601	1	0	0	0
J456	1132.154	1	0	0	0
J46	1169.2	1	0	0	0
J462	1163.796	1	0	0	0
J466	1145.106	1	0	0	0
J47	1169.574	1.342	0	0	10
J472	1139.584	1	0	0	0
J474	1161.796	1	0	0	0
J475	1139.849	1	0	0	0
J48	1176.134	1	0	0	0
J482	1158.868	2.799	0	0	0
J486	1151.577	1	0	0	0
J49	1160.189	1	0	0	0
J491	1125.459	1	0	0	0
J495	1144.926	1	0	0	0
J5	1169.46	0.3	0	0	0
J50	1169.537	1.379	0	0	10
J51	1182.651	0.466	0	0	0
J52	1172.663	1.244	0	0	0

```
J53              1180.812   1.3        0          0          0
J54              1173.024   1.018      0          0          0
J55              1172.814   1.272      0          0          0
J56              1167.997   0.419      0          0          0
J57              1170.285   0.497      0          0          0
J58              1179.652   1.335      0          0          0
J59              1177.99    0.362      0          0          0
J6               1180.113   1.3        0          0          0
J60              1183.032   0.3        0          0          0
J61              1181.157   1.2        0          0          0
J62              1170.7     1.87       0          0          0
J63              1179.841   2.35       0          0          0
J64              1179.105   0.3        0          0          0
J65              1177.853   0.998      0          0          0
J66              1176.751   1.7        0          0          0
J67              1173.932   1.581      0          0          0
J68              1173.045   1.23       0          0          0
J69              1170.285   0.497      0          0          0
J7               1177.184   0.459      0          0          0
J70              1183.272   0.245      0          0          0
J71              1182.513   0.833      0          0          0
J72              1185.554   0.061      0          0          0
J73              1175.345   0.708      0          0          0
J74              1173.704   1.1        0          0          0
J75              1173.074   1.45       0          0          0
J76              1173.266   1.5        0          0          0
J77              1173.61    1.2        0          0          20
J78              1173.623   1.2        0          0          0
J79              1173.991   1.1        0          0          0
J8               1175.746   1.318      0          0          0
;Pipe East
J80              1174.827   1.1        0          0          0
J81              1170.499   0.406      0          0          0
;Not found; assumed elev
J82              1174.746   1.2        0          0          0
J83              1177.103   1.45       0          0          0
J84              1177.985   1.45       0          0          0
J85              1178.13    1.15       0          0          10
J86              1184.505   0.011      0          0          0
J87              1171.909   1.65       0          0          0
J88              1173.2     1.5        0          0          0
J89              1172.803   1.35       0          0          100
J9               1171.417   0.451      0          0          0
J90              1173.248   1.1        0          0          0
J91              1172.373   1.2        0          0          10
J92              1173.806   1.55       0          0          0
J93              1172.087   1.2        0          0          10
J94              1169.156   0.69       0          0          0
J95              1172.863   0.996      0          0          100
J96              1171.711   2.125      0          0          0
J97              1171.166   2.5        0          0          100
;Outlet not found (estimated)
J98              1170.189   0.45       0          0          0
;has an unknown pipe coming in from school
J99              1172.689   1.175      0          0          100

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
J109             1158.619   FREE                        NO
J488             1119.969   FREE                        NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape       Curve Name/Params            SurDepth Fevap    Psi
Ksat     IMD
;;-------------- -------- ---------- ---------- ----------- ---------------------------- -------- -------- --------
-------- --------
J103             1173.087 0.3        0          TABULAR     Basic.CB                     0        0
J125             1177.008 0.635      0          TABULAR     Driveway                     0        0
J34              1176.266 2.033      0          TABULAR     J34                          0        0
J37              1183.251 0.3        0          TABULAR     Basic.CB                     0        0
SU1              1167.379 1.835      0.4        TABULAR     SU1                          0        0
SU10             1178.001 0.85       0          TABULAR     Basic.CB                     0        0
SU11             1174.51  0.3        0          TABULAR     Basic.CB                     0        0
SU12             1174.466 0.3        0          TABULAR     Basic.CB                     0        0
SU13             1186.431 0.869      0          TABULAR     SU13                         0        0
SU14             1178.98  0.3        0          TABULAR     Basic.CB                     0        0
SU15             1179.135 0.3        0          TABULAR     Basic.CB                     0        0
SU16             1178.253 0.3        0          TABULAR     Basic.CB                     0        0
SU17             1180.687 0.726      0          TABULAR     Basic.CB                     0        0
SU18             1175.627 0.3        0          TABULAR     Basic.CB                     0        0
SU19             1174.504 0.319      0          TABULAR     Basic.CB                     0        0
```

```
;assumed invert
SU2              1166.987 2.227      0.5        TABULAR     SU2                       0        0
SU20             1174.791 0.3        0          TABULAR     Basic.CB                  0        0
SU21             1173.742 0.344      0          TABULAR     Basic.CB                  0        0
SU22             1174.048 0.3        0          TABULAR     Basic.CB                  0        0
SU23             1173.553 0.6        0          TABULAR     Basic.CB                  0        0
SU24             1175.056 0.3        0          TABULAR     Basic.CB                  0        0
SU25             1172.987 0.3        0          TABULAR     SU25                      0        0
SU26             1173.273 0.3        0          TABULAR     Basic.CB                  0        0
SU27             1173.259 0.6        0          TABULAR     Basic.CB                  0        0
SU28             1170.616 0.3        0          TABULAR     Basic.CB                  0        0
SU29             1173.364 0.5        0          TABULAR     Basic.CB                  0        0
SU3              1166.542 2.117      0.258      TABULAR     SU3                       0        0
SU30             1173.236 0.628      0          TABULAR     Basic.CB                  0        0
SU31             1173.066 0.6        0          TABULAR     Basic.CB                  0        0
SU32             1174.155 0.3        0          TABULAR     Basic.CB                  0        0
SU33             1174.262 0.3        0          TABULAR     Basic.CB                  0        0
SU34             1181.812 0.545      0          TABULAR     Basic.CB                  0        0
SU35             1180.534 0.3        0          TABULAR     Basic.CB                  0        0
SU36             1174.201 0.6        0          TABULAR     Basic.CB                  0        0
SU37             1175.4   0.3        0          TABULAR     Basic.CB                  0        0
SU38             1186.693 0.6        0          TABULAR     Basic.CB                  0        0
SU39             1181.113 0.3        0          TABULAR     Basic.CB                  0        0
SU4              1163.018 1.7        0.2        TABULAR     SU4                       0        0
SU40             1174.498 0.6        0          TABULAR     Basic.CB                  0        0
SU41             1186.606 0.3        0          TABULAR     Basic.CB                  0        0
SU42             1173.607 0.3        0          TABULAR     Basic.CB                  0        0
SU43             1175.6   0.5        0          TABULAR     Basic.CB                  0        0
SU44             1178.837 0.3        0          TABULAR     Basic.CB                  0        0
SU45             1175.3   0.3        0          TABULAR     Basic.CB                  0        0
SU46             1172.27  1.017      0          TABULAR     Basic.CB                  0        0
SU47             1174     0.3        0          TABULAR     Basic.CB                  0        0
SU5              1161.116 1.639      0.3        TABULAR     SU5                       0        0
SU6              1175.213 0.3        0          TABULAR     Basic.CB                  0        0
SU7              1173.975 0.3        0          TABULAR     Basic.CB                  0        0
SU8              1174.904 0.3        0          TABULAR     Basic.CB                  0        0
SU9              1178.719 0.3        0          TABULAR     Basic.CB                  0        0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ---------
-
```

```
C1               J130             J82              49.502     0.011      0          0          0          0
C1_1             J1               J127             16.049     0.024      0          0          0          0
C1_2             J127             J252             71.532     0.05       0          0          0          0
C10              J14              J70              16.553     0.013      0          0          0          0
C100             J17              J22              241.996    0.035      0          0          0          0
;??
C101             J91              J87              5.3        0.011      0          0          0          0
C102             J177             J185             264.927    0.05       0          0          0          0
C103             J62              J94              43.563     0.024      0          0          0          0
C104             J187             J250             672.289    0.05       0          0          0          0
C105             J95              J96              5.522      0.011      0          0.175      0          0
C106             J96              J97              15.002     0.011      0          0.15       0          0
;Outlet not found
C107             J97              J98              47.4       0.011      0          0          0          0
C108             J99              J96              21.303     0.011      0          0.425      0          0
C109             J100             J102             14.636     0.024      0          0          0          0
C11              J11              J124             92.504     0.024      0          0.193      0          0
C110             J104             J97              103.167    0.011      0          0.175      0          0
C110_1           J102             SU29             62.902     0.035      0          0          0          0
C111             J118             J119             30.786     0.011      0          0          0          0
C111_1           J106             J135             11.504     0.011      0          0          0          0
C111_2           J135             J104             3.403      0.011      0          0.05       0          0
C112             J110             J106             3.634      0.013      0          0.425      0          0
C113             J107             J88              4.453      0.011      0          0          0          0
C114             J196             J187             157.595    0.05       0          0          0          0
;Assumed
C115             J108             J107             4.561      0.011      0          0          0          0
C116             SU44             SU9              14.685     0.013      0.1        0.1        0          0
C117             J172             J177             299.497    0.05       0          0          0          0
C118_1           SU9              J7               23.387     0.013      0.1        0          0          0
C118_2           J7               SU40             51.475     0.013      0.088      0          0          0
C119             J28              J114             14.377     0.011      0          0          0          0
C12              SU8              SU40             125.583    0.013      0.1        0          0          0
;used Culvert Code 1 (headwall but CSP?)
C12_2            J124             J13              37.873     0.024      0          0          0          0
C120             J113             J123             176.938    0.035      0          0          0          0
C120_1           J114             J123             215.9      0.035      0          0          0          0
C120_2           J123             J95              202.558    0.035      0          0          0          0
C121             J112             J136             13.52      0.011      0          0          0          0
C122             J120             J31              5.049      0.011      0          0          0          0
C123             J33              SU43             125.687    0.035      0          0          0          0
```

C124	J150	J172	140.69	0.05	0	0	0	0
C125	J19	SU13	260.378	0.05	0	0	0	0
C126	SU3	J196	246.582	0.05	0.258	0	0	0
C127	J60	J122	13.714	0.013	0	0	0	0
C128	SU10	J59	67.628	0.013	0.1	0	0	0
C129	SU41	J60	99.163	0.013	0.1	0	0	0
C13	J57	SU3	186	0.05	0	0.258	0	0
;NOT FOUND								
C130	J21	J38	32.561	0.024	0	0	0	0
C131	SU32	J196	167.679	0.05	0	0	0	0
C132	J20	SU39	187.017	0.013	0	0	0	0
C133	J23	J235	767.672	0.05	0	0	0	0
C134	J46	J21	188.055	0.05	0	0	0	0
C135	J131	J88	17.499	0.011	0	0	0	0
C135_1	J88	J106	14.312	0.011	0	0	0	0
C136	J133	J119	5.217	0.011	0	0	0	0
C137	SU35	SU37	67.329	0.013	0.1	0	0	0
C138	J117	J126	11.203	0.011	0	0	0	0
C139	J209	J475	108.169	0.05	0	0	0	0
C14	J482	J109	396.635	0.05	0	0	0	0
C140	J119	J126	75.813	0.011	0	0.2	0	0
C141	J37	SU43	107.861	0.013	0.1	0	0	0
C143	J111	J112	13.457	0.011	0	0	0	0
C144_1	J97	J18	59.654	0.011	0	0	0	0
C144_2	J18	J62	14.981	0.011	0	0	0	0
C15	J69	SU3	135	0.05	0	0.258	0	0
C16	J140	J482	8	0.01	0	0	0	0
C165	J160	J466	69.401	0.05	0	0	0	0
C17	J48	J49	634.103	0.05	0	0	0	0
C173	J101	J150	555.476	0.05	0	0	0	0
C18	J81	SU3	33	0.05	0	0.258	0	0
C188_1	J156	J11	150.433	0.035	0	0	0	0
C19	J55	J57	67.574	0.024	0	0	0	0
C19_1	J474	J49	517.134	0.05	0	0	0	0
C19_2	J49	J140	155.572	0.05	0	0	0	0
C19_3	J22	J56	24.994	0.024	0	0	0	0
C19_4	J56	SU1	65	0.05	0	0.4	0	0
C192	J235	J456	1044.571	0.05	0	0	0	0
C194	J158	J160	294.504	0.05	0	0	0	0
C196	J292	SU5	561.378	0.05	0	0	0	0
C2	J39	J118	9.741	0.011	0	0	0	0
C2_1	J13	J26	48.347	0.035	0	0	0	0
C2_2	J2	J113	60.105	0.035	0	0	0	0
C2_3	J26	J27	19.672	0.024	0	0	0	0
C2_4	J73	J75	43.085	0.024	0	0	0	0
C2_6	J27	J73	63.357	0.035	0	0	0	0
C2_9	J75	J9	48.987	0.011	0	0	0	0
C20	J5	SU3	28	0.05	0	0.258	0	0
C200	J142	J156	151.635	0.05	0	0	0	0
C21	J462	J474	482.484	0.05	0	0	0	0
C214	J105	J101	526.438	0.05	0	0	0	0
C22	SU12	SU7	72.384	0.013	0	0	0	0
C23	J94	SU3	52	0.05	0	0.258	0	0
C24	J50	J24	24.258	0.024	0	0	0	0
C25	J51	J6	41.049	0.024	0	0	0	0
C25_2	J25	J47	261.115	0.035	0	0	0	0
C25_3	J47	J50	4.547	0.024	0	0	0	0
;assumed								
C26	J34	J33	16.339	0.024	0	0	0	0
C27	J162	J488	48.434	0.05	0	0	0	0
;height is actually 0.02m								
C28	J36	J37	9.711	0.013	0	0	0	0
C28_1	J15	J116	23.822	0.024	0	0	0	0
C28_4	J116	J36	59.117	0.035	0	0	0	0
C29	J29	J113	16.769	0.011	0	0	0	0
C3	J3	J2	19.883	0.024	0	0	0	0
C30	J30	J231	20.061	0.024	0	0	0	0
C31	J183	J162	380.453	0.05	0	0	0	0
C32	J32	J30	385.691	0.05	0	0	0	0
C33	J98	J196	115.927	0.05	0	0	0	0
C33_1	J491	J128	103.289	0.05	0	0	0	0
C33_3	J128	J129	21.594	0.024	0	0	0	0
C33_4	J129	J183	211.201	0.05	0	0	0	0
C34	J31	J35	60.807	0.024	0	0	0	0
C35	J198	J491	304.252	0.05	0	0	0	0
C36	SU7	SU21	39.702	0.013	0	0	0	0
C37	SU16	SU20	87.124	0.013	0	0	0	0
C38	J456	J198	306.461	0.05	0	0	0	0
C39	J134	J126	9.297	0.011	0	0	0	0
C4	J4	J5	46.564	0.011	0	0	0	0
C40	J231	J456	396.767	0.05	0	0	0	0
C41	J472	J231	278.342	0.05	0	0	0	0

C42	J239	J472	68.29	0.05	0	0	0	0
C43	J252	J239	39.313	0.024	0	0	0	0
C44	J126	J31	34.804	0.024	0	0	0	0
C45	J495	J252	331.679	0.05	0	0	0	0
C46	J41	J40	13.995	0.024	0	0	0	0
C47	J43	J42	14.387	0.024	0	0	0	0
C48	J24	SU2	82	0.05	0	0.5	0	0
C49	SU2	SU3	60	0.05	0.5	0.258	0	0
C5	SU21	SU42	23.195	0.013	0	0	0	0
C50	J12	SU22	86.308	0.013	0	0	0	0
C51	J486	J495	591.594	0.05	0	0	0	0
C52	J16	J72	128.816	0.035	0	0	0	0
C53	J286	J495	872.88	0.05	0	0	0	0
C54	J45	J43	564.725	0.05	0	0	0	0
C55	J35	J187	89.424	0.05	0	0	0	0
C56	J9	SU3	70	0.05	0	0.258	0	0
C57	J40	SU1	122	0.05	0	0.4	0	0
;assumed size, assumed above water level								
C58	SU1	SU2	26.631	0.024	0.4	0.5	0	0
C59	J42	SU2	82	0.05	0	0.5	0	0
C6	J6	J58	16.473	0.024	0	0	0	0
C60	J52	J47	70.732	0.011	0	0.224	0	0
C61	J54	J52	20.926	0.024	0	0	0	0
C62	SU22	SU23	16.692	0.013	0	0	0	0
C63	J136	J88	72.807	0.011	0	0	0	0
C64	SU5	J286	20	0.024	0	3.349	0	0
C65	J87	J62	14.796	0.011	0	0	0	0
C65_1	J61	J53	10.981	0.024	0	0	0	0
;Backsloped??								
C65_2	J53	J63	2.339	0.024	0	1.25	0	0
C66	SU37	SU8	45.882	0.013	0	0.1	0	0
;assumed size, inlet								
C66_1	SU4	SU5	35	0.024	0.2	1	0	0
C67	SU24	SU26	37.136	0.013	0.1	0	0	0
C68	J63	J64	43.972	0.011	0	0	0	0
C69	SU26	SU27	12.935	0.013	0.1	0	0	0
C7	J59	J121	16.791	0.013	0	0	0	0
C7_3	J58	J121	86.292	0.035	0	0	0	0
C7_4	J121	J8	31.39	0.035	0	0	0	0
C70	SU11	SU19	70.974	0.013	0	0	0	0
C71	J65	J66	13.566	0.011	0	0.65	0	0
C72	J66	J67	78.453	0.011	0	0	0	0
C73	J67	J68	34.731	0.013	0	0	0	0
C74	J68	J69	59.547	0.011	0	0	0	0
C75	J64	J65	36.909	0.035	0	0	0	0
C76	J70	J71	55.847	0.035	0	0	0	0
C77	SU42	SU28	72.89	0.013	0	0	0	0
C77_1	J71	J124	7	0.024	0	0	0	0
C77_3	J223	J41	378.637	0.05	0	0	0	0
C77_4	J22	J10	389.979	0.035	0.637	0	0	0
C77_5	J10	J462	214.317	0.05	0	0	0	0
C78	J475	J491	853.843	0.05	0	0	0	0
C79	J72	J70	76.071	0.013	0	0	0	0
C8	J8	J55	90.095	0.013	0	0	0	0
C80	J38	J44	52.358	0.05	0	0	0	0
C80_1	J207	J44	192.905	0.05	0	0	0	0
C80_2	J44	SU4	374.902	0.05	0	0	0	0
C81	J76	J75	2.381	0.013	0	0.2	0	0
C82	J77	J75	16.478	0.013	0	0.05	0	0
C83	J250	J207	150.291	0.05	0	0	0	0
C84	J466	J475	235.894	0.05	0	0	0	0
C85	J74	J78	2.08	0.011	0	0	0	0
C86	J79	J78	19.696	0.011	0	0	0	0
C87	J82	J78	36.913	0.011	0	0	0	0
C88	J78	J81	65.092	0.024	0	0	0	0
;Outlet??								
C89	J80	J82	3.05	0.011	0	0	0	0
C9	J122	SU44	78.595	0.01	0	0.1	0	0
C90	J83	J130	27.533	0.011	0	0	0	0
C91	J84	J83	16.752	0.011	0	0.1	0	0
C92	J85	J130	32.589	0.011	0	0	0	0
C93	J185	J466	328.193	0.05	0	0	0	0
;Street								
C94	J86	SU14	108.453	0.013	0	0	0	0
C95	J115	J93	12.87	0.011	0	0	0	0
C95_1	SU30	J103	34.737	0.013	0	0.1	0	0
C95_2	J103	SU25	15.555	0.013	0.1	0	0	0
C96	J89	J87	17.509	0.011	0	0.3	0	0
C97	J90	J91	20.494	0.011	0	0.2	0	0
C98	J92	J91	36.776	0.011	0	0	0	0
C99	J93	J87	22.62	0.011	0	0	0	0
W1	J26	J65	92.449	0.035	0.7	0	0	0

```
W15              SU15             SU16             24.798     0.013      0.2        0          0          0
W27              SU13             J3               12.196     0.035      0.569      0.507      0          0
W44              SU36             SU30             110.463    0.011      0.1        0          0          0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff
Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- -------- ----------
---------- ---------- ---------- ----------------
C118             SU46             J94              TRANSVERSE   0.15       1.85       YES      0        0
YES
C142             SU43             SU8              TRANSVERSE   0.2        1.85       YES      0        0
YES
W10              J55              SU21             TRANSVERSE   0.972      1.85       YES      0        0
YES
W11              SU11             SU12             TRANSVERSE   0.1        1.85       NO       0        0
YES
W12              J73              SU12             TRANSVERSE   0.408      1.85       NO       0        0
YES
W13              J84              SU15             TRANSVERSE   1.15       1.85       YES      0        0
YES
W14              J83              SU16             TRANSVERSE   1.15       1.85       YES      0        0
YES
W16              J79              SU20             TRANSVERSE   0.8        1.85       YES      0        0
YES
W17              J74              SU19             TRANSVERSE   0.8        1.85       YES      0        0
YES
W18              J78              SU19             TRANSVERSE   0.9        1.85       YES      0        0
YES
W19              SU20             J4               TRANSVERSE   0.1        1.85       NO       0        0
YES
W2               J7               J125             TRANSVERSE   0.159      1.85       YES      0        0
YES
W20              J21              J38              TRANSVERSE   1.7        1.85       NO       0        0
YES
W21              J28              SU38             TRANSVERSE   1.336      1.85       YES      0        0
YES
W22              J29              SU41             TRANSVERSE   0.315      1.85       YES      0        0
YES
W23              J100             J102             TRANSVERSE   0.3        1.85       NO       0        0
YES
W24              J71              J124             TRANSVERSE   0.6        1.85       NO       0        0
YES

W25              J120             SU8              TRANSVERSE   0.354      1.85       YES      0        0
YES
W26              SU23             SU27             TRANSVERSE   0.1        1.85       NO       0        0
YES
W28              J97              SU31             TRANSVERSE   1.9        1.85       YES      0        0
YES
W29              SU31             J98              TRANSVERSE   0.3        1.85       NO       0        0
YES
W3               J125             SU40             TRANSVERSE   0.088      1.85       YES      0        0
YES
W30              J87              SU27             TRANSVERSE   1.35       1.85       YES      0        0
YES
W31              J4               J5               TRANSVERSE   0.295      1.85       NO       0        0
YES
W32              J15              J116             TRANSVERSE   0.43       1.85       NO       0        0
YES
W33              SU4              SU5              TRANSVERSE   0.268      1.85       NO       0        0
YES
W34              J95              SU30             TRANSVERSE   0.696      1.85       YES      0        0
YES
W35              SU25             SU46             TRANSVERSE   0.179      1.85       NO       0        0
YES
W36              SU5              J286             TRANSVERSE   1.339      1.85       NO       0        0
YES
W37              SU38             J114             TRANSVERSE   0.15       1.85       NO       0        0
YES
W38              SU29             SU30             TRANSVERSE   0.3        1.85       NO       0        0
YES
;Overtop curb
W39              SU28             J47              TRANSVERSE   0.1        1.85       YES      0        0
YES
W4               SU39             SU17             TRANSVERSE   0.1        1.85       NO       0        0
YES
W40              SU47             SU32             TRANSVERSE   0.15       1.85       YES      0        0
YES
W41              J110             SU36             TRANSVERSE   0.7        1.85       YES      0        0
YES
W42              SU40             SU36             TRANSVERSE   0.1        1.85       NO       0        0
YES
W43              J106             SU33             TRANSVERSE   1.175      1.85       YES      0        0
YES
W45              J107             SU40             TRANSVERSE   1.088      1.85       YES      0        0
YES
```

W46	J108	SU40	TRANSVERSE	0.7	1.85	YES	0	0
YES								
W47	J112	SU9	TRANSVERSE	1.5	1.85	YES	0	0
YES								
W48	J135	SU47	TRANSVERSE	1.2	1.85	YES	0	0
YES								
W49	J36	J37	TRANSVERSE	0.3	1.85	NO	0	0
YES								
W5	SU6	SU7	TRANSVERSE	0.1	1.85	NO	0	0
YES								
W50	J111	SU44	TRANSVERSE	1.5	1.85	YES	0	0
YES								
W51	SU36	SU47	TRANSVERSE	0.2	1.85	NO	0	0
YES								
W52	SU36	SU33	TRANSVERSE	0.2	1.85	NO	0	0
YES								
W53	SU30	SU31	TRANSVERSE	0.139	1.85	NO	0	0
YES								
W54	J96	SU30	TRANSVERSE	1.525	1.85	YES	0	0
YES								
W55	SU17	J121	TRANSVERSE	0	1.85	NO	0	0
YES								
W57	J115	J103	TRANSVERSE	0.8	1.85	YES	0	0
YES								
W6	SU1	SU2	TRANSVERSE	1.535	1.85	NO	0	0
YES								
W7	J68	SU7	TRANSVERSE	0.93	1.85	NO	0	0
YES								
W77	SU27	J94	TRANSVERSE	0.1	1.85	YES	0	0
YES								
W8	J65	SU10	TRANSVERSE	0.448	1.85	NO	0	0
YES								
W9	SU40	SU47	TRANSVERSE	0.122	1.85	NO	0	0
YES								

[OUTLETS]

;;Name	From Node	To Node	Offset	Type	QTable/Qcoeff	Qexpon	Gated
OL1	SU28	J50	0	TABULAR/DEPTH	Cinlet		NO
OL10	SU34	J61	0.245	TABULAR/DEPTH	Cinlet		NO
OL11	SU34	J63	0.079	TABULAR/DEPTH	GratedTopMH		NO
OL12	SU10	J66	0	TABULAR/DEPTH	GratedTopMH		NO
OL13	SU14	J85	0	TABULAR/DEPTH	Cinlet		NO
OL14	SU30	J96	0	TABULAR/DEPTH	GratedTopMH		NO
OL15	SU16	J83	0	TABULAR/DEPTH	Cinlet		NO
OL16	SU15	J84	0	TABULAR/DEPTH	TwinK2inlet		NO
OL17	SU29	J99	0	TABULAR/DEPTH	K3inlet		NO
OL18	SU18	J80	0	TABULAR/DEPTH	Cinlet		NO
OL19	SU11	J77	0	TABULAR/DEPTH	Cinlet		NO
OL2	SU42	J52	0	TABULAR/DEPTH	Cinlet		NO
OL20	SU19	J74	0	TABULAR/DEPTH	Cinlet		NO
OL21	SU19	J78	0	TABULAR/DEPTH	GratedTopMH		NO
OL22	SU20	J79	0	TABULAR/DEPTH	TwinCinlet		NO
OL23	SU22	J90	0	TABULAR/DEPTH	GratedTopMH		NO
OL24	SU23	J89	0	TABULAR/DEPTH	K3inlet		NO
OL25	SU27	J87	0	TABULAR/DEPTH	GratedTopMH		NO
OL26	SU26	J91	0	TABULAR/DEPTH	Cinlet		NO
OL27	SU25	J93	0	TABULAR/DEPTH	GratedTopMH		NO
OL28	SU24	J92	0	TABULAR/DEPTH	GratedTopMH		NO
OL29	SU38	J28	0	TABULAR/DEPTH	TwinK2inlet		NO
OL3	SU21	J54	0	TABULAR/DEPTH	K3inlet		NO
OL30	SU41	J29	0	TABULAR/DEPTH	TwinK2inlet		NO
OL31	SU33	J106	0	TABULAR/DEPTH	GratedTopMH		NO
OL32	SU36	J110	0	TABULAR/DEPTH	Cinlet		NO
OL33	SU32	J104	0	TABULAR/DEPTH	K3inlet		NO
OL34	SU40	J107	0.088	TABULAR/DEPTH	GratedTopMH		NO
OL35	SU40	J108	0	TABULAR/DEPTH	TwinK2inlet		NO
OL36	SU37	J117	0	TABULAR/DEPTH	TwinK2inlet		NO
OL37	SU17	J58	0	TABULAR/DEPTH	Cinlet		NO
OL38	SU34	J53	0	TABULAR/DEPTH	GratedTopMH		NO
OL39	SU8	J120	0	TABULAR/DEPTH	TwinCinlet		NO
OL4	SU21	J55	0.041	TABULAR/DEPTH	Cinlet		NO
OL40	SU9	J112	0	TABULAR/DEPTH	TwinK2inlet		NO
OL41	SU44	J111	0	TABULAR/DEPTH	Cinlet		NO
OL42	J103	J115	0	TABULAR/DEPTH	TwinCinlet		NO
OL43	SU35	J133	0	TABULAR/DEPTH	Cinlet		NO
OL44	J37	J39	0	TABULAR/DEPTH	Cinlet		NO
OL45	SU43	J134	0	TABULAR/DEPTH	TwinK2inlet		NO
OL46	SU45	J131	0	TABULAR/DEPTH	Cinlet		NO
OL47	SU46	J18	0	TABULAR/DEPTH	Cinlet		NO
OL48	SU47	J135	0	TABULAR/DEPTH	K2inlet		NO
OL5	SU7	J68	0	TABULAR/DEPTH	K3inlet		NO
OL6	SU6	J67	0	TABULAR/DEPTH	GratedTopMH		NO
OL7	SU12	J76	0	TABULAR/DEPTH	Cinlet		NO

OL8	SU31	J97	0	TABULAR/DEPTH	K3inlet	NO
OL9	SU39	J6	0	TABULAR/DEPTH	TwinK2inlet	NO

[XSECTIONS]

;;Link	Shape	Geom1	Geom2	Geom3	Geom4	Barrels	Culvert
C1	CIRCULAR	0.6	0	0	0	1	
C1_1	CIRCULAR	0.4	0	0	0	1	6
C1_2	TRAPEZOIDAL	1	5	5	5	1	
C10	TRIANGULAR	0.3	10	0	0	1	
C100	TRAPEZOIDAL	1	1	5	5	1	
C101	CIRCULAR	0.525	0	0	0	1	
C102	TRAPEZOIDAL	1	5	5	5	1	
C103	CIRCULAR	0.75	0	0	0	2	6
C104	TRAPEZOIDAL	1	5	5	5	1	
C105	CIRCULAR	0.525	0	0	0	1	6
C106	CIRCULAR	0.45	0	0	0	1	
C107	CIRCULAR	0.45	0	0	0	1	6
C108	CIRCULAR	0.375	0	0	0	1	
C109	CIRCULAR	0.375	0	0	0	1	6
C11	CIRCULAR	0.6	0	0	0	1	5
C110	CIRCULAR	0.6	0	0	0	1	
C110_1	TRAPEZOIDAL	0.5	1	5	5	1	
C111	CIRCULAR	0.3	0	0	0	1	
C111_1	CIRCULAR	0.525	0	0	0	1	
C111_2	CIRCULAR	0.525	0	0	0	1	
C112	CIRCULAR	0.3	0	0	0	1	
C113	CIRCULAR	0.45	0	0	0	1	
C114	TRAPEZOIDAL	1	5	5	5	1	
C115	CIRCULAR	0.45	0	0	0	1	
C116	TRAPEZOIDAL	0.3	0.5	15	15	1	
C117	TRAPEZOIDAL	1	5	5	5	1	
C118_1	IRREGULAR	Street	0	0	0	1	
C118_2	IRREGULAR	Street	0	0	0	1	
C119	CIRCULAR	0.3	0	0	0	1	6
C12	IRREGULAR	Street	0	0	0	1	
C12_2	CIRCULAR	0.6	0	0	0	1	4
C120	TRAPEZOIDAL	1	1	15	15	1	
C120_1	TRAPEZOIDAL	0.5	1	15	7	1	
C120_2	TRAPEZOIDAL	1	1	15	15	1	
C121	CIRCULAR	0.45	0	0	0	1	
C122	CIRCULAR	0.45	0	0	0	1	
C123	TRAPEZOIDAL	1	5	5	5	1	
C124	TRAPEZOIDAL	1	5	5	5	1	
C125	TRAPEZOIDAL	1	5	5	5	1	
C126	TRAPEZOIDAL	1	5	5	5	1	
C127	TRAPEZOIDAL	0.3	0.5	15	15	1	
C128	IRREGULAR	Street	0	0	0	1	
C129	IRREGULAR	Street	0	0	0	1	
C13	TRAPEZOIDAL	1	5	5	5	1	
C130	CIRCULAR	0.6	0	0	0	1	6
C131	TRAPEZOIDAL	0.3	10	5	5	1	
C132	IRREGULAR	Street	0	0	0	1	
C133	TRAPEZOIDAL	1	1	1	3	1	
C134	TRAPEZOIDAL	1	1	1	3	1	
C135	CIRCULAR	0.525	0	0	0	1	
C135_1	CIRCULAR	0.525	0	0	0	1	
C136	CIRCULAR	0.3	0	0	0	1	
C137	IRREGULAR	Street	0	0	0	1	
C138	CIRCULAR	0.3	0	0	0	1	
C139	TRAPEZOIDAL	1	5	5	5	1	
C14	TRAPEZOIDAL	1	5	5	5	1	
C140	CIRCULAR	0.3	0	0	0	1	
C141	IRREGULAR	Street	0	0	0	1	
C143	CIRCULAR	0.45	0	0	0	1	
C144_1	CIRCULAR	0.75	0	0	0	1	
C144_2	CIRCULAR	0.75	0	0	0	1	
C15	TRAPEZOIDAL	1	5	5	5	1	
C16	RECT_OPEN	1.9	8	0	0	1	
C165	TRAPEZOIDAL	1	5	5	5	1	
C17	TRAPEZOIDAL	1	5	5	5	1	
C173	TRAPEZOIDAL	1	5	5	5	1	
C18	TRAPEZOIDAL	1	5	5	5	1	
C188_1	TRAPEZOIDAL	1	5	5	5	1	
C19	CIRCULAR	0.45	0	0	0	1	6
C19_1	TRAPEZOIDAL	1	5	5	5	1	
C19_2	TRAPEZOIDAL	1	5	5	5	1	
C19_3	CIRCULAR	0.6	0	0	0	1	6
C19_4	TRAPEZOIDAL	1	5	5	5	1	
C192	TRAPEZOIDAL	1	5	5	5	1	
C194	TRAPEZOIDAL	1	5	5	5	1	
C196	TRAPEZOIDAL	1	5	5	5	1	

C2	CIRCULAR	0.3	0	0	0	1	
C2_1	TRAPEZOIDAL	1	1	5	5	1	
C2_2	TRAPEZOIDAL	1	1	7	15	1	
C2_3	CIRCULAR	0.45	0	0	0	2	5
C2_4	CIRCULAR	0.45	0	0	0	1	6
C2_6	TRAPEZOIDAL	1	1	5	5	1	
C2_9	CIRCULAR	0.45	0	0	0	1	6
C20	TRAPEZOIDAL	1	5	5	5	1	
C200	TRAPEZOIDAL	1	5	5	5	1	
C21	TRAPEZOIDAL	1	5	5	5	1	
C214	TRAPEZOIDAL	1	5	5	5	1	
C22	IRREGULAR	Street	0	0	0	1	
C23	TRAPEZOIDAL	1	5	5	5	1	
C24	CIRCULAR	0.6	0	0	0	1	6
C25	CIRCULAR	0.45	0	0	0	1	6
C25_2	TRAPEZOIDAL	1	5	5	5	1	
C25_3	CIRCULAR	0.6	0	0	0	1	6
C26	CIRCULAR	0.3	0	0	0	1	6
C27	TRAPEZOIDAL	1	5	5	5	1	
C28	TRIANGULAR	0.3	10	0	0	1	
C28_1	CIRCULAR	0.3	0	0	0	1	6
C28_4	TRAPEZOIDAL	1	2	5	5	1	
C29	CIRCULAR	0.3	0	0	0	1	6
C3	CIRCULAR	0.3	0	0	0	1	6
C30	CIRCULAR	0.9	0	0	0	1	6
C31	TRAPEZOIDAL	1	5	5	5	1	
C32	TRAPEZOIDAL	1	5	5	5	1	
C33	TRAPEZOIDAL	1	5	5	5	1	
C33_1	TRAPEZOIDAL	1	5	5	5	1	
C33_3	CIRCULAR	2.5	0	0	0	1	5
C33_4	TRAPEZOIDAL	1	5	5	5	1	
C34	CIRCULAR	0.9	0	0	0	1	6
C35	TRAPEZOIDAL	1	5	5	5	1	
C36	IRREGULAR	Street	0	0	0	1	
C37	IRREGULAR	Street	0	0	0	1	
C38	TRAPEZOIDAL	1	5	5	5	1	
C39	CIRCULAR	0.45	0	0	0	1	
C4	CIRCULAR	0.3	0	0	0	1	6
C40	TRAPEZOIDAL	1	5	5	5	1	
C41	TRAPEZOIDAL	1	5	5	5	1	
C42	TRAPEZOIDAL	1	5	5	5	1	
C43	CIRCULAR	2.27	0	0	0	1	6
C44	CIRCULAR	0.75	0	0	0	1	
C45	TRAPEZOIDAL	1	5	5	5	1	
C46	CIRCULAR	0.4	0	0	0	1	6
C47	CIRCULAR	0.3	0	0	0	1	6
C48	TRAPEZOIDAL	1	5	5	5	1	
C49	TRAPEZOIDAL	1	5	5	5	1	
C5	IRREGULAR	Street	0	0	0	1	
C50	IRREGULAR	Street	0	0	0	1	
C51	TRAPEZOIDAL	1	5	5	5	1	
C52	TRAPEZOIDAL	1	5	5	5	1	
C53	TRAPEZOIDAL	1	5	5	5	1	
C54	TRAPEZOIDAL	1	5	5	5	1	
C55	TRAPEZOIDAL	1	5	5	5	1	
C56	TRAPEZOIDAL	1	5	5	5	1	
C57	TRAPEZOIDAL	1	5	5	5	1	
C58	CIRCULAR	1.2	0	0	0	1	6
C59	TRAPEZOIDAL	1	5	5	5	1	
C6	CIRCULAR	0.45	0	0	0	1	6
C60	CIRCULAR	0.6	0	0	0	1	6
C61	CIRCULAR	0.45	0	0	0	1	
C62	IRREGULAR	Street	0	0	0	1	
C63	CIRCULAR	0.45	0	0	0	1	
C64	CIRCULAR	0.6	0	0	0	2	6
C65	CIRCULAR	0.525	0	0	0	1	
C65_1	CIRCULAR	0.45	0	0	0	1	
C65_2	CIRCULAR	0.45	0	0	0	1	
C66	IRREGULAR	Street	0	0	0	1	
C66_1	CIRCULAR	0.6	0	0	0	1	6
C67	IRREGULAR	Street	0	0	0	1	
C68	CIRCULAR	0.375	0	0	0	1	6
C69	IRREGULAR	Street	0	0	0	1	
C7	TRIANGULAR	0.362	1	0	0	1	
C7_3	TRAPEZOIDAL	1	2	5	5	1	
C7_4	TRAPEZOIDAL	1	5	5	5	1	
C70	IRREGULAR	Street	0	0	0	1	
C71	CIRCULAR	0.3	0	0	0	1	6
C72	CIRCULAR	0.45	0	0	0	1	
C73	CIRCULAR	0.45	0	0	0	1	
C74	CIRCULAR	0.45	0	0	0	1	6
C75	TRAPEZOIDAL	0.5	5	5	5	1	

C76	TRAPEZOIDAL	0.633	1	5	5	1	
C77	IRREGULAR	Street	0	0	0	1	
C77_1	CIRCULAR	0.45	0	0	0	1	6
C77_3	TRAPEZOIDAL	1	5	5	5	1	
C77_4	TRAPEZOIDAL	1	5	5	5	1	
C77_5	TRAPEZOIDAL	1	5	5	5	1	
C78	TRAPEZOIDAL	1	5	5	5	1	
C79	TRIANGULAR	0.3	10	0	0	1	
C8	CIRCULAR	0.45	0	0	0	1	6
C80	TRAPEZOIDAL	1	5	10	10	1	
C80_1	TRAPEZOIDAL	1	5	5	5	1	
C80_2	TRAPEZOIDAL	1	5	5	5	1	
C81	CIRCULAR	0.3	0	0	0	1	
C82	CIRCULAR	0.3	0	0	0	1	
C83	TRAPEZOIDAL	1	5	5	5	1	
C84	TRAPEZOIDAL	1	5	5	5	1	
C85	CIRCULAR	0.3	0	0	0	1	
C86	CIRCULAR	0.45	0	0	0	1	
C87	CIRCULAR	0.6	0	0	0	1	
C88	CIRCULAR	0.6	0	0	0	1	6
C89	CIRCULAR	0.3	0	0	0	1	
C9	IRREGULAR	Street	0	0	0	1	
C90	CIRCULAR	0.375	0	0	0	1	
C91	CIRCULAR	0.375	0	0	0	1	
C92	CIRCULAR	0.25	0	0	0	1	
C93	TRAPEZOIDAL	1	5	5	5	1	
C94	IRREGULAR	Street	0	0	0	1	
C95	CIRCULAR	0.525	0	0	0	1	
C95_1	IRREGULAR	Street	0	0	0	1	
C95_2	IRREGULAR	Street	0	0	0	1	
C96	CIRCULAR	0.3	0	0	0	1	
C97	CIRCULAR	0.3	0	0	0	1	
C98	CIRCULAR	0.525	0	0	0	1	
C99	CIRCULAR	0.525	0	0	0	1	
W1	TRAPEZOIDAL	0.5	1	5	5	1	
W15	TRAPEZOIDAL	0.3	5	5	5	1	
W27	TRAPEZOIDAL	0.3	10	5	5	1	
W44	IRREGULAR	Street	0	0	0	1	
C118	RECT_OPEN	0.3	30	0	0		
C142	RECT_OPEN	0.3	20	0	0		
W10	RECT_OPEN	0.3	20	0	0		

W11	RECT_OPEN	0.2	20	0	0
W12	RECT_OPEN	0.3	20	0	0
W13	RECT_OPEN	0.3	20	0	0
W14	RECT_OPEN	0.3	20	0	0
W16	RECT_OPEN	0.3	20	0	0
W17	RECT_OPEN	0.3	20	0	0
W18	RECT_OPEN	0.3	20	0	0
W19	RECT_OPEN	0.3	30	0	0
W2	RECT_OPEN	0.3	10	0	0
W20	RECT_OPEN	0.3	50	0	0
W21	RECT_OPEN	0.3	20	0	0
W22	RECT_OPEN	0.3	20	0	0
W23	RECT_OPEN	0.3	30	0	0
W24	RECT_OPEN	0.3	20	0	0
W25	RECT_OPEN	0.3	10	0	0
W26	RECT_OPEN	0.3	50	0	0
W28	RECT_OPEN	0.3	10	0	0
W29	RECT_OPEN	0.3	50	0	0
W3	RECT_OPEN	0.3	10	0	0
W30	RECT_OPEN	0.3	20	0	0
W31	RECT_OPEN	0.3	50	0	0
W32	RECT_OPEN	0.3	30	0	0
W33	RECT_OPEN	0.3	50	0	0
W34	RECT_OPEN	0.3	30	0	0
W35	RECT_OPEN	0.5	50	0	0
W36	RECT_OPEN	0.3	50	0	0
W37	RECT_OPEN	0.3	30	0	0
W38	RECT_OPEN	0.3	30	0	0
W39	RECT_OPEN	0.3	20	0	0
W4	RECT_OPEN	0.3	20	0	0
W40	RECT_OPEN	0.3	10	0	0
W41	RECT_OPEN	0.3	10	0	0
W42	RECT_OPEN	0.3	20	0	0
W43	RECT_OPEN	0.3	10	0	0
W45	RECT_OPEN	0.3	10	0	0
W46	RECT_OPEN	0.3	10	0	0
W47	RECT_OPEN	0.3	10	0	0
W48	RECT_OPEN	0.3	10	0	0
W49	RECT_OPEN	0.3	50	0	0
W5	RECT_OPEN	0.3	20	0	0
W50	RECT_OPEN	0.3	10	0	0

```
W51              RECT_OPEN    0.3              20          0           0
W52              RECT_OPEN    0.3              20          0           0
W53              RECT_OPEN    0.3              30          0           0
W54              RECT_OPEN    0.3              10          0           0
W55              RECT_OPEN    0.3              20          0           0
W57              RECT_OPEN    0.3              10          0           0
W6               RECT_OPEN    0.3              50          0           0
W7               RECT_OPEN    0.3              10          0           0
W77              RECT_OPEN    0.3              30          0           0
W8               RECT_OPEN    0.3              30          0           0
W9               RECT_OPEN    0.3              30          0           0

[TRANSECTS]
;;Transect Data in HEC-2 format
;
NC 0.01     0.01     0.01
X1 Street            4        0.0      0.0      0.0      0.0      0.0      0.0      0.0
GR 1        0        0.91     4.5      1.06     4.5      1.13     8

[LOSSES]
;;Link            Kentry     Kexit      Kavg       Flap Gate  Seepage
;;--------------- ---------- ---------- ---------- ---------- ----------
C1               0          0.2        0          NO         0
C105             0          0.42       0          NO         0
C106             0          0.42       0          NO         0
C108             1          1          0          NO         0
C110             0          1          0          NO         0
C111_2           0          1          0          NO         0
C112             1          0          0          NO         0
C113             0          1          0          NO         0
C115             1          0.83       0          NO         0
C2_4             0          0.27       0          NO         0
C29              1          0          0          NO         0
C44              0          1          0          NO         0
C65_1            1          0          0          NO         0
C65_2            0          0.61       0          NO         0
C71              0          0.48       0          NO         0
C72              0          0.27       0          NO         0
C73              0          0.27       0          NO         0
C81              1          0.7        0          NO         0
C82              1          1          0          NO         0

C85              1          0          0          NO         0
C86              1          1          0          NO         0
C87              0          0.2        0          NO         0
C89              1          0          0          NO         0
C91              1          0.7        0          NO         0
C92              1          0          0          NO         0
C96              1          0          0          NO         0
C97              1          0          0          NO         0
C99              1          0          0          NO         0

[CURVES]
;;Name            Type       X-Value    Y-Value
;;--------------- ---------- ---------- ----------
Cinlet           Rating     0          0
Cinlet                      0.1        0.1103
Cinlet                      0.2        0.1498
Cinlet                      0.3        0.1555
Cinlet                      0.4        0.161
Cinlet                      0.5        0.1663

GratedTopMH      Rating     0          0
GratedTopMH                 0.1        0.0524
GratedTopMH                 0.2        0.0742
GratedTopMH                 0.3        0.0908
GratedTopMH                 0.4        0.1049
GratedTopMH                 0.5        0.1173

K2inlet          Rating     0          0
K2inlet                     0.1        0.0984
K2inlet                     0.2        0.1498
K2inlet                     0.3        0.1555
K2inlet                     0.4        0.161
K2inlet                     0.5        0.1663

K3inlet          Rating     0          0
K3inlet                     0.1        0.0779
K3inlet                     0.2        0.1101
K3inlet                     0.3        0.1349
K3inlet                     0.4        0.1557
K3inlet                     0.5        0.1663
```

PROPOSED RAINFALL

OUTPUT FILES

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

WARNING 04: minimum elevation drop used for Conduit W27
WARNING 10: crest elevation raised to downstream invert for regulator Link W13
WARNING 10: crest elevation raised to downstream invert for regulator Link W21
WARNING 10: crest elevation raised to downstream invert for regulator Link W25
WARNING 10: crest elevation raised to downstream invert for regulator Link W40
WARNING 02: maximum depth increased for Node J102
WARNING 02: maximum depth increased for Node J11
WARNING 02: maximum depth increased for Node J113
WARNING 02: maximum depth increased for Node J114
WARNING 02: maximum depth increased for Node J120
WARNING 02: maximum depth increased for Node J121
WARNING 02: maximum depth increased for Node J124
WARNING 02: maximum depth increased for Node J127
WARNING 02: maximum depth increased for Node J128
WARNING 02: maximum depth increased for Node J129
WARNING 02: maximum depth increased for Node J13
WARNING 02: maximum depth increased for Node J14
WARNING 02: maximum depth increased for Node J2
WARNING 02: maximum depth increased for Node J231
WARNING 02: maximum depth increased for Node J239
WARNING 02: maximum depth increased for Node J24
WARNING 02: maximum depth increased for Node J252
WARNING 02: maximum depth increased for Node J27
WARNING 02: maximum depth increased for Node J30
WARNING 02: maximum depth increased for Node J36
WARNING 02: maximum depth increased for Node J40
WARNING 02: maximum depth increased for Node J41
WARNING 02: maximum depth increased for Node J42
WARNING 02: maximum depth increased for Node J43
WARNING 02: maximum depth increased for Node J5
WARNING 02: maximum depth increased for Node J56
WARNING 02: maximum depth increased for Node J57
WARNING 02: maximum depth increased for Node J64
WARNING 02: maximum depth increased for Node J69
WARNING 02: maximum depth increased for Node J70
WARNING 02: maximum depth increased for Node J71
WARNING 02: maximum depth increased for Node J72

WARNING 02: maximum depth increased for Node J73
WARNING 02: maximum depth increased for Node J78
WARNING 02: maximum depth increased for Node J81
WARNING 02: maximum depth increased for Node J84
WARNING 02: maximum depth increased for Node J86
WARNING 02: maximum depth increased for Node J87
WARNING 02: maximum depth increased for Node J9
WARNING 02: maximum depth increased for Node J94
WARNING 02: maximum depth increased for Node J95
WARNING 02: maximum depth increased for Node J98

****
Element Count
****
Number of rain gages 12
Number of subcatchments ... 111
Number of nodes 217
Number of links 299
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Huff_24h_100y_101.3mm	Huff_24h_100y_101.3mm	INTENSITY	5 min.
Huff_24h_10y_67.6mm	Huff_24h_10y_67.6mm	INTENSITY	5 min.
Huff_24h_25y_81.2mm	Huff_24h_25y_81.2mm	INTENSITY	5 min.
Huff_24h_2y_40.5mm	Huff_24h_2y_40.5mm	INTENSITY	5 min.
Huff_24h_50y_91.3mm	Huff_24h_50y_91.3mm	INTENSITY	5 min.
Huff_24h_5y_56.8mm	Huff_24h_5y_56.8mm	INTENSITY	5 min.
Sundre_4h_100y	Sundre_4h_100y	INTENSITY	5 min.
Sundre_4h_10y	Sundre_4h_10y	INTENSITY	5 min.
Sundre_4h_25y	Sundre_4h_25y	INTENSITY	5 min.
Sundre_4h_2y	Sundre_4h_2y	INTENSITY	5 min.
Sundre_4h_50y	Sundre_4h_50y	INTENSITY	5 min.
Sundre_4h_5y	Sundre_4h_5y	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.41	37.66	52.00	4.0000	Sundre_4h_100y	J100
S1_1	0.06	9.38	70.00	0.5000	Sundre_4h_100y	SU46
S1_2	104.20	1132.64	100.00	6.0900	Sundre_4h_100y	J49
S1_3	26.96	512.96	100.00	5.8310	Sundre_4h_100y	J32
S1_5	0.10	10.27	70.00	0.5000	Sundre_4h_100y	J4
S1_6	0.08	9.43	70.00	1.0000	Sundre_4h_100y	SU31
S1_7	19.06	596.37	100.00	5.3890	Sundre_4h_100y	SU3
S10	1.12	55.84	33.00	4.5000	Sundre_4h_100y	SU29
S103	20.16	314.81	100.00	4.3000	Sundre_4h_100y	J142
S105	40.68	263.49	100.00	4.6400	Sundre_4h_100y	J158
S11	0.36	33.66	12.00	5.0000	Sundre_4h_100y	J116
S111	12.29	179.92	100.00	3.4000	Sundre_4h_100y	J142
S112	15.14	545.15	100.00	6.4990	Sundre_4h_100y	J101
S117	29.66	326.97	100.00	5.5000	Sundre_4h_100y	J150
S12	2.53	127.81	20.00	7.0000	Sundre_4h_100y	SU43
S12_1	0.53	40.13	22.00	6.0000	Sundre_4h_100y	J36
S122	0.89	65.59	24.00	5.0000	Sundre_4h_100y	J59
S122_2	0.71	55.85	40.00	3.7300	Sundre_4h_100y	SU21
S122_3	0.34	15.77	60.00	3.5000	Sundre_4h_100y	SU42
S122_4	0.27	20.93	10.00	3.5000	Sundre_4h_100y	J121
S122_7	0.46	39.57	35.00	5.0000	Sundre_4h_100y	J64
S127	17.37	650.18	100.00	4.3430	Sundre_4h_100y	J466
S129_1	22.04	688.83	100.00	4.9600	Sundre_4h_100y	J462
S13	18.50	270.09	100.00	3.7000	Sundre_4h_100y	J46
S13_1	0.45	58.25	45.00	3.5000	Sundre_4h_100y	SU18
S13_2	0.30	40.40	26.91	1.6000	Sundre_4h_100y	SU19
S130_4	21.55	446.84	100.00	4.1470	Sundre_4h_100y	SU1
S134_1	3.44	255.23	100.00	4.4700	Sundre_4h_100y	SU3
S134_10	0.64	69.81	100.00	4.7000	Sundre_4h_100y	J156
S134_11	0.28	39.07	68.00	1.0000	Sundre_4h_100y	J14
S134_12	0.60	37.34	30.00	2.0000	Sundre_4h_100y	J73
S134_14	0.25	32.19	40.00	3.5000	Sundre_4h_100y	SU6
S134_15	0.50	51.72	3.00	2.5000	Sundre_4h_100y	J11
S134_16	1.24	62.93	10.00	2.5000	Sundre_4h_100y	J72
S134_3	0.32	18.16	33.00	2.2000	Sundre_4h_100y	J86
S134_4	0.25	31.00	42.00	4.0000	Sundre_4h_100y	J124
S134_5	0.54	51.89	22.00	4.8000	Sundre_4h_100y	SU14
S134_6	0.95	44.66	37.00	4.0000	Sundre_4h_100y	SU11
S134_8	0.66	63.08	20.00	4.4700	Sundre_4h_100y	J26
S134_9	0.29	38.40	40.00	3.5000	Sundre_4h_100y	SU7
S135_1	2.15	99.80	16.00	6.0000	Sundre_4h_100y	SU38
S135_2	0.83	32.59	13.00	4.0000	Sundre_4h_100y	J12
S135_3	0.52	48.56	25.00	4.0000	Sundre_4h_100y	SU22
S135_4	1.28	39.39	16.27	4.5000	Sundre_4h_100y	SU24
S136	20.21	630.42	100.00	7.0260	Sundre_4h_100y	J150
S14	0.61	57.81	45.00	3.2640	Sundre_4h_100y	SU20
S141	34.79	843.26	100.00	6.8450	Sundre_4h_100y	J475
S145	18.61	299.28	100.00	6.5320	Sundre_4h_100y	J172
S147_2	0.16	9.43	70.00	1.0000	Sundre_4h_100y	SU47
S147_3	9.01	694.00	100.00	5.4310	Sundre_4h_100y	J187
S148	6.10	228.90	100.00	7.5320	Sundre_4h_100y	J185
S149	22.82	429.85	100.00	6.6360	Sundre_4h_100y	J177
S15	2.78	111.71	100.00	4.5000	Sundre_4h_100y	J16
S155	43.07	499.68	100.00	5.2400	Sundre_4h_100y	J209
S158	34.40	500.07	100.00	4.2570	Sundre_4h_100y	J209
S16	0.97	50.82	45.00	3.2000	Sundre_4h_100y	SU39
S16_2	1.00	57.21	40.00	2.5000	Sundre_4h_100y	SU34
S160_1	33.90	1297.77	100.00	7.6670	Sundre_4h_100y	J250
S160_3	3.35	98.60	100.00	5.8000	Sundre_4h_100y	J34
S162_2	2.25	108.00	100.00	2.7000	Sundre_4h_100y	J207
S17	33.29	315.20	100.00	4.0000	Sundre_4h_100y	J105
S179_2	26.12	363.21	100.00	6.6000	Sundre_4h_100y	SU4
S18	25.27	311.99	100.00	4.4000	Sundre_4h_100y	J23
S180	32.47	444.23	100.00	5.8500	Sundre_4h_100y	J250
S19	0.37	15.08	28.22	5.3890	Sundre_4h_100y	J3
S19_2	22.38	245.12	100.00	3.9000	Sundre_4h_100y	J474
S198_1	12.13	183.46	100.00	3.8000	Sundre_4h_100y	J1
S198_2	9.40	191.12	100.00	2.7000	Sundre_4h_100y	J252
S2	10.84	162.34	100.00	4.5000	Sundre_4h_100y	J10
S2_1	3.53	107.57	100.00	4.2500	Sundre_4h_100y	J474
S20	2.12	46.52	100.00	3.3000	Sundre_4h_100y	J25
S20_2	1.99	79.74	18.46	4.9690	Sundre_4h_100y	J47
S206_2	23.56	228.69	100.00	6.0000	Sundre_4h_100y	SU5
S21	1.80	60.95	100.00	5.3000	Sundre_4h_100y	J17
S215	21.71	734.69	100.00	6.4710	Sundre_4h_100y	J486
S217	15.01	285.47	100.00	10.1000	Sundre_4h_100y	J286

S22	0.35	17.36	35.00	4.0000	Sundre_4h_100y	SU45
S225	15.20	293.40	100.00	8.0880	Sundre_4h_100y	J286
S23	0.76	46.04	15.00	4.0000	Sundre_4h_100y	J95
S24	12.38	209.47	100.00	4.3620	Sundre_4h_100y	J41
S24_1	9.63	162.13	100.00	6.6740	Sundre_4h_100y	J43
S25	30.10	352.08	100.00	2.8800	Sundre_4h_100y	J231
S26	57.83	400.46	100.00	5.0220	Sundre_4h_100y	J292
S27	33.01	377.66	100.00	2.0000	Sundre_4h_100y	J495
S28	8.64	172.89	100.00	3.3000	Sundre_4h_100y	J21
S3	28.30	427.49	100.00	7.0000	Sundre_4h_100y	J286
S3_2	38.34	328.86	100.00	5.3000	Sundre_4h_100y	SU4
S4	7.90	115.14	100.00	1.8000	Sundre_4h_100y	J472
S5	3.56	225.39	100.00	5.9340	Sundre_4h_100y	SU2
S5_2	7.05	133.09	100.00	5.8550	Sundre_4h_100y	J51
S5_4	2.39	85.61	100.00	4.0000	Sundre_4h_100y	J20
S6	0.50	28.33	36.00	4.2000	Sundre_4h_100y	SU25
S7	7.17	144.79	100.00	2.3000	Sundre_4h_100y	J15
S7_1	1.58	93.01	30.00	4.0000	Sundre_4h_100y	SU44
S7_10	2.29	109.92	35.00	4.5000	Sundre_4h_100y	J123
S7_12	2.64	65.89	26.00	4.8000	Sundre_4h_100y	SU15
S7_15	0.12	7.61	70.00	1.2000	Sundre_4h_100y	SU9
S7_16	0.14	24.48	30.00	4.5000	Sundre_4h_100y	SU40
S7_17	0.10	22.59	30.00	5.0000	Sundre_4h_100y	J125
S7_3	1.08	61.52	25.00	3.5000	Sundre_4h_100y	SU40
S7_4	1.41	80.75	15.00	3.3000	Sundre_4h_100y	J60
S7_7	1.96	84.35	12.00	4.6000	Sundre_4h_100y	J22
S7_8	0.09	13.89	15.00	6.0000	Sundre_4h_100y	SU30
S7_9	3.32	134.82	21.00	1.1400	Sundre_4h_100y	J10
S75	31.37	348.52	100.00	4.0000	Sundre_4h_100y	J101
S8	6.74	194.21	99.99	5.0000	Sundre_4h_100y	SU5
S9	1.96	94.41	20.00	2.0000	Sundre_4h_100y	SU41
S9_1	3.38	135.66	100.00	4.6000	Sundre_4h_100y	SU13
S9_2	0.78	67.08	100.00	2.0000	Sundre_4h_100y	J19
S9_5	0.47	17.90	25.00	3.3220	Sundre_4h_100y	SU35
S9_6	0.75	36.38	9.00	5.6000	Sundre_4h_100y	SU38

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
S1_2	Rural	1	1032026.00	1132.64	99.04	100.00	0.00
S1_3	Rural	1	264117.00	512.96	97.96	100.00	0.00
S1_7	Rural	1	183003.00	596.37	96.01	100.00	0.00
S103	Rural	1	198511.00	640.42	98.46	100.00	0.00
S105	Rural	1	406045.00	263.49	99.80	100.00	0.00
S111	Rural	1	121957.00	179.92	99.27	100.00	0.00
S112	Rural	1	150002.00	545.15	99.06	100.00	0.00
S117	Rural	1	289265.00	326.97	97.54	100.00	0.00
S127	Rural	1	172306.00	650.18	99.19	100.00	0.00
S129_1	Rural	1	218331.00	688.83	99.05	100.00	0.00
S13	Rural	1	179510.00	270.88	97.03	100.00	0.00
S130_4	Rural	1	172500.00	446.84	80.05	100.00	0.00
S134_1	Rural	1	29234.00	255.23	84.97	100.00	0.00
S134_10	Rural	1	6237.00	69.81	97.96	100.00	0.00
S136	Rural	1	200560.00	620.42	99.26	100.00	0.00
S141	Rural	1	344362.00	843.26	98.99	100.00	0.00
S145	Rural	1	184184.00	299.28	98.98	100.00	0.00
S147_3	Rural	1	90046.00	694.00	99.89	100.00	0.00
S148	Rural	1	60377.00	228.90	99.02	100.00	0.00
S149	Rural	1	227561.00	429.85	99.74	100.00	0.00
S15	Rural	1	27116.00	111.71	97.48	100.00	0.00
S155	Rural	1	427668.00	499.68	99.30	100.00	0.00
S158	Rural	1	340439.00	500.07	98.95	100.00	0.00
S160_1	Rural	1	335579.00	1297.77	99.00	100.00	0.00
S160_3	Rural	1	31854.00	98.60	95.02	100.00	0.00
S162_2	Rural	1	20883.00	108.00	92.97	100.00	0.00
S17	Rural	1	319926.00	315.20	96.10	100.00	0.00
S179_2	Rural	1	240151.00	363.21	91.96	100.00	0.00
S18	Rural	1	245213.00	311.99	97.03	100.00	0.00
S180	Rural	1	311692.00	444.23	96.00	100.00	0.00
S19_2	Rural	1	183594.00	245.06	82.04	100.00	0.00
S198_1	Rural	1	113965.00	183.46	93.98	100.00	0.00
S198_2	Rural	1	93132.00	191.12	99.04	100.00	0.00
S2	Rural	1	106241.00	162.34	97.97	100.00	0.00
S2_1	Rural	1	33190.00	37.28	94.05	100.00	0.00
S20	Rural	1	19066.00	46.52	90.08	100.00	0.00
S206_2	Rural	1	230851.00	229.00	98.00	100.00	0.00
S21	Rural	1	15380.00	60.95	85.54	100.00	0.00
S215	Rural	1	212732.00	734.69	97.97	100.00	0.00

S217	Rural	1	147080.00	285.47	98.00	100.00	0.00
S225	Rural	1	149331.00	293.96	98.22	100.00	0.00
S24	Rural	1	116398.00	209.47	94.02	100.00	0.00
S24_1	Rural	1	88588.00	162.13	92.00	100.00	0.00
S25	Rural	1	292026.00	352.08	97.01	100.00	0.00
S26	Rural	1	566645.00	400.46	97.98	100.00	0.00
S27	Rural	1	320075.00	377.66	96.97	100.00	0.00
S28	Rural	1	77786.00	0.00	89.98	0.00	0.00
S3	Rural	1	277260.00	427.49	97.97	100.00	0.00
S3_2	Rural	1	364450.00	328.86	95.04	100.00	0.00
S4	Rural	1	72686.00	115.14	92.02	100.00	0.00
S5	Rural	1	26697.00	225.39	75.00	100.00	0.00
S5_2	Rural	1	70385.00	109.45	99.79	100.00	0.00
S5_4	Rural	1	23585.00	37.06	98.74	100.00	0.00
S7	Rural	1	68771.00	144.79	95.95	100.00	0.00
S75	Rural	1	302666.00	348.52	96.49	100.00	0.00
S8	Rural	1	59292.00	194.21	87.98	100.00	0.00
S9_1	Rural	1	32428.00	135.00	96.00	100.00	0.00
S9_2	Rural	1	7611.00	67.08	97.82	100.00	0.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	1148.94	0.46	0.0	
J10	JUNCTION	1164.72	1.00	0.0	
J100	JUNCTION	1178.52	0.60	0.0	
J101	JUNCTION	1178.52	1.00	0.0	
J102	JUNCTION	1177.35	0.50	0.0	
J104	JUNCTION	1172.36	2.10	0.0	
J105	JUNCTION	1196.46	1.00	0.0	
J106	JUNCTION	1173.09	1.48	100.0	
J107	JUNCTION	1173.59	1.51	0.0	
J108	JUNCTION	1173.80	1.30	100.0	
J11	JUNCTION	1184.66	1.00	0.0	
J110	JUNCTION	1173.50	1.30	100.0	
J111	JUNCTION	1177.34	1.80	0.0	
J112	JUNCTION	1177.22	1.80	0.0	
J113	JUNCTION	1184.57	1.00	0.0	
J114	JUNCTION	1184.70	0.50	0.0	
J115	JUNCTION	1172.29	1.30	0.0	
J116	JUNCTION	1185.82	1.00	100.0	
J117	JUNCTION	1173.90	1.80	10.0	
J118	JUNCTION	1180.92	1.80	0.0	
J119	JUNCTION	1178.53	1.80	0.0	
J12	JUNCTION	1178.80	0.30	0.0	
J120	JUNCTION	1173.40	1.80	10.0	
J121	JUNCTION	1177.30	1.00	0.0	
J122	JUNCTION	1182.05	0.30	0.0	
J123	JUNCTION	1178.10	1.00	0.0	
J124	JUNCTION	1182.41	0.79	0.0	
J126	JUNCTION	1173.60	1.80	10.0	
J127	JUNCTION	1148.23	1.00	0.0	
J128	JUNCTION	1123.95	2.50	0.0	
J129	JUNCTION	1123.98	2.50	0.0	
J13	JUNCTION	1180.49	1.00	0.0	
J130	JUNCTION	1176.60	0.60	0.0	
J131	JUNCTION	1173.80	1.80	0.0	
J133	JUNCTION	1179.03	1.80	0.0	
J134	JUNCTION	1173.80	1.50	0.0	
J135	JUNCTION	1172.80	1.50	10.0	
J136	JUNCTION	1176.80	1.80	0.0	
J14	JUNCTION	1183.32	0.30	0.0	
J140	JUNCTION	1159.05	2.61	0.0	
J142	JUNCTION	1190.42	1.00	0.0	
J15	JUNCTION	1186.02	0.73	100.0	
J150	JUNCTION	1163.66	1.00	0.0	
J156	JUNCTION	1187.65	1.00	0.0	
J158	JUNCTION	1153.01	1.00	0.0	
J16	JUNCTION	1188.10	1.00	0.0	
J160	JUNCTION	1146.35	1.00	0.0	
J162	JUNCTION	1119.97	1.00	0.0	
J17	JUNCTION	1176.60	1.00	0.0	
J172	JUNCTION	1162.25	1.00	0.0	
J177	JUNCTION	1156.19	1.00	0.0	
J18	JUNCTION	1171.07	1.50	0.0	
J183	JUNCTION	1122.98	1.00	0.0	
J185	JUNCTION	1151.53	1.00	0.0	
J187	JUNCTION	1166.60	1.00	0.0	

J19	JUNCTION	1198.50	1.00	0.0
J196	JUNCTION	1166.68	1.00	0.0
J198	JUNCTION	1128.81	1.00	0.0
J2	JUNCTION	1185.85	1.00	0.0
J20	JUNCTION	1184.90	0.30	0.0
J207	JUNCTION	1164.64	1.00	0.0
J209	JUNCTION	1143.66	1.00	0.0
J21	JUNCTION	1168.30	2.00	0.0
J22	JUNCTION	1168.26	2.23	0.0
J223	JUNCTION	1178.40	1.00	0.0
J23	JUNCTION	1184.00	1.00	0.0
J231	JUNCTION	1137.34	1.00	0.0
J235	JUNCTION	1152.84	1.00	0.0
J239	JUNCTION	1140.20	2.27	0.0
J24	JUNCTION	1169.32	1.00	0.0
J25	JUNCTION	1180.50	1.00	0.0
J250	JUNCTION	1165.25	1.00	0.0
J252	JUNCTION	1141.47	2.27	0.0
J26	JUNCTION	1178.68	1.43	0.0
J27	JUNCTION	1177.76	1.00	0.0
J28	JUNCTION	1185.36	1.94	0.0
J286	JUNCTION	1157.58	4.00	0.0
J29	JUNCTION	1186.29	0.61	0.0
J292	JUNCTION	1193.88	1.00	0.0
J3	JUNCTION	1186.49	0.81	0.0
J30	JUNCTION	1137.53	1.00	0.0
J31	JUNCTION	1173.30	2.10	0.0
J32	JUNCTION	1149.00	1.00	0.0
J33	JUNCTION	1176.00	1.96	0.0
J35	JUNCTION	1168.70	1.00	0.0
J36	JUNCTION	1183.65	1.00	100.0
J38	JUNCTION	1168.00	2.30	0.0
J39	JUNCTION	1181.75	1.80	0.0
J4	JUNCTION	1173.77	0.59	0.0
J40	JUNCTION	1170.98	1.00	0.0
J41	JUNCTION	1171.23	1.00	0.0
J42	JUNCTION	1169.53	1.00	0.0
J43	JUNCTION	1169.78	1.00	0.0
J44	JUNCTION	1164.09	1.24	0.0
J45	JUNCTION	1191.60	1.00	0.0
J456	JUNCTION	1132.15	1.00	0.0
J46	JUNCTION	1169.20	1.00	0.0
J462	JUNCTION	1163.80	1.00	0.0
J466	JUNCTION	1145.11	1.00	0.0
J47	JUNCTION	1169.57	1.34	10.0
J472	JUNCTION	1139.58	1.00	0.0
J474	JUNCTION	1161.80	1.00	0.0
J475	JUNCTION	1139.85	1.00	0.0
J48	JUNCTION	1176.13	1.00	0.0
J482	JUNCTION	1158.87	2.80	0.0
J486	JUNCTION	1151.58	1.00	0.0
J49	JUNCTION	1160.19	1.00	0.0
J491	JUNCTION	1125.46	1.00	0.0
J495	JUNCTION	1144.93	1.00	0.0
J5	JUNCTION	1169.46	1.00	0.0
J50	JUNCTION	1169.54	1.38	10.0
J51	JUNCTION	1182.65	0.47	0.0
J52	JUNCTION	1172.66	1.24	0.0
J53	JUNCTION	1180.81	1.30	0.0
J54	JUNCTION	1173.02	1.02	0.0
J55	JUNCTION	1172.81	1.27	0.0
J56	JUNCTION	1168.00	1.00	0.0
J57	JUNCTION	1170.29	1.00	0.0
J58	JUNCTION	1179.65	1.33	0.0
J59	JUNCTION	1177.99	0.36	0.0
J6	JUNCTION	1180.11	1.30	0.0
J60	JUNCTION	1183.03	0.30	0.0
J61	JUNCTION	1181.16	1.20	0.0
J62	JUNCTION	1170.70	1.87	0.0
J63	JUNCTION	1179.84	2.35	0.0
J64	JUNCTION	1179.11	0.50	0.0
J65	JUNCTION	1177.85	1.00	0.0
J66	JUNCTION	1176.75	1.70	0.0
J67	JUNCTION	1173.93	1.58	0.0
J68	JUNCTION	1173.05	1.23	0.0
J69	JUNCTION	1170.29	1.00	0.0
J7	JUNCTION	1177.18	0.46	0.0
J70	JUNCTION	1183.27	0.63	0.0
J71	JUNCTION	1182.51	0.90	0.0
J72	JUNCTION	1185.55	1.00	0.0
J73	JUNCTION	1175.35	1.00	0.0
J74	JUNCTION	1173.70	1.10	0.0

J75	JUNCTION	1173.07	1.45	0.0
J76	JUNCTION	1173.27	1.50	0.0
J77	JUNCTION	1173.61	1.20	20.0
J78	JUNCTION	1173.62	1.20	0.0
J79	JUNCTION	1173.99	1.10	0.0
J8	JUNCTION	1175.75	1.32	0.0
J80	JUNCTION	1174.83	1.10	0.0
J81	JUNCTION	1170.50	1.00	0.0
J82	JUNCTION	1174.75	1.20	0.0
J83	JUNCTION	1177.10	1.45	0.0
J84	JUNCTION	1177.98	1.45	0.0
J85	JUNCTION	1178.13	1.15	10.0
J86	JUNCTION	1184.51	0.22	0.0
J87	JUNCTION	1171.91	1.65	0.0
J88	JUNCTION	1173.20	1.50	0.0
J89	JUNCTION	1172.80	1.35	100.0
J9	JUNCTION	1171.42	1.00	0.0
J90	JUNCTION	1173.25	1.10	0.0
J91	JUNCTION	1172.37	1.20	10.0
J92	JUNCTION	1173.81	1.55	0.0
J93	JUNCTION	1172.09	1.20	10.0
J94	JUNCTION	1169.16	1.00	0.0
J95	JUNCTION	1172.86	1.00	100.0
J96	JUNCTION	1171.71	2.13	0.0
J97	JUNCTION	1171.17	2.50	100.0
J98	JUNCTION	1170.19	1.00	0.0
J99	JUNCTION	1172.69	1.18	100.0
J109	OUTFALL	1158.62	1.00	0.0
J488	OUTFALL	1119.97	1.00	0.0
J103	STORAGE	1173.09	0.30	0.0
J125	STORAGE	1177.01	0.63	0.0
J34	STORAGE	1176.27	2.03	0.0
J37	STORAGE	1183.25	0.30	0.0
SU1	STORAGE	1167.38	1.83	0.0
SU10	STORAGE	1178.00	0.85	0.0
SU11	STORAGE	1174.51	0.30	0.0
SU12	STORAGE	1174.47	0.30	0.0
SU13	STORAGE	1186.43	0.87	0.0
SU14	STORAGE	1178.98	0.30	0.0
SU15	STORAGE	1179.13	0.30	0.0
SU16	STORAGE	1178.25	0.30	0.0
SU17	STORAGE	1180.69	0.73	0.0
SU18	STORAGE	1175.63	0.30	0.0
SU19	STORAGE	1174.50	0.32	0.0
SU2	STORAGE	1166.99	2.23	0.0
SU20	STORAGE	1174.79	0.30	0.0
SU21	STORAGE	1173.74	0.34	0.0
SU22	STORAGE	1174.05	0.30	0.0
SU23	STORAGE	1173.55	0.60	0.0
SU24	STORAGE	1175.06	0.30	0.0
SU25	STORAGE	1172.99	0.30	0.0
SU26	STORAGE	1173.27	0.30	0.0
SU27	STORAGE	1173.26	0.60	0.0
SU28	STORAGE	1170.62	0.30	0.0
SU29	STORAGE	1173.36	0.50	0.0
SU3	STORAGE	1166.54	2.12	0.0
SU30	STORAGE	1173.24	0.63	0.0
SU31	STORAGE	1173.07	0.60	0.0
SU32	STORAGE	1174.15	0.30	0.0
SU33	STORAGE	1174.26	0.30	0.0
SU34	STORAGE	1181.81	0.55	0.0
SU35	STORAGE	1180.53	0.30	0.0
SU36	STORAGE	1174.20	0.60	0.0
SU37	STORAGE	1175.40	0.30	0.0
SU38	STORAGE	1186.69	0.60	0.0
SU39	STORAGE	1181.11	0.30	0.0
SU4	STORAGE	1163.02	1.70	0.0
SU40	STORAGE	1174.50	0.60	0.0
SU41	STORAGE	1186.61	0.30	0.0
SU42	STORAGE	1173.61	0.30	0.0
SU43	STORAGE	1175.60	0.50	0.0
SU44	STORAGE	1178.84	0.30	0.0
SU45	STORAGE	1175.30	0.30	0.0
SU46	STORAGE	1172.27	1.02	0.0
SU47	STORAGE	1174.00	0.30	0.0
SU5	STORAGE	1161.12	1.64	0.0
SU6	STORAGE	1175.21	0.30	0.0
SU7	STORAGE	1173.97	0.30	0.0
SU8	STORAGE	1174.90	0.30	0.0
SU9	STORAGE	1178.72	0.30	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J130	J82	CONDUIT	49.5	3.7439	0.0110
C1_1	J1	J127	CONDUIT	16.0	4.3908	0.0240
C1_2	J127	J252	CONDUIT	71.5	9.4900	0.0500
C10	J14	J70	CONDUIT	16.6	0.2598	0.0130
C100	J17	J22	CONDUIT	242.0	3.4471	0.0350
C101	J91	J87	CONDUIT	5.3	8.7885	0.0110
C102	J177	J185	CONDUIT	264.9	1.7600	0.0500
C103	J62	J94	CONDUIT	43.6	3.5465	0.0240
C104	J187	J250	CONDUIT	672.3	0.2011	0.0500
C105	J95	J96	CONDUIT	5.5	17.9765	0.0110
C106	J96	J97	CONDUIT	15.0	2.6339	0.0110
C107	J97	J98	CONDUIT	47.4	2.0616	0.0110
C108	J99	J96	CONDUIT	21.3	2.5968	0.0110
C109	J100	J102	CONDUIT	14.6	8.0403	0.0240
C11	J11	J124	CONDUIT	92.5	2.2188	0.0240
C110	J104	J97	CONDUIT	103.2	0.9829	0.0110
C110_1	J102	SU29	CONDUIT	62.9	6.3464	0.0350
C111	J118	J119	CONDUIT	30.8	7.7966	0.0110
C111_1	J106	J135	CONDUIT	11.5	2.4956	0.0110
C111_2	J135	J104	CONDUIT	3.4	11.6864	0.0110
C112	J110	J106	CONDUIT	3.6	-0.3027	0.0130
C113	J107	J88	CONDUIT	4.5	8.7011	0.0110
C114	J196	J187	CONDUIT	157.6	0.0482	0.0500
C115	J108	J107	CONDUIT	4.6	4.6531	0.0110
C116	SU44	SU9	CONDUIT	14.7	0.8036	0.0130
C117	J172	J177	CONDUIT	299.5	2.0238	0.0500
C118_1	SU9	J7	CONDUIT	23.4	7.0082	0.0100
C118_2	J7	SU40	CONDUIT	51.5	5.3969	0.0100
C119	J28	J114	CONDUIT	14.4	4.5746	0.0110
C12	SU8	SU40	CONDUIT	125.6	0.4029	0.0100
C12_2	J124	J13	CONDUIT	37.9	5.0814	0.0240
C120	J113	J123	CONDUIT	176.9	3.6602	0.0350
C120_1	J114	J123	CONDUIT	215.9	3.0584	0.0350
C120_2	J123	J95	CONDUIT	202.6	2.5863	0.0350
C121	J112	J136	CONDUIT	13.5	3.1006	0.0110
C122	J120	J31	CONDUIT	5.0	2.0603	0.0110
C123	J33	SU43	CONDUIT	125.7	0.3183	0.0350
C124	J150	J172	CONDUIT	140.7	1.0001	0.0500
C125	J19	SU13	CONDUIT	260.4	4.6402	0.0500
C126	SU3	J196	CONDUIT	246.6	0.0491	0.0500
C127	J60	J122	CONDUIT	13.7	7.1643	0.0130
C128	SU10	J59	CONDUIT	67.6	0.1641	0.0100
C129	SU41	J60	CONDUIT	99.2	3.7076	0.0100
C13	J57	SU3	CONDUIT	186.0	1.8740	0.0500
C130	J21	J38	CONDUIT	32.6	0.9214	0.0240
C131	SU32	J196	CONDUIT	167.7	4.4630	0.0500
C132	J20	SU39	CONDUIT	187.0	2.0254	0.0100
C133	J23	J235	CONDUIT	767.7	4.0626	0.0500
C134	J46	J21	CONDUIT	188.1	0.4786	0.0500
C135	J131	J88	CONDUIT	17.5	3.4308	0.0110
C135_1	J88	J106	CONDUIT	14.3	0.7896	0.0110
C136	J133	J119	CONDUIT	5.2	9.7061	0.0110
C137	SU35	SU37	CONDUIT	67.3	7.7974	0.0100
C138	J117	J126	CONDUIT	11.2	2.6788	0.0110
C139	J209	J475	CONDUIT	108.2	3.5217	0.0500
C14	J482	J109	CONDUIT	396.6	0.0628	0.0500
C140	J119	J126	CONDUIT	75.8	6.2512	0.0110
C141	J37	SU43	CONDUIT	107.9	7.2047	0.0100
C143	J111	J112	CONDUIT	13.5	0.8769	0.0110
C144_1	J97	J18	CONDUIT	59.7	0.1609	0.0110
C144_2	J18	J62	CONDUIT	15.0	2.4705	0.0110
C15	J69	SU3	CONDUIT	135.0	2.5823	0.0500
C16	J140	J482	CONDUIT	8.0	2.3131	0.0100
C165	J160	J466	CONDUIT	69.4	1.7942	0.0500
C17	J48	J49	CONDUIT	634.1	2.5154	0.0500
C173	J101	J150	CONDUIT	555.5	2.6776	0.0500
C18	J81	SU3	CONDUIT	33.0	11.2802	0.0500
C188_1	J156	J11	CONDUIT	150.4	1.9926	0.0350
C19	J55	J57	CONDUIT	67.6	3.7452	0.0240
C19_1	J474	J49	CONDUIT	517.1	0.3108	0.0500
C19_2	J49	J140	CONDUIT	155.6	0.7302	0.0500
C19_3	J22	J56	CONDUIT	25.0	1.0643	0.0240
C19_4	J56	SU1	CONDUIT	65.0	0.3354	0.0500
C192	J235	J456	CONDUIT	1044.6	1.9805	0.0500
C194	J158	J160	CONDUIT	294.5	2.2623	0.0500
C196	J292	SU5	CONDUIT	561.4	5.8472	0.0500
C2	J39	J118	CONDUIT	9.7	8.5310	0.0110

C2_1	J13	J26	CONDUIT	48.3	3.7443	0.0350
C2_2	J2	J113	CONDUIT	60.1	2.1234	0.0350
C2_3	J26	J27	CONDUIT	19.7	4.6920	0.0240
C2_4	J73	J75	CONDUIT	43.1	5.2783	0.0240
C2_6	J27	J73	CONDUIT	63.4	3.8113	0.0350
C2_9	J75	J9	CONDUIT	49.0	3.3845	0.0110
C20	J5	SU3	CONDUIT	28.0	9.5432	0.0500
C200	J142	J156	CONDUIT	151.6	1.8277	0.0500
C21	J462	J474	CONDUIT	482.5	0.4145	0.0500
C214	J105	J101	CONDUIT	526.4	3.4086	0.0500
C22	SU12	SU7	CONDUIT	72.4	0.6783	0.0100
C23	J94	SU3	CONDUIT	52.0	4.5354	0.0500
C24	J50	J24	CONDUIT	24.3	0.8987	0.0240
C25	J51	J6	CONDUIT	41.0	6.1947	0.0240
C25_2	J25	J47	CONDUIT	261.1	4.1880	0.0350
C25_3	J47	J50	CONDUIT	4.5	0.8138	0.0240
C26	J34	J33	CONDUIT	16.3	1.6282	0.0240
C27	J162	J488	CONDUIT	48.4	-0.0021	0.0500
C28	J36	J37	CONDUIT	9.7	4.1535	0.0130
C28_1	J15	J116	CONDUIT	23.8	0.8102	0.0240
C28_4	J116	J36	CONDUIT	59.1	3.6698	0.0350
C29	J29	J113	CONDUIT	16.8	10.3053	0.0110
C3	J3	J2	CONDUIT	19.9	3.2457	0.0240
C30	J30	J231	CONDUIT	20.1	0.9472	0.0240
C31	J183	J162	CONDUIT	380.5	0.7907	0.0500
C32	J32	J30	CONDUIT	385.7	2.9742	0.0500
C33	J98	J196	CONDUIT	115.9	3.0292	0.0500
C33_1	J491	J128	CONDUIT	103.3	1.4582	0.0500
C33_3	J128	J129	CONDUIT	21.6	-0.1482	0.0240
C33_4	J129	J183	CONDUIT	211.2	0.4777	0.0500
C34	J31	J35	CONDUIT	60.8	7.5867	0.0240
C35	J198	J491	CONDUIT	304.3	1.0998	0.0500
C36	SU7	SU21	CONDUIT	39.7	0.5869	0.0100
C37	SU16	SU20	CONDUIT	87.1	3.9768	0.0100
C38	J456	J198	CONDUIT	306.5	1.0929	0.0500
C39	J134	J126	CONDUIT	9.3	2.1517	0.0110
C4	J4	J5	CONDUIT	46.6	9.2895	0.0110
C40	J231	J456	CONDUIT	396.8	1.3082	0.0500
C41	J472	J231	CONDUIT	278.3	0.8048	0.0500
C42	J239	J472	CONDUIT	68.3	0.9035	0.0500
C43	J252	J239	CONDUIT	39.3	3.2424	0.0240
C44	J126	J31	CONDUIT	34.8	0.8620	0.0240
C45	J495	J252	CONDUIT	331.7	1.0405	0.0500
C46	J41	J40	CONDUIT	14.0	1.7723	0.0240
C47	J43	J42	CONDUIT	14.4	1.7379	0.0240
C48	J24	SU2	CONDUIT	82.0	2.2347	0.0500
C49	SU2	SU3	CONDUIT	60.0	1.1451	0.0500
C5	SU21	SU42	CONDUIT	23.2	0.5820	0.0100
C50	J12	SU22	CONDUIT	86.3	5.5142	0.0100
C51	J486	J495	CONDUIT	591.6	1.1243	0.0500
C52	J16	J72	CONDUIT	128.8	1.9768	0.0350
C53	J286	J495	CONDUIT	872.9	1.4494	0.0500
C54	J45	J43	CONDUIT	564.7	3.8662	0.0500
C55	J35	J187	CONDUIT	89.4	2.3457	0.0500
C56	J9	SU3	CONDUIT	70.0	6.6101	0.0500
C57	J40	SU1	CONDUIT	122.0	2.6255	0.0500
C58	SU1	SU2	CONDUIT	26.6	1.0965	0.0240
C59	J42	SU2	CONDUIT	82.0	2.4971	0.0500
C6	J6	J58	CONDUIT	16.5	2.7996	0.0240
C60	J52	J47	CONDUIT	70.7	4.0538	0.0110
C61	J54	J52	CONDUIT	20.9	1.7254	0.0240
C62	SU22	SU23	CONDUIT	16.7	2.9668	0.0100
C63	J136	J88	CONDUIT	72.8	4.9506	0.0110
C64	SU5	J286	CONDUIT	20.0	0.9550	0.0240
C65	J87	J62	CONDUIT	14.8	8.1985	0.0110
C65_1	J61	J53	CONDUIT	11.0	3.1433	0.0240
C65_2	J53	J63	CONDUIT	2.3	-12.0139	0.0240
C66	SU37	SU8	CONDUIT	45.9	0.8631	0.0100
C66_1	SU4	SU5	CONDUIT	35.0	3.1501	0.0240
C67	SU24	SU26	CONDUIT	37.1	5.0771	0.0100
C68	J63	J64	CONDUIT	44.0	1.6740	0.0110
C69	SU26	SU27	CONDUIT	12.9	0.8814	0.0100
C7	J59	J121	CONDUIT	16.8	4.1248	0.0130
C7_3	J58	J121	CONDUIT	86.3	2.7290	0.0350
C7_4	J121	J8	CONDUIT	31.4	4.9503	0.0350
C70	SU11	SU19	CONDUIT	71.0	0.0085	0.0100
C71	J65	J66	CONDUIT	13.6	3.3337	0.0110
C72	J66	J67	CONDUIT	78.5	3.5956	0.0110
C73	J67	J68	CONDUIT	34.7	2.5547	0.0130
C74	J68	J69	CONDUIT	59.5	4.6400	0.0110
C75	J64	J65	CONDUIT	36.9	3.3941	0.0350
C76	J70	J71	CONDUIT	55.8	1.3592	0.0350

C77	SU42	SU28	CONDUIT	72.9	4.1069	0.0100
C77_1	J71	J124	CONDUIT	7.0	1.4573	0.0240
C77_3	J223	J41	CONDUIT	378.6	1.8942	0.0500
C77_4	J22	J10	CONDUIT	390.0	1.0719	0.0350
C77_5	J10	J462	CONDUIT	214.3	0.4311	0.0500
C78	J475	J491	CONDUIT	853.8	1.6856	0.0500
C79	J72	J70	CONDUIT	76.1	3.0012	0.0130
C8	J8	J55	CONDUIT	90.1	3.2561	0.0130
C80	J38	J44	CONDUIT	52.4	7.4907	0.0500
C80_1	J207	J44	CONDUIT	192.9	0.2856	0.0500
C80_2	J44	SU4	CONDUIT	374.9	0.2857	0.0500
C81	J76	J75	CONDUIT	2.4	-0.3360	0.0130
C82	J77	J75	CONDUIT	16.5	2.9507	0.0130
C83	J250	J207	CONDUIT	150.3	0.4065	0.0500
C84	J466	J475	CONDUIT	235.9	2.2291	0.0500
C85	J74	J78	CONDUIT	2.1	3.8972	0.0110
C86	J79	J78	CONDUIT	19.7	1.8687	0.0110
C87	J82	J78	CONDUIT	36.9	3.0437	0.0110
C88	J78	J81	CONDUIT	65.1	4.8049	0.0240
C89	J80	J82	CONDUIT	3.0	2.6567	0.0110
C9	J122	SU44	CONDUIT	78.6	3.9665	0.0100
C90	J83	J130	CONDUIT	27.5	1.8345	0.0110
C91	J84	J83	CONDUIT	16.8	4.6732	0.0110
C92	J85	J130	CONDUIT	32.6	4.7062	0.0110
C93	J185	J466	CONDUIT	328.2	1.9568	0.0500
C94	J86	SU14	CONDUIT	108.5	5.1010	0.0100
C95	J115	J93	CONDUIT	12.9	1.5542	0.0110
C95_1	SU30	J103	CONDUIT	34.7	0.1411	0.0100
C95_2	J103	SU25	CONDUIT	15.6	1.2859	0.0100
C96	J89	J87	CONDUIT	17.5	3.3945	0.0110
C97	J90	J91	CONDUIT	20.5	3.2954	0.0110
C98	J92	J91	CONDUIT	36.8	3.8995	0.0110
C99	J93	J87	CONDUIT	22.6	0.7869	0.0110
W1	J26	J65	CONDUIT	92.4	1.6519	0.0350
W15	SU15	SU16	CONDUIT	24.8	4.3674	0.0130
W27	SU13	J3	CONDUIT	12.2	0.0025	0.0350
W44	SU36	SU30	CONDUIT	110.5	0.9642	0.0100
C118	SU46	J94	WEIR			
C142	SU43	SU8	WEIR			
W10	J55	SU21	WEIR			
W11	SU11	SU12	WEIR			
W12	J73	SU12	WEIR			
W13	J84	SU15	WEIR			
W14	J83	SU16	WEIR			
W16	J79	SU20	WEIR			
W17	J74	SU19	WEIR			
W18	J78	SU19	WEIR			
W19	SU20	J4	WEIR			
W2	J7	J125	WEIR			
W20	J21	J38	WEIR			
W21	J28	SU38	WEIR			
W22	J29	SU41	WEIR			
W23	J100	J102	WEIR			
W24	J71	J124	WEIR			
W25	J120	SU8	WEIR			
W26	SU23	SU27	WEIR			
W28	J97	SU31	WEIR			
W29	SU31	J98	WEIR			
W3	J125	SU40	WEIR			
W30	J87	SU27	WEIR			
W31	J4	J5	WEIR			
W32	J15	J116	WEIR			
W33	SU4	SU5	WEIR			
W34	J95	SU30	WEIR			
W35	SU25	SU46	WEIR			
W36	SU5	J286	WEIR			
W37	SU38	J114	WEIR			
W38	SU29	SU30	WEIR			
W39	SU28	J47	WEIR			
W4	SU39	SU17	WEIR			
W40	SU47	SU32	WEIR			
W41	J110	SU36	WEIR			
W42	SU40	SU36	WEIR			
W43	J106	SU33	WEIR			
W45	J107	SU40	WEIR			
W46	J108	SU40	WEIR			
W47	J112	SU9	WEIR			
W48	J135	SU47	WEIR			
W49	J36	J37	WEIR			
W5	SU6	SU7	WEIR			
W50	J111	SU44	WEIR			
W51	SU36	SU47	WEIR			

W52	SU36	SU33	WEIR
W53	SU30	SU31	WEIR
W54	J96	SU30	WEIR
W55	SU17	J121	WEIR
W57	J115	J103	WEIR
W6	SU1	SU2	WEIR
W7	J68	SU7	WEIR
W77	SU27	J94	WEIR
W8	J65	SU10	WEIR
W9	SU40	SU47	WEIR
OL1	SU28	J50	OUTLET
OL10	SU34	J61	OUTLET
OL11	SU34	J63	OUTLET
OL12	SU10	J66	OUTLET
OL13	SU14	J85	OUTLET
OL14	SU30	J96	OUTLET
OL15	SU16	J83	OUTLET
OL16	SU15	J84	OUTLET
OL17	SU29	J99	OUTLET
OL18	SU18	J80	OUTLET
OL19	SU11	J77	OUTLET
OL2	SU42	J52	OUTLET
OL20	SU19	J74	OUTLET
OL21	SU19	J78	OUTLET
OL22	SU20	J79	OUTLET
OL23	SU22	J90	OUTLET
OL24	SU23	J89	OUTLET
OL25	SU27	J87	OUTLET
OL26	SU26	J91	OUTLET
OL27	SU25	J93	OUTLET
OL28	SU24	J92	OUTLET
OL29	SU38	J28	OUTLET
OL3	SU21	J54	OUTLET
OL30	SU41	J29	OUTLET
OL31	SU33	J106	OUTLET
OL32	SU36	J110	OUTLET
OL33	SU32	J104	OUTLET
OL34	SU40	J107	OUTLET
OL35	SU40	J108	OUTLET
OL36	SU37	J117	OUTLET
OL37	SU17	J58	OUTLET
OL38	SU34	J53	OUTLET
OL39	SU8	J120	OUTLET
OL4	SU21	J55	OUTLET
OL40	SU9	J112	OUTLET
OL41	SU44	J111	OUTLET
OL42	J103	J115	OUTLET
OL43	SU35	J133	OUTLET
OL44	J37	J39	OUTLET
OL45	SU43	J134	OUTLET
OL46	SU45	J131	OUTLET
OL47	SU46	J18	OUTLET
OL48	SU47	J135	OUTLET
OL5	SU7	J68	OUTLET
OL6	SU6	J67	OUTLET
OL7	SU12	J76	OUTLET
OL8	SU31	J97	OUTLET
OL9	SU39	J6	OUTLET

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	1.40
C1_1	CIRCULAR	0.40	0.13	0.10	0.40	1	0.24
C1_2	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	46.62
C10	TRIANGULAR	0.30	1.50	0.15	10.00	1	1.66
C100	TRAPEZOIDAL	1.00	6.00	0.54	11.00	1	21.00
C101	CIRCULAR	0.53	0.22	0.13	0.53	1	1.51
C102	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.08
C103	CIRCULAR	0.75	0.44	0.19	0.75	2	1.14
C104	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	6.79
C105	CIRCULAR	0.53	0.22	0.13	0.53	1	2.16
C106	CIRCULAR	0.45	0.16	0.11	0.45	1	0.55
C107	CIRCULAR	0.45	0.16	0.11	0.45	1	0.48
C108	CIRCULAR	0.38	0.11	0.09	0.38	1	0.33
C109	CIRCULAR	0.38	0.11	0.09	0.38	1	0.27
C11	CIRCULAR	0.60	0.28	0.15	0.60	1	0.50
C110	CIRCULAR	0.60	0.28	0.15	0.60	1	0.72

C110_1	TRAPEZOIDAL	0.50	1.75	0.29	6.00	1	5.48
C111	CIRCULAR	0.30	0.07	0.07	0.30	1	0.32
C111_1	CIRCULAR	0.53	0.22	0.13	0.53	1	0.80
C111_2	CIRCULAR	0.53	0.22	0.13	0.53	1	1.74
C112	CIRCULAR	0.30	0.07	0.07	0.30	1	0.05
C113	CIRCULAR	0.45	0.16	0.11	0.45	1	0.99
C114	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	3.32
C115	CIRCULAR	0.45	0.16	0.11	0.45	1	0.73
C116	TRAPEZOIDAL	0.30	1.50	0.16	9.50	1	3.02
C117	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	21.53
C118_1	Street	0.22	0.91	0.11	8.00	1	5.51
C118_2	Street	0.22	0.91	0.11	8.00	1	4.84
C119	CIRCULAR	0.30	0.07	0.07	0.30	1	0.24
C12	Street	0.22	0.91	0.11	8.00	1	1.32
C12_2	CIRCULAR	0.60	0.28	0.15	0.60	1	0.75
C120	TRAPEZOIDAL	1.00	16.00	0.52	31.00	1	56.20
C120_1	TRAPEZOIDAL	0.50	3.25	0.27	12.00	1	6.78
C120_2	TRAPEZOIDAL	1.00	16.00	0.52	31.00	1	47.24
C121	CIRCULAR	0.45	0.16	0.11	0.45	1	0.59
C122	CIRCULAR	0.45	0.16	0.11	0.45	1	0.48
C123	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	12.20
C124	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	15.13
C125	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	32.60
C126	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	3.35
C127	TRAPEZOIDAL	0.30	1.50	0.16	9.50	1	9.01
C128	Street	0.22	0.91	0.11	8.00	1	0.84
C129	Street	0.22	0.91	0.11	8.00	1	4.01
C13	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.72
C130	CIRCULAR	0.60	0.28	0.15	0.60	1	0.32
C131	TRAPEZOIDAL	0.30	3.45	0.26	13.00	1	6.00
C132	Street	0.22	0.91	0.11	8.00	1	2.96
C133	TRAPEZOIDAL	1.00	3.00	0.54	5.00	1	8.00
C134	TRAPEZOIDAL	1.00	3.00	0.54	5.00	1	2.75
C135	CIRCULAR	0.53	0.22	0.13	0.53	1	0.94
C135_1	CIRCULAR	0.53	0.22	0.13	0.53	1	0.45
C136	CIRCULAR	0.30	0.07	0.07	0.30	1	0.36
C137	Street	0.22	0.91	0.11	8.00	1	5.81
C138	CIRCULAR	0.30	0.07	0.07	0.30	1	0.19
C139	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	28.40
C14	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	3.79
C140	CIRCULAR	0.30	0.07	0.07	0.30	1	0.29
C141	Street	0.22	0.91	0.11	8.00	1	5.59
C143	CIRCULAR	0.45	0.16	0.11	0.45	1	0.32
C144_1	CIRCULAR	0.75	0.44	0.19	0.75	1	0.53
C144_2	CIRCULAR	0.75	0.44	0.19	0.75	1	2.07
C15	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	24.32
C16	RECT_OPEN	1.90	15.20	1.29	8.00	1	273.73
C165	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.27
C17	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	24.00
C173	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	24.76
C18	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	50.82
C188_1	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	30.52
C19	CIRCULAR	0.45	0.16	0.11	0.45	1	0.30
C19_1	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	8.44
C19_2	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	12.93
C19_3	CIRCULAR	0.60	0.28	0.15	0.60	1	0.34
C19_4	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	8.76
C192	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	21.30
C194	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	22.76
C196	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	36.59
C2	CIRCULAR	0.30	0.07	0.07	0.30	1	0.33
C2_1	TRAPEZOIDAL	1.00	6.00	0.54	11.00	1	21.89
C2_2	TRAPEZOIDAL	1.00	12.00	0.52	23.00	1	32.29
C2_3	CIRCULAR	0.45	0.16	0.11	0.45	2	0.33
C2_4	CIRCULAR	0.45	0.16	0.11	0.45	1	0.35
C2_6	TRAPEZOIDAL	1.00	6.00	0.54	11.00	1	22.08
C2_9	CIRCULAR	0.45	0.16	0.11	0.45	1	0.62
C20	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	46.75
C200	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.46
C21	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	9.74
C214	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	27.94
C22	Street	0.22	0.91	0.11	8.00	1	1.72
C23	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	32.23
C24	CIRCULAR	0.60	0.28	0.15	0.60	1	0.32
C25	CIRCULAR	0.45	0.16	0.11	0.45	1	0.38
C25_2	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	44.24
C25_3	CIRCULAR	0.60	0.28	0.15	0.60	1	0.30
C26	CIRCULAR	0.30	0.07	0.07	0.30	1	0.07
C27	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	0.69
C28	TRIANGULAR	0.30	1.50	0.15	10.00	1	6.63
C28_1	CIRCULAR	0.30	0.07	0.07	0.30	1	0.05
C28_4	TRAPEZOIDAL	1.00	7.00	0.57	12.00	1	26.46

C29	CIRCULAR	0.30	0.07	0.07	0.30	1	0.37
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.09
C30	CIRCULAR	0.90	0.64	0.23	0.90	1	0.95
C31	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	13.46
C32	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	26.10
C33	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	26.34
C33_1	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	18.27
C33_3	CIRCULAR	2.50	4.91	0.63	2.50	1	5.76
C33_4	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	10.46
C34	CIRCULAR	0.90	0.64	0.23	0.90	1	2.70
C35	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	15.87
C36	Street	0.22	0.91	0.11	8.00	1	1.60
C37	Street	0.22	0.91	0.11	8.00	1	4.15
C38	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	15.82
C39	CIRCULAR	0.45	0.16	0.11	0.45	1	0.49
C4	CIRCULAR	0.30	0.07	0.07	0.30	1	0.35
C40	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	17.31
C41	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	13.58
C42	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	14.38
C43	CIRCULAR	2.27	4.05	0.57	2.27	1	20.82
C44	CIRCULAR	0.75	0.44	0.19	0.75	1	0.56
C45	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	15.44
C46	CIRCULAR	0.40	0.13	0.10	0.40	1	0.15
C47	CIRCULAR	0.30	0.07	0.07	0.30	1	0.07
C48	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	22.62
C49	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	16.19
C5	Street	0.22	0.91	0.11	8.00	1	1.59
C50	Street	0.22	0.91	0.11	8.00	1	4.89
C51	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	16.05
C52	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	30.39
C53	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	18.22
C54	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	29.75
C55	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	23.18
C56	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	38.91
C57	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	24.52
C58	CIRCULAR	1.20	1.13	0.30	1.20	1	2.21
C59	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	23.91
C6	CIRCULAR	0.45	0.16	0.11	0.45	1	0.26
C60	CIRCULAR	0.60	0.28	0.15	0.60	1	1.46
C61	CIRCULAR	0.45	0.16	0.11	0.45	1	0.20
C62	Street	0.22	0.91	0.11	8.00	1	3.59
C63	CIRCULAR	0.45	0.16	0.11	0.45	1	0.75
C64	CIRCULAR	0.60	0.28	0.15	0.60	2	0.33
C65	CIRCULAR	0.53	0.22	0.13	0.53	1	1.46
C65_1	CIRCULAR	0.45	0.16	0.11	0.45	1	0.27
C65_2	CIRCULAR	0.45	0.16	0.11	0.45	1	0.54
C66	Street	0.22	0.91	0.11	8.00	1	1.93
C66_1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.59
C67	Street	0.22	0.91	0.11	8.00	1	4.69
C68	CIRCULAR	0.38	0.11	0.09	0.38	1	0.27
C69	Street	0.22	0.91	0.11	8.00	1	1.95
C7	TRIANGULAR	0.36	0.18	0.15	1.00	1	0.79
C7_3	TRAPEZOIDAL	1.00	7.00	0.57	12.00	1	22.82
C7_4	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	48.10
C70	Street	0.22	0.91	0.11	8.00	1	0.19
C71	CIRCULAR	0.30	0.07	0.07	0.30	1	0.21
C72	CIRCULAR	0.45	0.16	0.11	0.45	1	0.64
C73	CIRCULAR	0.45	0.16	0.11	0.45	1	0.46
C74	CIRCULAR	0.45	0.16	0.11	0.45	1	0.73
C75	TRAPEZOIDAL	0.50	3.75	0.37	10.00	1	10.20
C76	TRAPEZOIDAL	0.63	2.64	0.35	7.33	1	4.39
C77	Street	0.22	0.91	0.11	8.00	1	4.22
C77_1	CIRCULAR	0.45	0.16	0.11	0.45	1	0.19
C77_3	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	20.83
C77_4	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	22.38
C77_5	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	9.94
C78	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	19.65
C79	TRIANGULAR	0.30	1.50	0.15	10.00	1	5.64
C8	CIRCULAR	0.45	0.16	0.11	0.45	1	0.51
C80	TRAPEZOIDAL	1.00	15.00	0.60	25.00	1	58.26
C80_1	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	8.09
C80_2	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	8.09
C81	CIRCULAR	0.30	0.07	0.07	0.30	1	0.06
C82	CIRCULAR	0.30	0.07	0.07	0.30	1	0.17
C83	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	9.65
C84	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	22.59
C85	CIRCULAR	0.30	0.07	0.07	0.30	1	0.23
C86	CIRCULAR	0.45	0.16	0.11	0.45	1	0.46
C87	CIRCULAR	0.60	0.28	0.15	0.60	1	1.27
C88	CIRCULAR	0.60	0.28	0.15	0.60	1	0.73
C89	CIRCULAR	0.30	0.07	0.07	0.30	1	0.19
C9	Street	0.22	0.91	0.11	8.00	1	4.15

C90	CIRCULAR	0.38	0.11	0.09	0.38	1	0.28
C91	CIRCULAR	0.38	0.11	0.09	0.38	1	0.45
C92	CIRCULAR	0.25	0.05	0.06	0.25	1	0.15
C93	TRAPEZOIDAL	1.00	10.00	0.66	15.00	1	21.17
C94	Street	0.22	0.91	0.11	8.00	1	4.70
C95	CIRCULAR	0.53	0.22	0.13	0.53	1	0.63
C95_1	Street	0.22	0.91	0.11	8.00	1	0.78
C95_2	Street	0.22	0.91	0.11	8.00	1	2.36
C96	CIRCULAR	0.30	0.07	0.07	0.30	1	0.21
C97	CIRCULAR	0.30	0.07	0.07	0.30	1	0.21
C98	CIRCULAR	0.53	0.22	0.13	0.53	1	1.00
C99	CIRCULAR	0.53	0.22	0.13	0.53	1	0.45
W1	TRAPEZOIDAL	0.50	1.75	0.29	6.00	1	2.80
W15	TRAPEZOIDAL	0.30	1.95	0.24	8.00	1	12.17
W27	TRAPEZOIDAL	0.30	3.45	0.26	13.00	1	0.20
W44	Street	0.22	0.91	0.11	8.00	1	2.04

****
Transect Summary
****

Transect Street
Area:

	0.0005	0.0021	0.0048	0.0085	0.0133
	0.0191	0.0261	0.0340	0.0431	0.0532
	0.0644	0.0766	0.0899	0.1042	0.1197
	0.1362	0.1537	0.1723	0.1920	0.2127
	0.2344	0.2562	0.2779	0.2997	0.3214
	0.3432	0.3649	0.3867	0.4085	0.4302
	0.4520	0.4737	0.4955	0.5173	0.5395
	0.5627	0.5870	0.6124	0.6389	0.6664
	0.6949	0.7246	0.7553	0.7871	0.8199
	0.8538	0.8887	0.9248	0.9619	1.0000

Hrad:

	0.0196	0.0393	0.0589	0.0785	0.0981
	0.1178	0.1374	0.1570	0.1766	0.1963
	0.2159	0.2355	0.2551	0.2748	0.2944
	0.3140	0.3336	0.3533	0.3729	0.3925
	0.4224	0.4607	0.4989	0.5369	0.5748
	0.6126	0.6502	0.6876	0.7250	0.7621
	0.7992	0.8361	0.8728	0.9095	0.9090
	0.9067	0.9064	0.9076	0.9102	0.9141
	0.9191	0.9252	0.9321	0.9399	0.9484
	0.9576	0.9674	0.9778	0.9886	1.0000

Width:

	0.0275	0.0550	0.0825	0.1100	0.1375
	0.1650	0.1925	0.2200	0.2475	0.2750
	0.3025	0.3300	0.3575	0.3850	0.4125
	0.4400	0.4675	0.4950	0.5225	0.5500
	0.5625	0.5625	0.5625	0.5625	0.5625
	0.5625	0.5625	0.5625	0.5625	0.5625
	0.5625	0.5625	0.5625	0.5625	0.5875
	0.6150	0.6425	0.6700	0.6975	0.7250
	0.7525	0.7800	0.8075	0.8350	0.8625
	0.8900	0.9175	0.9450	0.9725	1.0000

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
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 ..... GREEN_AMPT
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 06/03/2022 00:00:00
Ending Date 06/04/2022 00:00:00

```
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:01:00
Dry Time Step ............ 00:01:00
Routing Time Step ........ 1.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 10
Head Tolerance ........... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Initial LID Storage	82.533	70.526
Total Precipitation	80.989	69.207
Evaporation Loss	0.000	0.000
Infiltration Loss	3.515	3.003
Surface Runoff	10.758	9.193
LID Drainage	8.711	7.444
Final Storage	140.553	120.106
Continuity Error (%)	-0.009	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	19.464	194.644
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	17.477	174.776
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.502	5.015
Final Stored Volume	2.533	25.328
Continuity Error (%)	-0.223	

```
************************
Highest Continuity Errors
************************
Node SU13 (63.40%)
Node J74 (-11.12%)
Node J43 (9.06%)
Node SU19 (5.69%)
Node J41 (5.06%)

**************************
Time-Step Critical Elements
**************************
Link C111_2 (14.41%)
Link C81 (3.21%)
Link C65_2 (2.66%)

*******************************
Highest Flow Instability Indexes
*******************************
Link C11 (72)
Link C12_2 (63)
Link C6 (60)
Link C2_6 (56)
Link C26 (54)

************************
Routing Time Step Summary
************************
Minimum Time Step           :     0.15 sec
Average Time Step           :     0.94 sec
Maximum Time Step           :     1.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     2.37
Percent Not Converging      :     5.57
Time Step Frequencies       :
    1.000 -  0.871 sec      :    80.60 %
    0.871 -  0.758 sec      :     6.37 %
    0.758 -  0.660 sec      :     5.06 %
```

0.660 - 0.574 sec : 3.60 %
0.574 - 0.500 sec : 4.38 %

****
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
S1	69.21	0.00	0.00	12.34	35.19	20.89	56.09	0.23	0.17	0.810
S1_1	69.21	0.00	0.00	7.70	47.36	13.07	60.43	0.03	0.03	0.873
S1_2	69.21	0.00	0.00	2.38	0.65	0.00	13.13	13.68	0.35	0.190
S1_3	69.21	0.00	0.00	2.35	1.38	0.00	15.80	4.26	0.16	0.228
S1_5	69.21	0.00	0.00	7.88	47.35	12.89	60.24	0.06	0.04	0.870
S1_6	69.21	0.00	0.00	7.70	47.36	13.07	60.43	0.05	0.04	0.873
S1_7	69.21	0.00	0.00	2.30	2.70	0.00	19.02	3.63	0.18	0.275
S10	69.21	0.00	0.00	18.08	22.33	28.30	50.63	0.57	0.30	0.732
S103	69.21	0.00	0.00	2.36	1.04	0.00	18.30	3.69	0.18	0.264
S105	69.21	0.00	0.00	2.40	0.13	0.00	11.34	4.61	0.08	0.164
S11	69.21	0.00	0.00	23.12	8.13	37.80	45.93	0.17	0.08	0.664
S111	69.21	0.00	0.00	2.38	0.50	0.00	14.28	1.75	0.05	0.206
S112	69.21	0.00	0.00	2.38	0.64	0.00	18.79	2.85		
S117	69.21	0.00	0.00	2.34	1.67	0.00	13.46	3.99	0.11	0.194
S12	69.21	0.00	0.00	21.50	13.54	33.88	47.42	1.20	0.56	0.685
S12_1	69.21	0.00	0.00	20.49	14.90	33.51	48.41	0.26	0.14	0.699
S122	69.21	0.00	0.00	20.06	16.25	32.55	48.80	0.43	0.23	0.705
S122_2	69.21	0.00	0.00	15.70	27.07	25.84	52.91	0.38	0.24	0.765
S122_3	69.21	0.00	0.00	10.55	40.59	17.14	57.73	0.19	0.13	0.834
S122_4	69.21	0.00	0.00	24.24	6.77	38.06	44.84	0.12	0.05	0.648
S122_7	69.21	0.00	0.00	16.88	23.69	28.12	51.82	0.24	0.15	0.749
S127	69.21	0.00	0.00	2.38	0.55	0.00	18.95	3.29	0.17	0.274
S129_1	69.21	0.00	0.00	2.38	0.64	0.00	18.03	3.97	0.19	0.261
S13	69.21	0.00	0.00	2.33	2.01	0.00	14.79	2.74	0.09	0.214
S13_1	69.21	0.00	0.00	14.07	30.46	24.01	54.48	0.24	0.18	0.787
S13_2	69.21	0.00	0.00	19.22	18.22	31.37	49.60	0.15	0.08	0.717
S130_4	69.21	0.00	0.00	1.92	13.50	0.00	22.62	4.88	0.25	0.327
S134_1	69.21	0.00	0.00	2.04	10.18	0.00	28.45	0.98	0.09	0.411
S134_10	69.21	0.00	0.00	2.35	1.38	0.00	25.16	0.16	0.01	0.364
S134_11	69.21	0.00	0.00	8.19	46.01	13.97	59.98	0.17	0.13	0.867
S134_12	69.21	0.00	0.00	19.27	20.30	29.19	49.49	0.30	0.14	0.715
S134_14	69.21	0.00	0.00	15.40	27.08	26.15	53.23	0.13	0.10	0.769
S134_15	69.21	0.00	0.00	26.03	2.03	41.11	43.14	0.21	0.09	0.623
S134_16	69.21	0.00	0.00	25.73	6.77	36.57	43.34	0.54	0.16	0.626
S134_3	69.21	0.00	0.00	18.46	22.33	27.92	50.25	0.16	0.08	0.726

S134_4	69.21	0.00	0.00	14.85	28.43	25.31	53.75	0.13
0.10	0.777							
S134_5	69.21	0.00	0.00	20.34	14.90	33.66	48.55	0.26
0.15	0.702							
S134_6	69.21	0.00	0.00	17.08	25.04	26.53	51.56	0.49
0.27	0.745							
S134_8	69.21	0.00	0.00	20.94	13.54	34.44	47.99	0.32
0.17	0.693							
S134_9	69.21	0.00	0.00	15.38	27.08	26.16	53.24	0.16
0.11	0.769							
S135_1	69.21	0.00	0.00	22.97	10.83	35.18	46.01	0.99
0.40	0.665							
S135_2	69.21	0.00	0.00	24.85	8.80	35.37	44.17	0.37
0.12	0.638							
S135_3	69.21	0.00	0.00	19.65	16.93	32.27	49.20	0.26
0.15	0.711							
S135_4	69.21	0.00	0.00	24.35	11.01	33.60	44.61	0.57
0.19	0.645							
S136	69.21	0.00	0.00	2.38	0.50	0.00	17.87	3.61
0.17	0.258							
S14	69.21	0.00	0.00	14.25	30.46	23.83	54.28	0.33
0.23	0.784							
S141	69.21	0.00	0.00	2.38	0.68	0.00	16.73	5.82
0.24	0.242							
S145	69.21	0.00	0.00	2.38	0.69	0.00	14.76	2.75
0.09	0.213							
S147_2	69.21	0.00	0.00	7.96	47.35	12.81	60.15	0.09
0.06	0.869							
S147_3	69.21	0.00	0.00	2.40	0.08	0.00	22.60	2.04
0.15	0.327							
S148	69.21	0.00	0.00	2.38	0.67	0.00	19.03	1.16
0.06	0.275							
S149	69.21	0.00	0.00	2.39	0.18	0.00	15.30	3.49
0.12	0.221							
S15	69.21	0.00	0.00	2.34	1.70	0.00	19.92	0.55
0.03	0.288							
S155	69.21	0.00	0.00	2.38	0.47	0.00	13.33	5.74
0.15	0.193							
S158	69.21	0.00	0.00	2.37	0.71	0.00	14.32	4.93
0.15	0.207							
S16	69.21	0.00	0.00	14.76	30.45	23.32	53.76	0.52
0.31	0.777							
S16_2	69.21	0.00	0.00	16.26	27.07	25.28	52.34	0.52
0.30	0.756							

S160_1	69.21	0.00	0.00	2.38	0.68	0.00	19.14	6.49
0.34	0.277							
S160_3	69.21	0.00	0.00	2.28	3.37	0.00	19.02	0.64
0.03	0.275							
S162_2	69.21	0.00	0.00	2.23	4.76	0.00	22.62	0.51
0.03	0.327							
S17	69.21	0.00	0.00	2.31	2.64	0.00	13.12	4.37
0.11	0.190							
S179_2	69.21	0.00	0.00	2.21	5.44	0.00	15.85	4.14
0.14	0.229							
S18	69.21	0.00	0.00	2.33	2.01	0.00	14.03	3.55
0.10	0.203							
S180	69.21	0.00	0.00	2.30	2.71	0.00	14.73	4.78
0.15	0.213							
S19	69.21	0.00	0.00	19.69	19.10	30.00	49.10	0.18
0.09	0.709							
S19_2	69.21	0.00	0.00	1.97	12.15	0.00	17.66	3.95
0.14	0.255							
S198_1	69.21	0.00	0.00	2.26	4.07	0.00	15.73	1.91
0.07	0.227							
S198_2	69.21	0.00	0.00	2.38	0.65	0.00	15.84	1.49
0.06	0.229							
S2	69.21	0.00	0.00	2.35	1.37	0.00	14.67	1.59
0.05	0.212							
S2_1	69.21	0.00	0.00	2.26	4.03	0.00	14.00	0.49
0.01	0.202							
S20	69.21	0.00	0.00	2.16	6.72	0.00	19.03	0.40
0.02	0.275							
S20_2	69.21	0.00	0.00	22.77	12.49	33.68	46.17	0.92
0.36	0.667							
S206_2	69.21	0.00	0.00	2.35	1.35	0.00	12.88	3.03
0.08	0.186							
S21	69.21	0.00	0.00	2.05	9.79	0.00	23.51	0.42
0.03	0.340							
S215	69.21	0.00	0.00	2.35	1.37	0.00	18.80	4.08
0.20	0.272							
S217	69.21	0.00	0.00	2.35	1.35	0.00	15.79	2.37
0.09	0.228							
S22	69.21	0.00	0.00	17.60	23.69	27.40	51.08	0.18
0.10	0.738							
S225	69.21	0.00	0.00	2.36	1.20	0.00	15.81	2.40
0.09	0.228							
S23	69.21	0.00	0.00	23.13	10.16	35.71	45.87	0.35
0.14	0.663							

S24	69.21	0.00	0.00	2.26	4.05	0.00	16.29	2.02	
0.07	0.235								
S24_1	69.21	0.00	0.00	2.21	5.41	0.00	16.86	1.62	
0.06	0.244								
S25	69.21	0.00	0.00	2.33	2.02	0.00	13.81	4.16	
0.12	0.200								
S26	69.21	0.00	0.00	2.35	1.37	0.00	11.74	6.79	
0.14	0.170								
S27	69.21	0.00	0.00	2.33	2.05	0.00	13.72	4.53	
0.13	0.198								
S28	69.21	0.00	0.00	1.27	6.78	0.00	29.33	2.54	
2.37	0.424								
S3	69.21	0.00	0.00	2.35	1.37	0.00	14.71	4.16	
0.13	0.213								
S3_2	69.21	0.00	0.00	2.28	3.35	0.00	12.93	4.96	
0.12	0.187								
S4	69.21	0.00	0.00	2.21	5.40	0.00	16.08	1.27	
0.05	0.232								
S5	69.21	0.00	0.00	1.80	16.93	0.00	32.08	1.14	
0.12	0.464								
S5_2	69.21	0.00	0.00	2.39	0.14	0.00	14.42	1.02	
0.03	0.208								
S5_4	69.21	0.00	0.00	2.37	0.85	0.00	14.65	0.35	
0.01	0.212								
S6	69.21	0.00	0.00	17.10	24.36	27.20	51.56	0.26	
0.15	0.745								
S7	69.21	0.00	0.00	2.30	2.74	0.00	16.66	1.19	
0.05	0.241								
S7_1	69.21	0.00	0.00	18.80	20.30	29.66	49.96	0.79	
0.42	0.722								
S7_10	69.21	0.00	0.00	17.55	23.69	27.44	51.13	1.17	
0.64	0.739								
S7_12	69.21	0.00	0.00	21.67	17.59	29.55	47.14	1.24	
0.50	0.681								
S7_15	69.21	0.00	0.00	7.90	47.35	12.87	60.22	0.07	
0.05	0.870								
S7_16	69.21	0.00	0.00	17.82	20.32	30.65	50.97	0.07	
0.05	0.736								
S7_17	69.21	0.00	0.00	17.70	20.32	30.77	51.09	0.05	
0.04	0.738								
S7_3	69.21	0.00	0.00	20.42	16.92	31.50	48.42	0.52	
0.25	0.700								
S7_4	69.21	0.00	0.00	23.46	10.16	35.38	45.53	0.64	
0.24	0.658								
S7_7	69.21	0.00	0.00	24.68	8.12	36.23	44.35	0.87	
0.29	0.641								
S7_8	69.21	0.00	0.00	21.72	10.16	37.14	47.29	0.04	
0.03	0.683								
S7_9	69.21	0.00	0.00	24.18	14.21	30.50	44.71	1.48	
0.51	0.646								
S75	69.21	0.00	0.00	2.32	2.37	0.00	13.70	4.30	
0.12	0.198								
S8	69.21	0.00	0.00	2.11	8.14	0.00	21.48	1.45	
0.08	0.310								
S9	69.21	0.00	0.00	23.01	13.54	32.36	45.90	0.90	
0.34	0.663								
S9_1	69.21	0.00	0.00	2.30	2.71	0.00	20.42	0.69	
0.04	0.295								
S9_2	69.21	0.00	0.00	2.35	1.48	0.00	23.99	0.19	
0.02	0.347								
S9_5	69.21	0.00	0.00	21.32	16.92	30.59	47.51	0.22	
0.09	0.686								
S9_6	69.21	0.00	0.00	25.05	6.09	37.94	44.04	0.33	
0.12	0.636								

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
S1_2	Rural	69.86	0.00	2.40	5.23	8.02	75.82	130.04	-0.01
S1_3	Rural	70.62	0.00	2.40	8.12	8.01	75.82	127.92	-0.01
S1_7	Rural	72.02	0.00	2.40	11.81	8.00	75.82	125.64	-0.01
S103	Rural	70.26	0.00	2.40	10.60	7.99	75.82	125.11	-0.01

S105	Rural	69.34	0.00	2.40	3.33	8.03	75.82	131.41	-0.01
S111	Rural	69.71	0.00	2.40	6.37	8.01	75.82	128.75	-0.01
S112	Rural	69.85	0.00	2.40	10.98	7.99	75.82	124.32	-0.01
S117	Rural	70.92	0.00	2.40	5.77	8.03	75.82	130.55	-0.01
S127	Rural	69.76	0.00	2.40	11.12	7.98	75.82	124.08	-0.01
S129_1	Rural	69.86	0.00	2.40	10.21	7.99	75.82	125.09	-0.01
S13	Rural	71.28	0.00	2.40	7.22	8.02	75.82	129.47	-0.01
S130_4	Rural	86.07	0.00	2.40	20.17	8.10	75.82	131.25	-0.01
S134_1	Rural	81.18	0.00	2.40	25.48	8.00	75.82	121.14	-0.01
S134_10	Rural	70.62	0.00	2.40	17.74	7.94	75.82	118.37	-0.01
S136	Rural	69.71	0.00	2.40	10.01	7.99	75.82	125.14	-0.01
S141	Rural	69.89	0.00	2.40	8.89	8.00	75.82	126.43	-0.01
S145	Rural	69.91	0.00	2.40	6.90	8.01	75.82	128.43	-0.01
S147_3	Rural	69.28	0.00	2.40	14.68	7.95	75.82	120.09	-0.01
S148	Rural	69.88	0.00	2.40	11.23	7.99	75.82	124.09	-0.01
S149	Rural	69.39	0.00	2.40	7.34	8.01	75.82	127.48	-0.01
S15	Rural	70.95	0.00	2.40	12.45	7.99	75.82	123.95	-0.01
S155	Rural	69.68	0.00	2.40	5.40	8.02	75.82	129.69	-0.01
S158	Rural	69.92	0.00	2.40	6.45	8.02	75.82	128.89	-0.01
S160_1	Rural	69.89	0.00	2.40	11.35	7.98	75.82	123.99	-0.01
S160_3	Rural	72.76	0.00	2.40	12.00	8.01	75.82	126.18	-0.01
S162_2	Rural	74.33	0.00	2.40	16.34	8.00	75.82	123.43	-0.01
S17	Rural	71.96	0.00	2.40	5.61	8.04	75.82	131.74	-0.01
S179_2	Rural	75.13	0.00	2.40	9.18	8.06	75.82	131.32	-0.01
S18	Rural	71.28	0.00	2.40	6.43	8.03	75.82	130.25	-0.01
S180	Rural	72.03	0.00	2.40	7.30	8.03	75.82	130.13	-0.01
S19_2	Rural	84.02	0.00	2.40	13.41	8.12	75.82	135.92	-0.01
S198_1	Rural	73.54	0.00	2.40	8.69	8.04	75.82	130.24	-0.01
S198_2	Rural	69.86	0.00	2.40	7.98	8.01	75.82	127.30	-0.01
S2	Rural	70.61	0.00	2.40	6.95	8.02	75.82	129.07	-0.01
S2_1	Rural	73.49	0.00	2.40	6.83	8.05	75.82	132.04	-0.01
S20	Rural	76.66	0.00	2.40	13.08	8.05	75.82	128.97	-0.01
S206_2	Rural	70.59	0.00	2.40	5.12	8.03	75.82	130.87	-0.01
S21	Rural	80.65	0.00	2.40	19.43	8.05	75.82	126.60	-0.01
S215	Rural	70.61	0.00	2.40	11.20	7.99	75.82	124.85	-0.01
S217	Rural	70.59	0.00	2.40	8.10	8.01	75.82	127.91	-0.01
S225	Rural	70.43	0.00	2.40	8.09	8.01	75.82	127.77	-0.01
S24	Rural	73.51	0.00	2.40	9.29	8.04	75.82	129.61	-0.01
S24_1	Rural	75.09	0.00	2.40	10.28	8.05	75.82	130.19	-0.01
S25	Rural	71.29	0.00	2.40	6.20	8.03	75.82	130.49	-0.01
S26	Rural	70.61	0.00	2.40	3.94	8.04	75.82	132.06	-0.01
S27	Rural	71.32	0.00	2.40	6.12	8.04	75.82	130.60	-0.01
S28	Rural	69.21	0.00	1.41	21.78	3.28	58.56	101.31	-0.00
S3	Rural	70.61	0.00	2.40	7.00	8.02	75.82	129.02	-0.01

S3_2	Rural	72.74	0.00	2.40	5.55	8.05	75.82	132.57	-0.01
S4	Rural	75.07	0.00	2.40	9.42	8.06	75.82	131.03	-0.01
S5	Rural	91.78	0.00	2.40	34.73	8.05	75.82	122.44	-0.01
S5_2	Rural	69.35	0.00	2.40	6.44	8.01	75.82	128.33	-0.01
S5_4	Rural	70.07	0.00	2.40	6.82	8.02	75.82	128.66	-0.01
S7	Rural	72.06	0.00	2.40	9.34	8.02	75.82	128.13	-0.01
S75	Rural	71.67	0.00	2.40	6.16	8.04	75.82	130.91	-0.01
S8	Rural	78.45	0.00	2.40	16.37	8.05	75.82	127.47	-0.01
S9_1	Rural	72.03	0.00	2.40	13.27	8.00	75.82	124.19	-0.01
S9_2	Rural	70.72	0.00	2.40	16.57	7.95	75.82	119.63	-0.01

****
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
J1	JUNCTION	0.12	0.25	1149.19	0 03:12	0.25
J10	JUNCTION	0.04	0.20	1164.92	0 01:41	0.20
J100	JUNCTION	0.02	0.31	1178.84	0 01:25	0.31
J101	JUNCTION	0.05	0.10	1178.62	0 02:57	0.10
J102	JUNCTION	0.00	0.09	1177.44	0 01:25	0.09
J104	JUNCTION	0.06	1.29	1173.64	0 01:35	1.28
J105	JUNCTION	0.03	0.05	1196.50	0 03:09	0.05
J106	JUNCTION	0.06	1.27	1174.36	0 01:28	1.27
J107	JUNCTION	0.04	1.02	1174.60	0 01:28	1.01
J108	JUNCTION	0.04	0.85	1174.65	0 01:27	0.84
J11	JUNCTION	0.32	0.57	1185.23	0 02:57	0.57
J110	JUNCTION	0.03	0.90	1174.40	0 01:28	0.89
J111	JUNCTION	0.03	0.24	1177.58	0 01:26	0.24
J112	JUNCTION	0.03	0.28	1177.50	0 01:26	0.28
J113	JUNCTION	0.02	0.09	1184.66	0 01:30	0.09
J114	JUNCTION	0.01	0.16	1184.86	0 01:30	0.16
J115	JUNCTION	0.01	0.25	1172.53	0 01:31	0.25
J116	JUNCTION	0.02	0.05	1185.87	0 01:35	0.05
J117	JUNCTION	0.02	0.44	1174.34	0 01:36	0.43
J118	JUNCTION	0.05	0.13	1181.05	0 01:30	0.13
J119	JUNCTION	0.05	0.19	1178.72	0 01:25	0.19
J12	JUNCTION	0.01	0.05	1178.85	0 01:25	0.05
J120	JUNCTION	0.05	0.66	1174.07	0 01:35	0.66
J121	JUNCTION	0.01	0.08	1177.38	0 01:36	0.08
J122	JUNCTION	0.01	0.09	1182.14	0 01:25	0.09
J123	JUNCTION	0.03	0.22	1178.32	0 01:32	0.22
J124	JUNCTION	0.22	0.58	1182.99	0 02:06	0.58
J126	JUNCTION	0.14	0.73	1174.33	0 01:35	0.73
J127	JUNCTION	0.01	0.03	1148.26	0 02:51	0.03
J128	JUNCTION	0.64	1.00	1124.96	0 05:13	1.00
J129	JUNCTION	0.40	0.68	1124.67	0 05:13	0.68
J13	JUNCTION	0.07	0.16	1180.65	0 02:06	0.16
J130	JUNCTION	0.02	0.24	1176.84	0 01:31	0.24
J131	JUNCTION	0.03	1.25	1175.05	0 01:25	0.77
J133	JUNCTION	0.01	0.10	1179.13	0 01:25	0.10
J134	JUNCTION	0.06	0.62	1174.42	0 01:35	0.61
J135	JUNCTION	0.06	1.40	1174.20	0 01:31	1.39
J136	JUNCTION	0.02	0.24	1177.04	0 01:26	0.24
J14	JUNCTION	0.01	0.12	1183.44	0 01:31	0.12
J140	JUNCTION	0.12	0.47	1159.52	0 03:05	0.47
J142	JUNCTION	0.04	0.10	1190.52	0 02:36	0.10
J15	JUNCTION	0.12	0.27	1186.28	0 02:41	0.27
J150	JUNCTION	0.10	0.20	1163.86	0 02:56	0.20
J156	JUNCTION	0.03	0.07	1187.72	0 02:36	0.07
J158	JUNCTION	0.03	0.04	1153.06	0 01:58	0.04
J16	JUNCTION	0.01	0.02	1188.12	0 02:26	0.02
J160	JUNCTION	0.03	0.05	1146.40	0 03:22	0.05
J162	JUNCTION	0.48	0.79	1120.76	0 05:22	0.79
J17	JUNCTION	0.01	0.04	1176.64	0 02:24	0.04
J172	JUNCTION	0.08	0.16	1162.41	0 03:01	0.16
J177	JUNCTION	0.09	0.18	1156.37	0 03:03	0.18
J18	JUNCTION	0.07	0.95	1172.02	0 01:31	0.91
J183	JUNCTION	0.32	0.56	1123.53	0 05:19	0.56

J185	JUNCTION	0.09	0.18	1151.71	0	03:06	0.18
J187	JUNCTION	0.23	0.63	1167.23	0	02:35	0.63
J19	JUNCTION	0.00	0.01	1198.51	0	02:16	0.01
J196	JUNCTION	0.28	0.70	1167.38	0	02:32	0.70
J198	JUNCTION	0.23	0.44	1129.25	0	05:12	0.44
J2	JUNCTION	0.01	0.08	1185.93	0	01:25	0.08
J20	JUNCTION	0.02	0.03	1184.93	0	03:34	0.03
J207	JUNCTION	0.23	0.59	1165.23	0	02:53	0.59
J209	JUNCTION	0.05	0.08	1143.74	0	02:56	0.08
J21	JUNCTION	0.24	1.73	1170.03	0	01:38	1.72
J22	JUNCTION	0.09	0.47	1168.74	0	01:45	0.47
J223	JUNCTION	0.00	0.00	1178.40	0	00:00	0.00
J23	JUNCTION	0.07	0.12	1184.12	0	02:50	0.12
J231	JUNCTION	0.23	0.42	1137.76	0	04:58	0.42
J235	JUNCTION	0.03	0.05	1152.89	0	03:31	0.05
J239	JUNCTION	0.24	0.45	1140.65	0	04:52	0.45
J24	JUNCTION	0.02	0.14	1169.46	0	01:49	0.14
J25	JUNCTION	0.00	0.01	1180.51	0	02:41	0.01
J250	JUNCTION	0.21	0.54	1165.79	0	02:49	0.54
J252	JUNCTION	0.55	0.99	1142.47	0	04:51	0.99
J26	JUNCTION	0.35	0.71	1179.39	0	02:06	0.71
J27	JUNCTION	0.07	0.16	1177.92	0	02:06	0.16
J28	JUNCTION	0.11	1.53	1186.88	0	01:25	1.49
J286	JUNCTION	0.20	0.38	1157.96	0	04:33	0.38
J29	JUNCTION	0.05	0.48	1186.77	0	01:26	0.47
J292	JUNCTION	0.03	0.04	1193.93	0	03:18	0.04
J3	JUNCTION	0.05	0.43	1186.92	0	01:25	0.43
J30	JUNCTION	0.16	0.25	1137.79	0	03:23	0.25
J31	JUNCTION	0.12	0.75	1174.05	0	01:35	0.75
J32	JUNCTION	0.03	0.06	1149.06	0	02:48	0.06
J33	JUNCTION	0.02	0.04	1176.04	0	04:20	0.04
J35	JUNCTION	0.03	0.16	1168.86	0	01:32	0.16
J36	JUNCTION	0.03	0.08	1183.74	0	01:25	0.08
J38	JUNCTION	0.02	0.13	1168.13	0	01:38	0.13
J39	JUNCTION	0.05	0.13	1181.88	0	01:30	0.13
J4	JUNCTION	0.01	0.30	1174.07	0	01:26	0.30
J40	JUNCTION	0.02	0.04	1171.02	0	04:09	0.04
J41	JUNCTION	0.12	0.26	1171.49	0	04:06	0.26
J42	JUNCTION	0.02	0.03	1169.56	0	04:57	0.03
J43	JUNCTION	0.12	0.23	1170.02	0	04:55	0.23
J44	JUNCTION	0.26	0.75	1164.84	0	03:02	0.75
J45	JUNCTION	0.00	0.00	1191.60	0	00:00	0.00
J456	JUNCTION	0.24	0.44	1132.60	0	05:05	0.44
J46	JUNCTION	0.12	0.85	1170.05	0	01:37	0.85
J462	JUNCTION	0.07	0.24	1164.04	0	02:01	0.24
J466	JUNCTION	0.10	0.20	1145.31	0	03:05	0.20
J47	JUNCTION	0.13	0.90	1170.47	0	01:47	0.90
J472	JUNCTION	0.27	0.50	1140.09	0	04:48	0.50
J474	JUNCTION	0.10	0.24	1162.04	0	02:30	0.24
J475	JUNCTION	0.14	0.27	1140.12	0	03:09	0.27
J48	JUNCTION	0.00	0.00	1176.13	0	00:00	0.00
J482	JUNCTION	0.31	0.64	1159.51	0	03:06	0.64
J486	JUNCTION	0.04	0.09	1151.67	0	02:39	0.09
J49	JUNCTION	0.13	0.31	1160.50	0	02:35	0.31
J491	JUNCTION	0.27	0.48	1125.93	0	05:12	0.48
J495	JUNCTION	0.23	0.43	1145.35	0	04:45	0.43
J5	JUNCTION	0.00	0.04	1169.50	0	01:26	0.04
J50	JUNCTION	0.13	0.89	1170.42	0	01:47	0.88
J51	JUNCTION	0.09	0.14	1182.79	0	02:51	0.14
J52	JUNCTION	0.03	0.38	1173.05	0	01:32	0.38
J53	JUNCTION	0.30	0.66	1181.47	0	01:29	0.65
J54	JUNCTION	0.02	0.22	1173.24	0	01:32	0.22
J55	JUNCTION	0.15	1.08	1173.90	0	01:32	1.08
J56	JUNCTION	0.02	0.18	1168.18	0	01:49	0.18
J57	JUNCTION	0.02	0.09	1170.38	0	01:40	0.09
J58	JUNCTION	0.03	0.10	1179.76	0	01:26	0.10
J59	JUNCTION	0.02	0.27	1178.26	0	01:36	0.27
J6	JUNCTION	0.13	0.59	1180.70	0	01:26	0.58
J60	JUNCTION	0.01	0.09	1183.12	0	01:25	0.09
J61	JUNCTION	0.01	0.33	1181.48	0	01:30	0.33
J62	JUNCTION	0.10	1.17	1171.87	0	01:35	1.16
J63	JUNCTION	0.04	0.93	1180.77	0	01:30	0.93
J64	JUNCTION	0.00	0.07	1179.18	0	01:30	0.07
J65	JUNCTION	0.05	0.47	1178.33	0	01:30	0.47
J66	JUNCTION	0.02	0.16	1176.91	0	01:34	0.16
J67	JUNCTION	0.03	0.38	1174.31	0	01:34	0.38
J68	JUNCTION	0.10	1.06	1174.11	0	01:31	1.06
J69	JUNCTION	0.01	0.10	1170.38	0	01:34	0.10
J7	JUNCTION	0.09	0.17	1177.35	0	01:26	0.17
J70	JUNCTION	0.03	0.16	1183.43	0	01:31	0.16
J71	JUNCTION	0.13	0.52	1183.04	0	01:58	0.52
J72	JUNCTION	0.03	0.08	1185.63	0	01:35	0.08

J73	JUNCTION	0.24	0.45	1175.79	0	01:35	0.45
J74	JUNCTION	0.06	1.03	1174.74	0	01:28	0.97
J75	JUNCTION	0.30	1.07	1174.14	0	01:37	1.04
J76	JUNCTION	0.14	1.17	1174.43	0	01:37	1.14
J77	JUNCTION	0.04	1.20	1174.81	0	01:28	1.20
J78	JUNCTION	0.08	1.08	1174.71	0	01:27	1.08
J79	JUNCTION	0.04	0.91	1174.90	0	01:26	0.91
J8	JUNCTION	0.13	0.57	1176.31	0	01:39	0.57
J80	JUNCTION	0.02	0.56	1175.39	0	01:26	0.55
J81	JUNCTION	0.01	0.09	1170.59	0	01:27	0.09
J82	JUNCTION	0.03	0.39	1175.14	0	01:27	0.39
J83	JUNCTION	0.04	0.65	1177.76	0	01:26	0.65
J84	JUNCTION	0.04	0.78	1178.76	0	01:26	0.77
J85	JUNCTION	0.02	1.15	1179.28	0	01:30	0.59
J86	JUNCTION	0.01	0.04	1184.55	0	01:25	0.04
J87	JUNCTION	0.02	0.31	1172.22	0	01:35	0.31
J88	JUNCTION	0.07	1.37	1174.57	0	01:28	1.36
J89	JUNCTION	0.01	0.15	1172.96	0	01:25	0.15
J9	JUNCTION	0.03	0.07	1171.49	0	01:30	0.07
J90	JUNCTION	0.01	0.09	1173.34	0	01:25	0.09
J91	JUNCTION	0.01	0.13	1172.50	0	01:31	0.13
J92	JUNCTION	0.01	0.09	1173.90	0	01:25	0.09
J93	JUNCTION	0.02	0.38	1172.46	0	01:34	0.38
J94	JUNCTION	0.02	0.23	1169.38	0	01:34	0.23
J95	JUNCTION	0.11	0.73	1173.59	0	01:44	0.73
J96	JUNCTION	0.13	1.66	1173.37	0	01:44	1.65
J97	JUNCTION	0.11	1.20	1172.37	0	01:44	1.20
J98	JUNCTION	0.01	0.10	1170.29	0	01:45	0.10
J99	JUNCTION	0.04	1.18	1173.86	0	01:38	1.18
J109	OUTFALL	0.06	0.16	1158.78	0	03:06	0.16
J488	OUTFALL	0.20	0.37	1120.34	0	05:22	0.37
J103	STORAGE	0.01	0.18	1173.27	0	01:43	0.18
J125	STORAGE	0.09	0.11	1177.11	0	01:26	0.11
J34	STORAGE	0.08	0.20	1176.47	0	02:31	0.20
J37	STORAGE	0.02	0.14	1183.39	0	01:30	0.14
SU1	STORAGE	0.58	0.63	1168.01	0	07:39	0.63
SU10	STORAGE	0.01	0.26	1178.26	0	01:34	0.26
SU11	STORAGE	0.01	0.15	1174.66	0	01:30	0.15
SU12	STORAGE	0.01	0.13	1174.60	0	01:30	0.13
SU13	STORAGE	0.47	0.59	1187.02	0	20:03	0.59
SU14	STORAGE	0.01	0.19	1179.17	0	01:36	0.19
SU15	STORAGE	0.01	0.23	1179.36	0	01:25	0.23
SU16	STORAGE	0.00	0.05	1178.30	0	01:26	0.05
SU17	STORAGE	0.00	0.01	1180.70	0	01:26	0.01
SU18	STORAGE	0.00	0.17	1175.80	0	01:26	0.17
SU19	STORAGE	0.01	0.20	1174.70	0	01:27	0.20
SU2	STORAGE	0.56	0.64	1167.62	0	02:32	0.64
SU20	STORAGE	0.00	0.11	1174.90	0	01:26	0.11
SU21	STORAGE	0.01	0.15	1173.89	0	01:32	0.15
SU22	STORAGE	0.01	0.07	1174.12	0	01:25	0.07
SU23	STORAGE	0.01	0.11	1173.67	0	01:25	0.11
SU24	STORAGE	0.01	0.15	1175.21	0	01:25	0.15
SU25	STORAGE	0.01	0.20	1173.18	0	01:33	0.20
SU26	STORAGE	0.00	0.09	1173.37	0	01:31	0.09
SU27	STORAGE	0.00	0.11	1173.37	0	01:25	0.11
SU28	STORAGE	0.00	0.17	1170.78	0	01:32	0.17
SU29	STORAGE	0.02	0.33	1173.69	0	01:25	0.33
SU3	STORAGE	0.55	1.00	1167.54	0	02:21	1.00
SU30	STORAGE	0.01	0.15	1173.39	0	01:43	0.15
SU31	STORAGE	0.00	0.14	1173.21	0	01:45	0.14
SU32	STORAGE	0.00	0.03	1174.18	0	01:34	0.03
SU33	STORAGE	0.00	0.10	1174.36	0	01:28	0.10
SU34	STORAGE	0.01	0.29	1182.11	0	01:30	0.29
SU35	STORAGE	0.00	0.08	1180.61	0	01:25	0.08
SU36	STORAGE	0.00	0.20	1174.40	0	01:30	0.20
SU37	STORAGE	0.00	0.00	1175.40	0	00:00	0.00
SU38	STORAGE	0.01	0.18	1186.88	0	01:25	0.18
SU39	STORAGE	0.01	0.11	1181.23	0	01:26	0.11
SU4	STORAGE	0.30	0.37	1163.39	0	03:08	0.37
SU40	STORAGE	0.01	0.15	1174.64	0	01:27	0.15
SU41	STORAGE	0.01	0.17	1186.77	0	01:25	0.17
SU42	STORAGE	0.00	0.10	1173.71	0	01:32	0.10
SU43	STORAGE	0.02	0.23	1175.83	0	01:32	0.23
SU44	STORAGE	0.02	0.26	1179.10	0	01:26	0.26
SU45	STORAGE	0.00	0.08	1175.38	0	01:25	0.08
SU46	STORAGE	0.00	0.17	1172.44	0	01:33	0.17
SU47	STORAGE	0.01	0.20	1174.20	0	01:32	0.20
SU5	STORAGE	0.77	1.39	1162.51	0	04:28	1.39
SU6	STORAGE	0.00	0.11	1175.32	0	01:25	0.11
SU7	STORAGE	0.01	0.13	1174.11	0	01:31	0.13
SU8	STORAGE	0.00	0.11	1175.01	0	01:35	0.11
SU9	STORAGE	0.01	0.18	1178.89	0	01:26	0.17

****
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	
J1	JUNCTION	0.067	0.067	0	02:51	1.91	1.91	-0.133	
J10	JUNCTION	0.511	0.511	0	01:25	3.07	3.07	1.052	
J100	JUNCTION	0.172	0.172	0	01:25	0.232	0.232	-0.022	
J101	JUNCTION	0.260	0.369	0	02:46	7.14	11.5	1.203	
J102	JUNCTION	0.000	0.172	0	01:25	0	0.232	-0.440	
J104	JUNCTION	0.000	0.779	0	01:27	0	2.42	0.577	
J105	JUNCTION	0.112	0.112	0	03:01	4.37	4.37	0.827	
J106	JUNCTION	0.000	0.724	0	01:25	0	2.28	0.001	
J107	JUNCTION	0.000	0.221	0	01:25	0	0.535	0.059	
J108	JUNCTION	0.000	0.243	0	01:27	0	0.56	-1.876	
J11	JUNCTION	0.090	0.253	0	02:25	0.214	5.78	3.414	
J110	JUNCTION	0.000	0.148	0	01:30	0	0.15	-1.461	
J111	JUNCTION	0.000	0.153	0	01:26	0	0.857	0.002	
J112	JUNCTION	0.000	0.427	0	01:26	0	1.47	0.002	
J113	JUNCTION	0.000	0.177	0	01:25	0	0.963	0.255	
J114	JUNCTION	0.000	0.511	0	01:25	0	1.32	-0.079	
J115	JUNCTION	0.000	0.208	0	01:43	0	0.395	0.000	
J116	JUNCTION	0.081	0.086	0	01:30	0.167	1.36	0.068	
J117	JUNCTION	0.000	0.004	0	01:22	0	0.000495	-0.226	
J118	JUNCTION	0.000	0.126	0	01:30	0	1.55	0.007	
J119	JUNCTION	0.000	0.210	0	01:25	0	1.77	0.028	
J12	JUNCTION	0.117	0.117	0	01:25	0.368	0.368	0.032	
J120	JUNCTION	0.000	0.202	0	01:35	0	0.157	0.001	
J121	JUNCTION	0.050	0.514	0	01:32	0.12	2.49	0.053	
J122	JUNCTION	0.000	0.458	0	01:25	0	0.96	-0.029	
J123	JUNCTION	0.638	1.146	0	01:25	1.17	3.45	-0.995	
J124	JUNCTION	0.099	0.355	0	01:48	0.133	6.98	-0.523	
J126	JUNCTION	0.000	0.504	0	01:30	0	3.51	0.017	
J127	JUNCTION	0.000	0.067	0	03:12	0	1.91	0.205	
J128	JUNCTION	0.000	4.251	0	05:12	0	153	0.166	
J129	JUNCTION	0.000	4.251	0	05:13	0	152	0.168	
J13	JUNCTION	0.000	0.352	0	02:06	0	7.01	0.024	
J130	JUNCTION	0.000	0.486	0	01:31	0	1.63	0.003	
J131	JUNCTION	0.000	0.090	0	01:25	0	0.179	-0.037	
J133	JUNCTION	0.000	0.087	0	01:25	0	0.221	0.005	
J134	JUNCTION	0.000	0.303	0	01:32	0	1.75	0.002	
J135	JUNCTION	0.000	0.802	0	01:29	0	2.44	-0.114	
J136	JUNCTION	0.000	0.427	0	01:26	0	1.47	-0.001	
J14	JUNCTION	0.128	0.128	0	01:25	0.166	0.166	-0.248	
J140	JUNCTION	0.000	6.037	0	03:04	0	62.4	0.263	
J142	JUNCTION	0.228	0.228	0	02:36	5.44	5.44	0.271	
J15	JUNCTION	0.047	0.047	0	02:41	1.19	1.19	0.023	
J150	JUNCTION	0.272	0.637	0	02:51	7.6	18.9	0.964	
J156	JUNCTION	0.015	0.241	0	02:32	0.16	5.59	0.350	
J158	JUNCTION	0.083	0.083	0	03:11	4.61	4.61	0.566	
J16	JUNCTION	0.030	0.030	0	02:26	0.554	0.554	0.367	
J160	JUNCTION	0.000	0.083	0	03:16	0	4.59	0.775	
J162	JUNCTION	0.000	4.244	0	05:19	0	152	0.505	
J17	JUNCTION	0.026	0.026	0	02:21	0.423	0.423	1.244	
J172	JUNCTION	0.089	0.726	0	02:57	2.75	21.5	0.422	
J177	JUNCTION	0.122	0.846	0	02:59	3.49	24.9	0.531	
J18	JUNCTION	0.000	1.219	0	01:46	0	5.15	0.004	
J183	JUNCTION	0.000	4.253	0	05:15	0	152	0.365	
J185	JUNCTION	0.060	0.901	0	03:01	1.16	25.9	0.538	
J187	JUNCTION	0.149	2.420	0	02:21	2.04	40.6	0.847	
J19	JUNCTION	0.015	0.015	0	02:06	0.187	0.187	0.260	
J196	JUNCTION	0.000	2.227	0	02:19	0	35.4	1.531	
J198	JUNCTION	0.000	3.229	0	05:09	0	104	0.387	
J2	JUNCTION	0.000	0.087	0	01:25	0	0.381	-0.058	
J20	JUNCTION	0.011	0.011	0	02:51	0.35	0.35	0.842	
J207	JUNCTION	0.033	2.860	0	02:49	0.508	51.6	0.348	
J209	JUNCTION	0.304	0.304	0	02:56	10.7	10.7	0.110	
J21	JUNCTION	2.369	2.369	0	01:28	2.54	5.49	-0.306	
J22	JUNCTION	0.292	0.292	0	01:30	0.868	1.29	0.176	
J223	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
J23	JUNCTION	0.104	0.104	0	02:56	3.55	3.55	0.721	
J231	JUNCTION	0.118	3.174	0	04:54	4.16	102	0.374	
J235	JUNCTION	0.000	0.104	0	03:00	0	3.52	2.201	
J239	JUNCTION	0.000	2.974	0	04:51	0	93	-0.277	
J24	JUNCTION	0.000	0.495	0	01:47	0	2.59	1.246	

J25	JUNCTION	0.018	0.018	0	02:36	0.403	0.403	1.267	
J250	JUNCTION	0.485	2.861	0	02:40	11.3	51.5	0.775	
J252	JUNCTION	0.055	3.000	0	04:44	1.49	93.9	1.048	
J26	JUNCTION	0.173	0.404	0	01:31	0.318	7.32	0.946	
J27	JUNCTION	0.000	0.381	0	02:06	0	7.26	-0.641	
J28	JUNCTION	0.000	0.282	0	01:25	0	1.05	-3.811	
J286	JUNCTION	0.308	2.810	0	04:27	8.93	83.4	0.469	
J29	JUNCTION	0.000	0.267	0	01:25	0	0.865	-0.260	
J292	JUNCTION	0.135	0.135	0	03:11	6.79	6.79	0.641	
J3	JUNCTION	0.088	0.088	0	01:25	0.183	0.382	0.226	
J30	JUNCTION	0.000	0.155	0	02:48	0	4.24	4.342	
J31	JUNCTION	0.000	0.697	0	01:32	0	3.67	0.007	
J32	JUNCTION	0.156	0.156	0	02:46	4.26	4.26	0.504	
J33	JUNCTION	0.000	0.033	0	03:03	0	0.634	0.660	
J35	JUNCTION	0.000	0.697	0	01:35	0	3.67	-0.066	
J36	JUNCTION	0.140	0.214	0	01:25	0.258	1.62	0.113	
J38	JUNCTION	0.000	1.011	0	01:38	0	5.26	-0.079	
J39	JUNCTION	0.000	0.126	0	01:30	0	1.55	0.003	
J4	JUNCTION	0.041	0.123	0	01:26	0.0619	0.0826	-0.015	
J40	JUNCTION	0.000	0.068	0	04:06	0	1.91	0.255	
J41	JUNCTION	0.075	0.075	0	02:46	2.02	2.02	5.328	
J42	JUNCTION	0.000	0.038	0	04:55	0	1.48	0.206	
J43	JUNCTION	0.062	0.062	0	02:46	1.62	1.62	9.958	
J44	JUNCTION	0.000	2.990	0	02:51	0	56.7	0.580	
J45	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
J456	JUNCTION	0.000	3.247	0	04:57	0	106	1.031	
J46	JUNCTION	0.088	0.713	0	01:31	2.74	2.98	0.838	
J462	JUNCTION	0.185	0.571	0	01:48	3.97	7.02	1.164	
J466	JUNCTION	0.168	1.140	0	03:01	3.29	33.6	0.507	
J47	JUNCTION	0.358	1.113	0	01:32	0.917	2.37	1.165	
J472	JUNCTION	0.045	3.003	0	04:52	1.27	94.5	0.252	
J474	JUNCTION	0.158	0.708	0	02:13	4.45	11.4	1.875	
J475	JUNCTION	0.237	1.674	0	03:01	5.82	49.9	0.789	
J48	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
J482	JUNCTION	0.000	7.031	0	03:03	0	62.2	0.396	
J486	JUNCTION	0.202	0.202	0	02:31	4.08	4.08	0.808	
J49	JUNCTION	0.353	0.922	0	02:33	13.7	24.8	1.764	
J491	JUNCTION	0.000	4.273	0	05:06	0	154	0.659	
J495	JUNCTION	0.127	3.013	0	04:31	4.53	91.6	1.106	
J5	JUNCTION	0.000	0.123	0	01:26	0	0.0827	-0.372	
J50	JUNCTION	0.000	0.496	0	01:47	0	2.59	0.002	
J51	JUNCTION	0.032	0.032	0	02:51	1.02	1.02	-2.169	
J52	JUNCTION	0.000	0.206	0	01:32	0	0.549	0.973	
J53	JUNCTION	0.000	0.144	0	01:30	0	0.395	0.828	
J54	JUNCTION	0.000	0.095	0	01:32	0	0.293	-0.001	
J55	JUNCTION	0.000	0.572	0	01:32	0	2.5	-0.398	
J56	JUNCTION	0.000	0.221	0	01:45	0	1.28	2.689	
J57	JUNCTION	0.000	0.280	0	01:35	0	2.29	-0.068	
J58	JUNCTION	0.000	0.222	0	01:26	0	1.85	-1.062	
J59	JUNCTION	0.233	0.322	0	01:31	0.435	0.528	1.469	
J6	JUNCTION	0.000	0.210	0	01:26	0	1.9	2.449	
J60	JUNCTION	0.241	0.466	0	01:25	0.64	0.959	-0.033	
J61	JUNCTION	0.000	0.054	0	01:30	0	0.0338	0.002	
J62	JUNCTION	0.000	1.812	0	01:35	0	6.99	0.001	
J63	JUNCTION	0.000	0.221	0	01:30	0	0.523	-0.466	
J64	JUNCTION	0.154	0.339	0	01:30	0.238	0.761	-0.108	
J65	JUNCTION	0.000	0.339	0	01:30	0	0.762	0.101	
J66	JUNCTION	0.000	0.178	0	01:34	0	0.709	0.007	
J67	JUNCTION	0.000	0.230	0	01:34	0	0.832	-0.009	
J68	JUNCTION	0.000	0.498	0	01:28	0	1.86	0.002	
J69	JUNCTION	0.000	0.340	0	01:31	0	1.86	-0.452	
J7	JUNCTION	0.000	0.413	0	01:26	0	0.353	0.787	
J70	JUNCTION	0.000	0.235	0	01:25	0	1.25	-0.119	
J71	JUNCTION	0.000	0.225	0	01:31	0	1.26	0.363	
J72	JUNCTION	0.164	0.167	0	01:35	0.537	1.09	0.647	
J73	JUNCTION	0.145	0.473	0	01:35	0.296	7.6	0.277	
J74	JUNCTION	0.000	0.250	0	01:36	0	0.29	-10.008	
J75	JUNCTION	0.000	0.342	0	01:37	0	6.86	-0.187	
J76	JUNCTION	0.000	0.122	0	01:30	0	1.01	0.038	
J77	JUNCTION	0.000	0.129	0	01:26	0	0.324	5.174	
J78	JUNCTION	0.000	0.876	0	01:27	0	2.37	0.030	
J79	JUNCTION	0.000	0.202	0	01:25	0	0.355	1.138	
J8	JUNCTION	0.000	0.511	0	01:36	0	2.49	0.820	
J80	JUNCTION	0.000	0.138	0	01:26	0	0.244	0.006	
J81	JUNCTION	0.000	0.583	0	01:27	0	2.16	-0.029	
J82	JUNCTION	0.000	0.620	0	01:27	0	1.87	-0.002	
J83	JUNCTION	0.000	0.355	0	01:26	0	1.2	0.002	
J84	JUNCTION	0.000	0.303	0	01:25	0	1.17	0.014	
J85	JUNCTION	0.000	0.147	0	01:36	0	0.424	-0.028	
J86	JUNCTION	0.082	0.082	0	01:25	0.162	0.162	-0.461	
J87	JUNCTION	0.000	0.615	0	01:31	0	1.84	-0.001	
J88	JUNCTION	0.000	0.687	0	01:25	0	2.18	-0.001	

J89	JUNCTION	0.000	0.082	0	01:25	0	0.31	0.000	
J9	JUNCTION	0.000	0.339	0	01:37	0	6.87	0.074	
J90	JUNCTION	0.000	0.036	0	01:25	0	0.188	0.002	
J91	JUNCTION	0.000	0.200	0	01:30	0	0.759	-0.000	
J92	JUNCTION	0.000	0.063	0	01:25	0	0.392	0.002	
J93	JUNCTION	0.000	0.282	0	01:33	0	0.681	0.002	
J94	JUNCTION	0.000	1.953	0	01:33	0	7.09	0.224	
J95	JUNCTION	0.139	1.167	0	01:32	0.346	3.83	1.338	
J96	JUNCTION	0.000	1.056	0	01:30	0	4.15	-0.044	
J97	JUNCTION	0.000	1.535	0	01:30	0	6.68	-0.182	
J98	JUNCTION	0.000	0.367	0	01:44	0	1.73	-0.305	
J99	JUNCTION	0.000	0.141	0	01:25	0	0.482	4.852	
J109	OUTFALL	0.000	1.065	0	03:06	0	24	0.000	
J488	OUTFALL	0.000	4.237	0	05:22	0	151	0.000	
J103	STORAGE	0.000	0.425	0	01:43	0	0.642	-0.006	
J125	STORAGE	0.044	0.044	0	01:26	0.0531	0.0551	-0.004	
J34	STORAGE	0.031	0.031	0	02:31	0.637	0.637	0.518	
J37	STORAGE	0.000	0.210	0	01:25	0	1.62	-0.051	
SU1	STORAGE	0.253	0.440	0	01:59	4.87	8.72	1.026	
SU10	STORAGE	0.000	0.296	0	01:29	0	0.256	-1.674	
SU11	STORAGE	0.269	0.503	0	01:27	0.491	0.734	-1.680	
SU12	STORAGE	0.000	0.720	0	01:30	0	2.43	0.020	
SU13	STORAGE	0.039	0.053	0	02:21	0.69	0.876	173.256	
SU14	STORAGE	0.150	0.227	0	01:25	0.262	0.424	0.185	
SU15	STORAGE	0.503	0.503	0	01:25	1.24	1.24	-0.003	
SU16	STORAGE	0.000	0.186	0	01:25	0	0.072	0.637	
SU17	STORAGE	0.000	0.053	0	01:26	0	0.0152	0.003	
SU18	STORAGE	0.184	0.184	0	01:25	0.244	0.244	-0.000	
SU19	STORAGE	0.085	1.288	0	01:28	0.15	0.554	6.033	
SU2	STORAGE	0.115	0.611	0	01:51	1.14	12.2	0.064	
SU20	STORAGE	0.229	0.347	0	01:32	0.331	0.371	-1.196	
SU21	STORAGE	0.241	1.186	0	01:30	0.375	1.15	0.015	
SU22	STORAGE	0.146	0.259	0	01:25	0.258	0.626	-0.034	
SU23	STORAGE	0.000	0.215	0	01:25	0	0.438	0.026	
SU24	STORAGE	0.191	0.191	0	01:25	0.571	0.571	-0.032	
SU25	STORAGE	0.148	0.300	0	01:32	0.26	0.507	0.022	
SU26	STORAGE	0.000	0.121	0	01:25	0	0.18	0.111	
SU27	STORAGE	0.000	0.132	0	01:25	0	0.127	0.025	
SU28	STORAGE	0.000	0.750	0	01:32	0	0.76	0.124	
SU29	STORAGE	0.303	0.470	0	01:25	0.566	0.799	-0.863	
SU3	STORAGE	0.264	3.648	0	01:45	4.6	35.7	1.254	
SU30	STORAGE	0.028	0.608	0	01:42	0.0414	0.864	0.248	
SU31	STORAGE	0.036	0.120	0	01:42	0.0473	0.119	0.036	
SU32	STORAGE	0.000	0.140	0	01:32	0	0.0784	-1.162	
SU33	STORAGE	0.000	0.118	0	01:28	0	0.0224	0.223	
SU34	STORAGE	0.295	0.295	0	01:25	0.524	0.524	0.002	
SU35	STORAGE	0.093	0.093	0	01:25	0.221	0.221	-0.005	
SU36	STORAGE	0.000	0.552	0	01:28	0	0.414	0.043	
SU37	STORAGE	0.000	0.000	0	00:00	0	0	0.000	ltr
SU38	STORAGE	0.504	1.217	0	01:25	1.32	1.47	2.897	
SU39	STORAGE	0.313	0.313	0	01:25	0.522	0.869	-0.247	
SU4	STORAGE	0.266	3.216	0	03:02	9.1	66.1	0.203	
SU40	STORAGE	0.301	0.976	0	01:26	0.594	1.07	0.955	
SU41	STORAGE	0.337	0.822	0	01:33	0.901	1.19	0.155	
SU42	STORAGE	0.129	0.862	0	01:31	0.194	1.01	-0.096	
SU43	STORAGE	0.557	0.585	0	01:25	1.2	1.9	0.028	
SU44	STORAGE	0.417	0.840	0	01:25	0.79	1.75	0.128	
SU45	STORAGE	0.097	0.097	0	01:25	0.179	0.179	-0.002	
SU46	STORAGE	0.026	0.236	0	01:33	0.034	0.255	0.020	
SU47	STORAGE	0.059	0.478	0	01:30	0.0947	0.267	1.184	
SU5	STORAGE	0.152	3.487	0	03:08	4.48	76.3	0.705	
SU6	STORAGE	0.096	0.096	0	01:25	0.134	0.134	-0.001	
SU7	STORAGE	0.113	0.681	0	01:30	0.155	1.58	0.007	
SU8	STORAGE	0.000	0.214	0	01:32	0	0.153	0.041	
SU9	STORAGE	0.048	0.690	0	01:26	0.0742	0.965	-0.069	

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J104	JUNCTION	0.49	0.688	0.812
J117	JUNCTION	0.33	0.143	1.357
J131	JUNCTION	0.45	0.726	0.549
J134	JUNCTION	0.42	0.169	0.881
J18	JUNCTION	0.37	0.198	0.552

J50	JUNCTION	0.86	0.287	0.492
J53	JUNCTION	0.67	0.213	0.637
J6	JUNCTION	0.33	0.138	0.712
J62	JUNCTION	0.70	0.419	0.701
J75	JUNCTION	3.38	0.566	0.384
J76	JUNCTION	3.64	0.868	0.332
J77	JUNCTION	0.46	0.900	0.000
J80	JUNCTION	0.29	0.261	0.539
J85	JUNCTION	0.25	0.900	0.000
J88	JUNCTION	0.50	0.849	0.126
J99	JUNCTION	0.61	0.800	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J77	0.05	0.064	0 01:28	0.006	0.000
J99	0.11	0.104	0 01:38	0.018	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J103	0.000	1	0	0	0.014	37	0 01:43	0.424
J125	0.001	5	0	0	0.002	7	0 01:26	0.044
J34	0.000	0	0	0	0.000	0	0 00:00	0.033
J37	0.001	1	0	0	0.008	22	0 01:30	0.202
SU1	3.526	8	0	0	4.573	10	0 07:39	0.141
SU10	0.001	0	0	0	0.029	10	0 01:34	0.221
SU11	0.000	1	0	0	0.010	26	0 01:30	0.560
SU12	0.001	1	0	0	0.007	19	0 01:30	0.718
SU13	0.089	31	0	0	0.121	43	0 20:03	0.005
SU14	0.000	1	0	0	0.016	42	0 01:36	0.147
SU15	0.001	2	0	0	0.022	57	0 01:25	0.489
SU16	0.000	0	0	0	0.001	3	0 01:26	0.153
SU17	0.000	0	0	0	0.000	0	0 01:26	0.053
SU18	0.000	0	0	0	0.013	33	0 01:26	0.138
SU19	0.000	1	0	0	0.017	40	0 01:27	0.515
SU2	2.296	7	0	0	2.834	9	0 02:32	0.401
SU20	0.000	0	0	0	0.006	15	0 01:26	0.284
SU21	0.000	0	0	0	0.010	20	0 01:32	0.996
SU22	0.000	0	0	0	0.002	6	0 01:25	0.251
SU23	0.000	0	0	0	0.006	4	0 01:25	0.214
SU24	0.001	2	0	0	0.010	26	0 01:25	0.184
SU25	0.003	2	0	0	0.062	46	0 01:33	0.297
SU26	0.000	0	0	0	0.004	10	0 01:31	0.102
SU27	0.000	0	0	0	0.006	4	0 01:25	0.130
SU28	0.000	1	0	0	0.012	32	0 01:32	0.748
SU29	0.003	2	0	0	0.046	44	0 01:25	0.416
SU3	2.269	14	0	0	5.235	32	0 02:21	2.018
SU30	0.000	0	0	0	0.010	6	0 01:43	0.601
SU31	0.000	0	0	0	0.009	6	0 01:45	0.092
SU32	0.000	0	0	0	0.000	1	0 01:34	0.117
SU33	0.000	0	0	0	0.004	11	0 01:28	0.052
SU34	0.001	1	0	0	0.037	30	0 01:30	0.221
SU35	0.000	0	0	0	0.003	7	0 01:25	0.087
SU36	0.000	0	0	0	0.016	11	0 01:30	0.453
SU37	0.000	0	0	0	0.000	0	0 00:00	0.000
SU38	0.001	0	0	0	0.014	10	0 01:25	0.609
SU39	0.000	0	0	0	0.006	15	0 01:26	0.263
SU4	1.364	3	0	0	2.095	4	0 03:08	3.205
SU40	0.000	0	0	0	0.009	6	0 01:27	0.830
SU41	0.001	2	0	0	0.012	32	0 01:25	0.497
SU42	0.000	0	0	0	0.005	12	0 01:32	0.861
SU43	0.001	1	0	0	0.023	22	0 01:32	0.518
SU44	0.001	3	0	0	0.029	76	0 01:26	0.800
SU45	0.000	0	0	0	0.003	8	0 01:25	0.090
SU46	0.000	0	0	0	0.012	3	0 01:33	0.235

SU47	0.000	1	0	0	0.017	45	0	01:32	0.290
SU5	4.039	23	0	0	11.763	67	0	04:28	2.585
SU6	0.000	0	0	0	0.005	14	0	01:25	0.095
SU7	0.000	0	0	0	0.007	20	0	01:31	0.789
SU8	0.000	0	0	0	0.005	14	0	01:35	0.202
SU9	0.000	1	0	0	0.013	35	0	01:26	0.687

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J109	91.44	0.307	1.065	24.003
J488	87.56	1.958	4.237	150.772
System	89.50	2.265	4.856	174.775

****
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
C1	CONDUIT	0.486	0	01:31	3.79	0.35	0.53
C1_1	CONDUIT	0.067	0	03:12	1.86	0.28	0.35
C1_2	CONDUIT	0.067	0	02:51	0.08	0.00	0.51
C10	CONDUIT	0.127	0	01:25	0.65	0.08	0.47
C100	CONDUIT	0.026	0	02:24	0.16	0.00	0.25
C101	CONDUIT	0.200	0	01:31	3.51	0.13	0.42
C102	CONDUIT	0.846	0	03:03	0.77	0.04	0.18
C103	CONDUIT	1.813	0	01:35	2.98	0.80	0.65
C104	CONDUIT	2.378	0	02:41	0.52	0.35	0.58
C105	CONDUIT	0.864	0	01:30	3.99	0.40	1.00
C106	CONDUIT	0.806	0	02:07	5.06	1.47	1.00
C107	CONDUIT	0.367	0	01:44	3.63	0.76	0.61
C108	CONDUIT	0.154	0	02:19	2.38	0.46	1.00
C109	CONDUIT	0.078	0	01:25	1.71	0.29	0.54
C11	CONDUIT	0.242	0	02:57	1.34	0.49	0.76
C110	CONDUIT	0.779	0	01:27	2.77	1.08	1.00
C110_1	CONDUIT	0.168	0	01:25	0.56	0.03	0.42
C111	CONDUIT	0.126	0	01:30	3.54	0.39	0.53
C111_1	CONDUIT	0.695	0	01:25	3.21	0.87	1.00
C111_2	CONDUIT	0.778	0	01:27	3.59	0.45	1.00
C112	CONDUIT	0.083	0	01:50	1.18	1.56	1.00
C113	CONDUIT	0.210	0	01:24	1.48	0.21	1.00
C114	CONDUIT	2.054	0	02:27	0.38	0.62	0.67
C115	CONDUIT	0.203	0	01:25	2.10	0.28	1.00
C116	CONDUIT	0.647	0	01:26	1.37	0.21	0.54
C117	CONDUIT	0.725	0	03:01	0.72	0.03	0.17
C118_1	CHANNEL	0.413	0	01:26	1.53	0.07	0.55
C118_2	CHANNEL	0.401	0	01:26	1.34	0.08	0.51
C119	CONDUIT	0.193	0	01:29	4.06	0.79	0.77
C12	CHANNEL	0.000	0	01:35	0.00	0.00	0.34
C12_2	CONDUIT	0.352	0	02:06	1.95	0.47	0.61
C120	CONDUIT	0.161	0	01:30	0.40	0.00	0.15
C120_1	CONDUIT	0.481	0	01:30	0.88	0.07	0.38
C120_2	CONDUIT	1.042	0	01:32	0.57	0.02	0.46
C121	CONDUIT	0.427	0	01:26	4.42	0.72	0.58
C122	CONDUIT	0.202	0	01:35	1.27	0.42	1.00
C123	CONDUIT	0.031	0	02:35	0.17	0.00	0.12
C124	CONDUIT	0.637	0	02:58	0.59	0.04	0.18
C125	CONDUIT	0.015	0	02:16	0.07	0.00	0.30
C126	CONDUIT	2.018	0	02:20	0.36	0.60	0.72
C127	CONDUIT	0.458	0	01:25	2.88	0.05	0.29
C128	CHANNEL	0.140	0	01:31	0.22	0.17	0.87
C129	CHANNEL	0.230	0	01:25	1.50	0.06	0.36
C13	CONDUIT	0.279	0	01:40	0.27	0.01	0.40
C130	CONDUIT	0.640	0	01:38	3.66	2.00	0.61
C131	CONDUIT	0.097	0	01:34	0.11	0.02	0.52
C132	CHANNEL	0.011	0	02:55	1.35	0.00	0.26
C133	CONDUIT	0.104	0	03:00	1.09	0.01	0.09
C134	CONDUIT	0.695	0	01:31	0.43	0.25	0.92
C135	CONDUIT	0.091	0	01:25	0.64	0.10	1.00

C135_1	CONDUIT	0.687	0	01:25	3.17	1.52	1.00
C136	CONDUIT	0.087	0	01:25	2.55	0.24	0.49
C137	CHANNEL	0.000	0	00:00	0.00	0.00	0.00
C138	CONDUIT	0.004	0	01:22	0.08	0.02	1.00
C139	CONDUIT	0.304	0	02:56	0.61	0.01	0.18
C14	CONDUIT	1.065	0	03:06	0.38	0.28	0.40
C140	CONDUIT	0.210	0	01:25	3.58	0.73	0.82
C141	CHANNEL	0.076	0	01:30	0.23	0.01	0.59
C143	CONDUIT	0.153	0	01:26	2.20	0.49	0.58
C144_1	CONDUIT	1.084	0	01:46	2.57	2.05	1.00
C144_2	CONDUIT	1.219	0	01:46	2.76	0.59	1.00
C15	CONDUIT	0.339	0	01:34	0.41	0.01	0.40
C16	CONDUIT	7.031	0	03:03	1.80	0.03	0.27
C165	CONDUIT	0.083	0	03:22	0.17	0.00	0.13
C17	CONDUIT	0.000	0	00:00	0.00	0.00	0.15
C173	CONDUIT	0.367	0	02:57	0.42	0.01	0.15
C18	CONDUIT	0.583	0	01:27	1.13	0.01	0.39
C188_1	CONDUIT	0.241	0	02:36	0.15	0.01	0.32
C19	CONDUIT	0.280	0	01:35	2.88	0.94	0.61
C19_1	CONDUIT	0.579	0	02:30	0.38	0.07	0.27
C19_2	CONDUIT	1.306	0	02:40	0.67	0.10	0.36
C19_3	CONDUIT	0.221	0	01:45	1.77	0.64	0.55
C19_4	CONDUIT	0.218	0	01:49	0.32	0.02	0.13
C192	CONDUIT	0.102	0	03:31	0.16	0.00	0.24
C194	CONDUIT	0.083	0	03:16	0.35	0.00	0.05
C196	CONDUIT	0.135	0	03:18	0.13	0.00	0.52
C2	CONDUIT	0.126	0	01:30	4.32	0.38	0.43
C2_1	CONDUIT	0.352	0	02:06	0.36	0.02	0.43
C2_2	CONDUIT	0.084	0	01:25	0.56	0.00	0.08
C2_3	CONDUIT	0.381	0	02:06	1.65	0.57	0.68
C2_4	CONDUIT	0.154	0	01:35	0.97	0.43	1.00
C2_6	CONDUIT	0.381	0	02:06	0.50	0.02	0.31
C2_9	CONDUIT	0.339	0	01:37	3.55	0.55	0.58
C20	CONDUIT	0.121	0	01:26	0.24	0.00	0.37
C200	CONDUIT	0.228	0	02:36	0.51	0.01	0.08
C21	CONDUIT	0.561	0	02:13	0.42	0.06	0.22
C214	CONDUIT	0.112	0	03:09	0.29	0.00	0.07
C22	CHANNEL	0.596	0	01:30	1.69	0.35	0.59
C23	CONDUIT	1.952	0	01:34	1.30	0.06	0.44
C24	CONDUIT	0.495	0	01:47	2.71	1.57	0.62
C25	CONDUIT	0.032	0	02:51	0.65	0.08	0.61
C25_2	CONDUIT	0.018	0	02:41	0.03	0.00	0.45
C25_3	CONDUIT	0.435	0	01:56	1.54	1.45	1.00
C26	CONDUIT	0.033	0	03:03	1.50	0.49	0.40
C27	CONDUIT	4.237	0	05:22	0.93	6.16	0.58
C28	CONDUIT	0.210	0	01:25	1.72	0.03	0.37
C28_1	CONDUIT	0.047	0	02:41	1.29	0.99	0.51
C28_4	CONDUIT	0.085	0	01:35	0.56	0.00	0.07
C29	CONDUIT	0.095	0	01:26	2.01	0.26	0.65
C3	CONDUIT	0.087	0	01:25	1.86	0.92	0.63
C30	CONDUIT	0.150	0	03:23	0.95	0.16	0.36
C31	CONDUIT	4.244	0	05:19	0.75	0.32	0.67
C32	CONDUIT	0.155	0	02:48	0.45	0.01	0.16
C33	CONDUIT	0.367	0	01:45	0.64	0.01	0.38
C33_1	CONDUIT	4.251	0	05:12	0.66	0.23	0.74
C33_3	CONDUIT	4.251	0	05:13	2.91	0.74	0.34
C33_4	CONDUIT	4.253	0	05:15	0.85	0.41	0.62
C34	CONDUIT	0.697	0	01:35	2.53	0.26	0.50
C35	CONDUIT	3.221	0	05:12	0.96	0.20	0.46
C36	CHANNEL	0.559	0	01:31	1.31	0.35	0.64
C37	CHANNEL	0.099	0	01:26	0.61	0.02	0.37
C38	CONDUIT	3.229	0	05:09	1.01	0.20	0.44
C39	CONDUIT	0.304	0	01:31	1.91	0.61	1.00
C4	CONDUIT	0.059	0	01:26	1.75	0.17	0.56
C40	CONDUIT	3.168	0	04:58	1.04	0.18	0.43
C41	CONDUIT	3.008	0	04:54	0.90	0.22	0.46
C42	CONDUIT	2.973	0	04:52	0.88	0.21	0.47
C43	CONDUIT	2.974	0	04:51	2.79	0.14	0.32
C44	CONDUIT	0.505	0	01:29	1.34	0.90	0.99
C45	CONDUIT	2.920	0	04:45	0.49	0.19	0.71
C46	CONDUIT	0.068	0	04:06	1.71	0.45	0.37
C47	CONDUIT	0.038	0	04:55	1.58	0.55	0.43
C48	CONDUIT	0.494	0	01:49	0.75	0.02	0.12
C49	CONDUIT	0.401	0	02:32	0.15	0.02	0.44
C5	CHANNEL	0.787	0	01:32	2.14	0.50	0.58
C50	CHANNEL	0.114	0	01:25	1.42	0.02	0.27
C51	CONDUIT	0.201	0	02:39	0.29	0.01	0.25
C52	CONDUIT	0.030	0	02:26	0.15	0.00	0.05
C53	CONDUIT	2.790	0	04:33	1.02	0.15	0.40
C54	CONDUIT	0.000	0	00:00	0.00	0.00	0.12
C55	CONDUIT	0.726	0	01:33	0.83	0.03	0.35
C56	CONDUIT	0.329	0	01:30	0.56	0.01	0.40

C57	CONDUIT	0.062	0	04:09	0.10	0.00	0.13
C58	CONDUIT	0.141	0	05:40	1.05	0.06	0.18
C59	CONDUIT	0.038	0	04:57	0.13	0.00	0.08
C6	CONDUIT	0.210	0	01:26	2.05	0.81	0.62
C60	CONDUIT	0.205	0	01:32	1.68	0.14	0.82
C61	CONDUIT	0.095	0	01:32	0.88	0.47	0.67
C62	CHANNEL	0.215	0	01:25	1.34	0.06	0.41
C63	CONDUIT	0.427	0	01:26	3.25	0.57	0.77
C64	CONDUIT	1.376	0	04:28	2.49	2.12	0.94
C65	CONDUIT	0.614	0	01:32	3.47	0.42	0.79
C65_1	CONDUIT	0.055	0	01:30	0.37	0.20	0.86
C65_2	CONDUIT	0.145	0	01:30	1.26	0.27	0.68
C66	CHANNEL	0.000	0	00:00	0.00	0.00	0.02
C66_1	CONDUIT	0.058	0	03:08	1.05	0.10	0.46
C67	CHANNEL	0.121	0	01:25	2.05	0.03	0.32
C68	CONDUIT	0.221	0	01:30	3.22	0.82	0.60
C69	CHANNEL	0.000	0	00:00	0.00	0.00	0.26
C7	CONDUIT	0.267	0	01:36	6.19	0.34	0.49
C7_3	CONDUIT	0.221	0	01:26	1.02	0.01	0.09
C7_4	CONDUIT	0.511	0	01:36	0.29	0.01	0.32
C70	CHANNEL	0.297	0	01:29	0.49	1.55	0.80
C71	CONDUIT	0.094	0	01:30	1.68	0.45	0.73
C72	CONDUIT	0.178	0	01:34	2.57	0.28	0.60
C73	CONDUIT	0.230	0	01:35	1.50	0.50	0.92
C74	CONDUIT	0.340	0	01:31	3.37	0.47	0.61
C75	CONDUIT	0.339	0	01:30	0.27	0.03	0.55
C76	CONDUIT	0.225	0	01:31	0.40	0.05	0.53
C77	CHANNEL	0.750	0	01:32	1.89	0.18	0.61
C77_1	CONDUIT	0.216	0	01:37	1.36	1.16	1.00
C77_3	CONDUIT	0.000	0	00:00	0.00	0.00	0.13
C77_4	CONDUIT	0.000	0	00:00	0.00	0.00	0.10
C77_5	CONDUIT	0.434	0	01:48	0.39	0.04	0.20
C78	CONDUIT	1.670	0	03:09	0.95	0.08	0.35
C79	CONDUIT	0.164	0	01:35	0.73	0.03	0.40
C8	CONDUIT	0.484	0	01:26	3.04	0.94	1.00
C80	CONDUIT	1.004	0	01:38	1.00	0.02	0.39
C80_1	CONDUIT	2.855	0	02:53	0.52	0.35	0.67
C80_2	CONDUIT	2.950	0	03:02	0.67	0.36	0.56
C81	CONDUIT	0.123	0	01:30	1.74	2.19	1.00
C82	CONDUIT	0.120	0	01:25	1.69	0.72	1.00
C83	CONDUIT	2.830	0	02:49	0.64	0.29	0.56
C84	CONDUIT	1.139	0	03:05	0.77	0.05	0.24
C85	CONDUIT	0.109	0	01:36	1.54	0.48	1.00
C86	CONDUIT	0.195	0	01:25	1.23	0.42	1.00
C87	CONDUIT	0.621	0	01:27	2.48	0.49	0.83
C88	CONDUIT	0.583	0	01:27	3.49	0.80	0.57
C89	CONDUIT	0.138	0	01:26	1.96	0.74	1.00
C9	CHANNEL	0.455	0	01:25	1.60	0.11	0.56
C90	CONDUIT	0.355	0	01:26	3.65	1.26	0.82
C91	CONDUIT	0.306	0	01:24	3.12	0.68	1.00
C92	CONDUIT	0.147	0	01:35	3.00	0.96	0.99
C93	CONDUIT	0.901	0	03:06	0.78	0.04	0.19
C94	CHANNEL	0.078	0	01:25	1.23	0.02	0.52
C95	CONDUIT	0.208	0	01:43	1.65	0.33	0.59
C95_1	CHANNEL	0.425	0	01:43	0.91	0.54	0.67
C95_2	CHANNEL	0.216	0	01:43	0.52	0.09	0.63
C96	CONDUIT	0.082	0	01:25	2.48	0.39	0.47
C97	CONDUIT	0.036	0	01:25	2.06	0.17	0.30
C98	CONDUIT	0.063	0	01:25	2.55	0.06	0.21
C99	CONDUIT	0.281	0	01:33	2.27	0.62	0.65
W1	CONDUIT	0.001	0	02:06	0.00	0.00	0.47
W15	CONDUIT	0.186	0	01:25	1.25	0.02	0.12
W27	CONDUIT	0.005	0	20:03	0.05	0.03	0.04
W44	CHANNEL	0.305	0	01:30	0.87	0.15	0.56
C118	WEIR	0.099	0	01:33			0.05
C142	WEIR	0.214	0	01:32			0.11
W10	WEIR	0.386	0	01:32			0.37
W11	WEIR	0.447	0	01:30			0.26
W12	WEIR	0.318	0	01:35			0.14
W13	WEIR	0.000	0	00:00			0.00
W14	WEIR	0.000	0	00:00			0.00
W16	WEIR	0.179	0	01:32			0.35
W17	WEIR	1.096	0	01:36			0.76
W18	WEIR	0.366	0	01:27			0.61
W19	WEIR	0.088	0	01:26			0.05
W2	WEIR	0.010	0	01:26			0.02
W20	WEIR	0.371	0	01:38			0.08
W21	WEIR	0.718	0	01:24			0.66
W22	WEIR	0.559	0	01:33			0.58
W23	WEIR	0.094	0	01:25			0.05
W24	WEIR	0.000	0	00:00			0.00
W25	WEIR	0.000	0	00:00			0.00

W26	WEIR	0.132	0	01:25	0.04
W28	WEIR	0.000	0	00:00	0.00
W29	WEIR	0.000	0	00:00	0.00
W3	WEIR	0.044	0	01:26	0.06
W30	WEIR	0.000	0	00:00	0.00
W31	WEIR	0.064	0	01:26	0.03
W32	WEIR	0.000	0	00:00	0.00
W33	WEIR	3.147	0	03:08	0.35
W34	WEIR	0.336	0	01:44	0.11
W35	WEIR	0.224	0	01:33	0.04
W36	WEIR	1.209	0	04:28	0.18
W37	WEIR	0.327	0	01:25	0.11
W38	WEIR	0.275	0	01:25	0.10
W39	WEIR	0.612	0	01:32	0.22
W4	WEIR	0.053	0	01:26	0.04
W40	WEIR	0.140	0	01:32	0.15
W41	WEIR	0.292	0	01:37	0.65
W42	WEIR	0.358	0	01:27	0.15
W43	WEIR	0.086	0	01:31	0.32
W45	WEIR	0.000	0	00:00	0.00
W46	WEIR	0.315	0	01:27	0.55
W47	WEIR	0.000	0	00:00	0.00
W48	WEIR	0.261	0	01:30	0.68
W49	WEIR	0.000	0	00:00	0.00
W5	WEIR	0.040	0	01:25	0.04
W50	WEIR	0.000	0	00:00	0.00
W51	WEIR	0.000	0	00:00	0.00
W52	WEIR	0.000	0	00:00	0.00
W53	WEIR	0.112	0	01:43	0.05
W54	WEIR	0.000	0	00:00	0.00
W55	WEIR	0.041	0	01:26	0.04
W57	WEIR	0.000	0	00:00	0.00
W6	WEIR	0.000	0	00:00	0.00
W7	WEIR	0.225	0	01:28	0.44
W77	WEIR	0.075	0	01:25	0.04
W8	WEIR	0.243	0	01:30	0.09
W9	WEIR	0.199	0	01:27	0.08
OL1	DUMMY	0.137	0	01:32	
OL10	DUMMY	0.054	0	01:30	
OL11	DUMMY	0.077	0	01:30	
OL12	DUMMY	0.084	0	01:34	
OL13	DUMMY	0.147	0	01:36	
OL14	DUMMY	0.064	0	01:43	
OL15	DUMMY	0.054	0	01:26	
OL16	DUMMY	0.303	0	01:25	
OL17	DUMMY	0.141	0	01:25	
OL18	DUMMY	0.138	0	01:26	
OL19	DUMMY	0.129	0	01:26	
OL2	DUMMY	0.111	0	01:32	
OL20	DUMMY	0.150	0	01:26	
OL21	DUMMY	0.074	0	01:27	
OL22	DUMMY	0.202	0	01:25	
OL23	DUMMY	0.036	0	01:25	
OL24	DUMMY	0.082	0	01:25	
OL25	DUMMY	0.055	0	01:25	
OL26	DUMMY	0.102	0	01:31	
OL27	DUMMY	0.074	0	01:33	
OL28	DUMMY	0.063	0	01:25	
OL29	DUMMY	0.282	0	01:25	
OL3	DUMMY	0.095	0	01:32	
OL30	DUMMY	0.267	0	01:25	
OL31	DUMMY	0.052	0	01:28	
OL32	DUMMY	0.148	0	01:30	
OL33	DUMMY	0.020	0	01:34	
OL34	DUMMY	0.030	0	01:27	
OL35	DUMMY	0.243	0	01:27	
OL36	DUMMY	0.000	0	00:00	
OL37	DUMMY	0.012	0	01:26	
OL38	DUMMY	0.090	0	01:30	
OL39	DUMMY	0.202	0	01:35	
OL4	DUMMY	0.115	0	01:32	
OL40	DUMMY	0.274	0	01:26	
OL41	DUMMY	0.153	0	01:26	
OL42	DUMMY	0.208	0	01:43	
OL43	DUMMY	0.087	0	01:25	
OL44	DUMMY	0.126	0	01:30	
OL45	DUMMY	0.303	0	01:32	
OL46	DUMMY	0.090	0	01:25	
OL47	DUMMY	0.136	0	01:33	
OL48	DUMMY	0.150	0	01:32	
OL5	DUMMY	0.088	0	01:31	
OL6	DUMMY	0.055	0	01:25	

OL7	DUMMY	0.122	0	01:30
OL8	DUMMY	0.092	0	01:45
OL9	DUMMY	0.210	0	01:26

****
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
C1	1.00	0.02	0.00	0.00	0.35	0.64	0.00	0.00	0.58	0.00
C1_1	1.00	0.06	0.00	0.00	0.00	0.94	0.00	0.00	0.00	0.94
C1_2	1.00	0.01	0.06	0.00	0.93	0.00	0.00	0.00	0.94	0.00
C10	1.00	0.02	0.00	0.00	0.96	0.03	0.00	0.00	0.86	0.00
C100	1.00	0.02	0.05	0.00	0.94	0.00	0.00	0.00	0.94	0.00
C101	1.00	0.02	0.00	0.00	0.58	0.40	0.00	0.00	0.46	0.00
C102	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.16	0.00
C103	1.00	0.02	0.00	0.00	0.22	0.76	0.00	0.00	0.00	0.19
C104	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.36	0.00
C105	1.00	0.02	0.00	0.00	0.06	0.01	0.00	0.91	0.00	0.95
C106	1.00	0.02	0.00	0.00	0.05	0.01	0.00	0.93	0.00	0.00
C107	1.00	0.02	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.74
C108	1.00	0.02	0.00	0.00	0.05	0.00	0.00	0.93	0.00	0.00
C109	1.00	0.02	0.00	0.00	0.62	0.36	0.00	0.00	0.00	0.76
C11	1.00	0.02	0.00	0.00	0.14	0.00	0.00	0.84	0.00	0.67
C110	1.00	0.02	0.00	0.00	0.06	0.04	0.00	0.89	0.02	0.00
C110_1	1.00	0.37	0.01	0.00	0.51	0.12	0.00	0.00	0.15	0.00
C111	1.00	0.02	0.00	0.00	0.00	0.98	0.00	0.00	0.98	0.00
C111_1	1.00	0.02	0.00	0.00	0.54	0.44	0.00	0.00	0.63	0.00
C111_2	1.00	0.02	0.00	0.00	0.03	0.10	0.00	0.85	0.00	0.00
C112	1.00	0.06	0.00	0.00	0.03	0.00	0.91	0.00	0.00	0.00
C113	1.00	0.02	0.19	0.00	0.76	0.04	0.00	0.00	0.96	0.00
C114	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.01	0.00
C115	1.00	0.02	0.00	0.00	0.60	0.39	0.00	0.00	0.00	0.00
C116	1.00	0.93	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00
C117	1.00	0.06	0.00	0.00	0.93	0.00	0.00	0.00	0.94	0.00
C118_1	1.00	0.06	0.91	0.00	0.01	0.02	0.00	0.00	0.94	0.00
C118_2	1.00	0.02	0.05	0.00	0.90	0.03	0.00	0.00	0.12	0.00
C119	1.00	0.02	0.00	0.00	0.59	0.39	0.00	0.00	0.00	0.98
C12	1.00	0.73	0.26	0.00	0.01	0.00	0.00	0.00	0.94	0.00
C12_2	1.00	0.02	0.00	0.00	0.01	0.97	0.00	0.00	0.00	0.98
C120	1.00	0.02	0.00	0.00	0.96	0.02	0.00	0.00	0.91	0.00
C120_1	1.00	0.02	0.20	0.00	0.78	0.00	0.00	0.00	0.97	0.00
C120_2	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.96	0.00
C121	1.00	0.02	0.00	0.00	0.39	0.60	0.00	0.00	0.01	0.00
C122	1.00	0.02	0.68	0.00	0.30	0.00	0.00	0.00	0.71	0.00
C123	1.00	0.02	0.05	0.00	0.93	0.00	0.00	0.00	0.06	0.00
C124	1.00	0.06	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00
C125	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.94	0.00
C126	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.38	0.00
C127	1.00	0.02	0.36	0.00	0.41	0.21	0.00	0.00	0.97	0.00
C128	1.00	0.02	0.91	0.00	0.03	0.00	0.05	0.00	0.00	0.00
C129	1.00	0.38	0.55	0.00	0.01	0.06	0.00	0.00	0.94	0.00
C13	1.00	0.02	0.01	0.00	0.97	0.00	0.00	0.00	0.97	0.00
C130	1.00	0.02	0.00	0.00	0.01	0.98	0.00	0.00	0.00	0.14
C131	1.00	0.02	0.89	0.00	0.09	0.00	0.00	0.00	0.94	0.00
C132	1.00	0.02	0.05	0.00	0.03	0.90	0.00	0.00	0.03	0.00
C133	1.00	0.06	0.00	0.00	0.01	0.93	0.00	0.00	0.00	0.00
C134	1.00	0.02	0.05	0.00	0.93	0.00	0.00	0.00	0.91	0.00
C135	1.00	0.02	0.11	0.00	0.87	0.00	0.00	0.00	0.96	0.00
C135_1	1.00	0.02	0.00	0.00	0.73	0.25	0.00	0.00	0.09	0.00
C136	1.00	0.02	0.35	0.00	0.48	0.15	0.00	0.00	0.98	0.00
C137	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C138	1.00	0.02	0.89	0.00	0.09	0.00	0.00	0.00	0.89	0.00
C139	1.00	0.06	0.00	0.00	0.93	0.01	0.00	0.00	0.93	0.00
C14	1.00	0.07	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00
C140	1.00	0.02	0.00	0.00	0.00	0.08	0.00	0.91	0.05	0.00
C141	1.00	0.02	0.95	0.00	0.04	0.00	0.00	0.00	0.94	0.00
C143	1.00	0.02	0.00	0.00	0.74	0.25	0.00	0.00	0.78	0.00
C144_1	1.00	0.02	0.00	0.00	0.78	0.20	0.00	0.00	0.00	0.00
C144_2	1.00	0.02	0.00	0.00	0.22	0.76	0.00	0.00	0.91	0.00
C15	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.97	0.00
C16	1.00	0.07	0.00	0.00	0.90	0.03	0.00	0.00	0.11	0.00
C165	1.00	0.06	0.01	0.00	0.93	0.00	0.00	0.00	0.94	0.00
C17	1.00	0.07	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C173	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.94	0.00
C18	1.00	0.02	0.14	0.00	0.81	0.01	0.00	0.02	0.96	0.00
C188_1	1.00	0.02	0.05	0.00	0.93	0.00	0.00	0.00	0.94	0.00

C7_3	1.00	0.02	0.00	0.00	0.03	0.96	0.00	0.00	0.00	0.00
C7_4	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.97	0.00
C70	1.00	0.66	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00
C71	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.88
C72	1.00	0.02	0.00	0.00	0.01	0.97	0.00	0.00	0.98	0.00
C73	1.00	0.02	0.00	0.00	0.55	0.44	0.00	0.00	0.67	0.00
C74	1.00	0.02	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.98
C75	1.00	0.02	0.24	0.00	0.75	0.00	0.00	0.00	0.97	0.00
C76	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.97	0.00
C77	1.00	0.65	0.00	0.00	0.17	0.19	0.00	0.00	0.02	0.00
C77_1	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.77
C77_3	1.00	0.06	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C77_4	1.00	0.02	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C77_5	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.92	0.00
C78	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.89	0.00
C79	1.00	0.02	0.00	0.00	0.07	0.91	0.00	0.00	0.23	0.00
C8	1.00	0.02	0.00	0.00	0.97	0.01	0.00	0.00	0.00	0.95
C80	1.00	0.02	0.00	0.00	0.95	0.03	0.00	0.00	0.94	0.00
C80_1	1.00	0.02	0.04	0.00	0.93	0.00	0.00	0.00	0.94	0.00
C80_2	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.79	0.00
C81	1.00	0.05	0.00	0.00	0.32	0.00	0.62	0.00	0.00	0.00
C82	1.00	0.02	0.01	0.00	0.94	0.02	0.00	0.02	0.82	0.00
C83	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.91	0.00
C84	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.94	0.00
C85	1.00	0.02	0.06	0.00	0.92	0.00	0.00	0.00	0.82	0.00
C86	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.94	0.00
C87	1.00	0.02	0.08	0.00	0.80	0.11	0.00	0.00	0.96	0.00
C88	1.00	0.02	0.00	0.00	0.53	0.45	0.00	0.00	0.00	0.40
C89	1.00	0.02	0.00	0.00	0.92	0.06	0.00	0.00	0.32	0.00
C9	1.00	0.02	0.00	0.00	0.00	0.05	0.00	0.93	0.03	0.00
C90	1.00	0.02	0.00	0.00	0.42	0.57	0.00	0.00	0.27	0.00
C91	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.96	0.00	0.00
C92	1.00	0.02	0.00	0.00	0.66	0.33	0.00	0.00	0.37	0.00
C93	1.00	0.06	0.00	0.00	0.93	0.00	0.00	0.00	0.94	0.00
C94	1.00	0.02	0.00	0.00	0.69	0.29	0.00	0.00	0.05	0.00
C95	1.00	0.02	0.85	0.00	0.12	0.02	0.00	0.00	0.93	0.00
C95_1	1.00	0.80	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00
C95_2	1.00	0.68	0.29	0.00	0.03	0.00	0.00	0.00	0.94	0.00
C96	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
C97	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
C98	1.00	0.02	0.00	0.00	0.62	0.37	0.00	0.00	0.89	0.00
C99	1.00	0.02	0.00	0.00	0.88	0.11	0.00	0.00	0.11	0.00
W1	1.00	0.02	0.97	0.00	0.01	0.00	0.00	0.00	0.93	0.00
W15	1.00	0.97	0.01	0.00	0.01	0.01	0.00	0.00	0.94	0.00
W27	1.00	0.54	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00
W44	1.00	0.80	0.18	0.00	0.02	0.00	0.00	0.00	0.94	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C103	0.01	0.70	0.01	0.01	0.01
C105	0.81	1.29	0.83	0.01	0.01
C106	0.87	0.87	0.91	0.81	0.83
C107	0.01	0.95	0.01	0.01	0.01
C108	0.48	0.48	0.81	0.01	0.08
C110	0.44	0.49	0.52	0.10	0.41
C111_1	0.49	0.49	0.52	0.01	0.01
C111_2	0.49	0.52	0.50	0.01	0.49
C112	0.47	0.47	0.47	0.11	0.06
C113	0.48	0.48	0.55	0.01	0.01
C115	0.47	0.47	0.48	0.01	0.01
C119	0.01	1.47	0.01	0.01	0.01
C122	0.40	0.40	0.72	0.01	0.01
C128	0.01	0.01	0.28	0.01	0.01
C130	0.01	1.01	0.01	1.00	0.01
C131	0.01	0.01	22.28	0.01	0.01
C134	0.01	0.01	0.81	0.01	0.01
C135	0.45	0.45	0.50	0.01	0.01
C135_1	0.49	0.50	0.49	0.56	0.49
C138	0.33	0.33	1.25	0.01	0.01
C140	0.01	0.01	0.61	0.01	0.01
C141	0.01	0.01	0.20	0.01	0.01
C144_1	0.37	0.54	0.37	0.94	0.37
C144_2	0.37	0.37	0.70	0.01	0.01
C19	0.01	0.65	0.01	0.01	0.01

C196	0.01	0.01	7.29	0.01	0.01
C2_3	0.01	3.40	0.01	0.01	0.01
C2_4	0.01	0.01	3.86	0.01	0.01
C2_9	0.01	3.86	0.01	0.01	0.01
C24	0.01	0.86	0.01	0.83	0.01
C25	0.01	0.01	0.28	0.01	0.01
C25_3	0.85	0.85	0.86	0.78	0.76
C27	0.01	0.01	0.01	21.31	0.01
C29	0.01	1.24	0.01	0.01	0.01
C3	0.01	0.24	0.01	0.01	0.01
C33_1	0.01	0.01	0.29	0.01	0.01
C39	0.42	0.42	0.73	0.01	0.01
C4	0.01	0.04	0.01	0.01	0.01
C44	0.01	0.01	0.01	0.01	0.01
C6	0.01	0.33	0.01	0.01	0.01
C60	0.01	0.01	0.32	0.01	0.01
C63	0.01	0.01	0.55	0.01	0.01
C64	0.01	12.76	0.01	12.02	0.01
C65	0.01	0.01	0.95	0.01	0.01
C65_1	0.01	0.01	0.67	0.01	0.01
C65_2	0.01	0.01	0.67	0.01	0.01
C68	0.01	0.50	0.01	0.01	0.01
C70	0.01	0.01	0.01	0.20	0.01
C71	0.01	1.20	0.01	0.01	0.01
C73	0.01	0.01	1.32	0.01	0.01
C74	0.01	1.32	0.01	0.01	0.01
C77_1	0.64	0.69	2.57	0.26	0.26
C8	0.51	0.51	0.65	0.01	0.01
C81	3.38	3.38	3.64	2.89	0.01
C82	0.35	0.35	4.44	0.01	0.10
C85	1.04	1.04	1.37	0.01	0.01
C86	0.55	0.55	0.88	0.01	0.01
C87	0.01	0.01	0.66	0.01	0.01
C88	0.01	0.66	0.01	0.01	0.01
C89	0.27	0.29	0.34	0.01	0.22
C90	0.01	0.30	0.01	0.34	0.01
C91	0.23	0.40	0.23	0.01	0.23
C92	0.01	0.25	0.01	0.01	0.01

Analysis begun on: Mon Nov 6 10:29:24 2023

Analysis ended on: Mon Nov 6 10:29:35 2023
Total elapsed time: 00:00:11

APPENDIX B

Cremona Detailed Cost Estimates

COST ESTIMATE - Regional Catchment Improvements

	Description	Quantity	Unit	Unit Price	Extension
General					
1	Mobilization & demobilization	1	L.S.	$ 1,140.00	$ 1,140.00
2	Erosion and sediment control	1	L.S.	$ 4,000.00	$ 4,000.00
3	Traffic accommodation	1	L.S.	$ 500.00	$ 500.00
Culvert/Pipe Improvements					
Location	**Existing Size (m)**	**Proposed Size (m)**	**Length (m)**	**Unit Price**	**Extension**
C64	1 x 0.6	2 x 0.6	20	$ 570.00	$ 11,400.00
SUBTOTAL					$17,040.00
CONTINGENCY (25%)					$ 4,260.00
ENGINEERING (15%)					$ 2,556.00
TOTAL					**$ 24,000.00**

COST ESTIMATE - Central West Catchment Improvements

	Description	Quantity	Unit	Unit Price	Extension
General					
1	Mobilization & demobilization	1	L.S.	$ 8,478.00	$ 8,478.00
2	Erosion and sediment control	1	L.S.	$ 15,000.00	$ 15,000.00
3	Traffic accommodation	1	L.S.	$ 5,000.00	$ 5,000.00
Other Upgrades					
5	Regrade catchbasin inlet	2	ea.	$ 1,000.00	$ 2,000.00
6	Road Reinstatement - Pavement	20	m	$ 1,400.00	$ 28,000.00
7	Install concrete swale	50	m	$ 396.00	$ 19,800.00
8	Install curb and gutter	110	m	$ 150.00	$ 16,500.00
Culvert/Pipe Improvements					
Location	**Existing Size (m)**	**Proposed Size (m)**	**Length (m)**	**Unit Price**	**Extension**
C68	0.3	0.45	33	$ 560.00	$ 18,480.00
C77_1	0.3	0.45	10	$ 560.00	$ 5,600.00
SUBTOTAL					$113,258.00
CONTINGENCY (25%)					$ 28,314.50
ENGINEERING (15%)					$ 16,988.70
TOTAL					**$ 159,000.00**

COST ESTIMATE - Centre Street Improvements

	Description	Quantity	Unit	Unit Price	Extension
General					
1	Mobilization & demobilization	1	L.S.	$ 10,260.00	$ 10,260.00
2	Erosion and sediment control	1	L.S.	$ 15,000.00	$ 15,000.00
3	Traffic accommodation	1	L.S.	$ 5,000.00	$ 5,000.00
Other Upgrades					
4	Supply and install catchbasin - Type TwinC	1	ea.	$ 1,800.00	$ 1,800.00
5	Regrade catchbasin inlet	1	ea.	$ 1,000.00	$ 1,000.00
6	Road Reinstatement - Pavement	20	m	$ 1,400.00	$ 28,000.00
7	Install curb and gutter	160	m	$ 150.00	$ 24,000.00
Culvert/Pipe Improvements					
Location	**Existing Size (m)**	**Proposed Size (m)**	**Length (m)**	**Unit Price**	**Extension**
C86	0.25	0.45	20	$ 770.00	$ 15,400.00
C90	0.25	0.375	28	$ 720.00	$ 20,160.00
C91	0.25	0.375	17	$ 720.00	$ 12,240.00
SUBTOTAL					$ 132,860.00
CONTINGENCY (25%)					$ 33,215.00
ENGINEERING (15%)					$ 19,929.00
TOTAL					**$ 187,000.00**

COST ESTIMATE - 1 Street East Improvements

	Description	Quantity	Unit	Unit Price	Extension
General					
1	Mobilization & demobilization	1	L.S.	$ 19,597.00	$ 19,597.00
2	Erosion and sediment control	1	L.S.	$ 15,000.00	$ 15,000.00
3	Traffic accommodation	1	L.S.	$ 25,000.00	$ 25,000.00
Other Upgrades					
4	Supply and install manhole - Type 1-S	4	ea.	$ 7,130.00	$ 28,520.00
5	Supply and install catchbasin - Type C	1	ea.	$ 1,800.00	$ 1,800.00
6	Supply and install catchbasin - Type TwinC	1	ea.	$ 1,800.00	$ 1,800.00
7	Supply and install catchbasin - Type K3	1	ea.	$ 1,800.00	$ 1,800.00
8	Regrade catchbasin inlet	1	ea.	$ 1,000.00	$ 1,000.00
9	Road Reinstatement - Pavement	20	m	$ 1,400.00	$ 28,000.00
Culvert/Pipe Improvements					
Location	**Existing Size (m)**	**Proposed Size (m)**	**Length (m)**	**Unit Price**	**Extension**
C95	N/A	0.525	12	$ 680.00	$ 8,160.00
C99	0.3	0.525	22	$ 795.00	$ 17,490.00
C103	0.525	0.75	44	$ 735.00	$ 32,340.00
C105	0.3	0.525	6	$ 350.00	$ 2,100.00
C108	0.3	0.375	21	$ 510.00	$ 10,710.00
C144_1	N/A	0.75	60	$ 830.00	$ 49,800.00
C144_2	N/A	0.75	15	$ 830.00	$ 12,450.00
SUBTOTAL					$ 226,567.00
CONTINGENCY (25%)					$ 56,641.75
ENGINEERING (15%)					$ 33,985.05
TOTAL					**$ 318,000.00**

COST ESTIMATE - 3 Street East Improvements

	Description	Quantity	Unit	Unit Price	Extension
General					
1	Mobilization & demobilization	1	L.S.	$ 22,294.00	$ 22,294.00
2	Erosion and sediment control	1	L.S.	$ 15,000.00	$ 15,000.00
3	Traffic accommodation	1	L.S.	$ 25,000.00	$ 25,000.00
Other Upgrades					
4	Supply and install manhole - Type 1-S	2	ea.	$ 7,130.00	$ 14,260.00
5	Supply and install catchbasin - Type C	2	ea.	$ 1,800.00	$ 3,600.00
6	Supply and install catchbasin - Type TwinK2	1	ea.	$ 1,800.00	$ 1,800.00
7	Supply and install catchbasin - Type K2	1	ea.	$ 1,800.00	$ 1,800.00
8	Road Reconstruction - Pavement	185	m	$ 175.00	$ 32,375.00
9	Install curb and gutter	370	m	$ 150.00	$ 55,500.00
Culvert/Pipe Improvements					
Location	**Existing Size (m)**	**Proposed Size (m)**	**Length (m)**	**Unit Price**	**Extension**
C63	N/A	0.45	73	$ 655.00	$ 47,815.00
C111_1	0.3	0.525	12	$ 795.00	$ 9,540.00
C111_2	0.3	0.525	5	$ 795.00	$ 3,975.00
C113	0.3	0.45	5	$ 770.00	$ 3,850.00
C115	0.3	0.45	5	$ 770.00	$ 3,850.00
C121	N/A	0.45	15	$ 655.00	$ 9,825.00
C135	N/A	0.525	18	$ 795.00	$ 14,310.00
C135_1	0.3	0.525	15	$ 795.00	$ 11,925.00
C143	N/A	0.45	13	$ 655.00	$ 8,515.00
SUBTOTAL					$ 285,234.00
CONTINGENCY (25%)					$ 71,308.50
ENGINEERING (15%)					$ 42,785.10
TOTAL					**$ 400,000.00**

COST ESTIMATE - 2A Avenue East Improvements

	Description	Quantity	Unit	Unit Price	Extension
General					
1	Mobilization & demobilization	1	L.S.	$ 180.00	$ 180.00
2	Erosion and sediment control	1	L.S.	$ 15,000.00	$ 15,000.00
3	Traffic accommodation	1	L.S.	$ 500.00	$ 500.00
Other Upgrades					
6	Supply and install catchbasin - Type TwinK2	1	ea.	$ 1,800.00	$ 1,800.00
SUBTOTAL					$ 1,800.00
CONTINGENCY (25%)					$ 450.00
ENGINEERING (15%)					$ 270.00
TOTAL					**$ 3,000.00**

COST ESTIMATE - East Catchment Improvements

	Description	Quantity	Unit	Unit Price	Extension
General					
1	Mobilization & demobilization	1	L.S.	$ 33,331.50	$ 33,331.50
2	Erosion and sediment control	1	L.S.	$ 15,000.00	$ 15,000.00
3	Traffic accommodation	1	L.S.	$ 25,000.00	$ 25,000.00
Other Upgrades					
4	Supply and install manhole - Type 1-S	4	ea.	$ 7,130.00	$ 28,520.00
5	Supply and install catchbasin - Type C	2	ea.	$ 1,800.00	$ 3,600.00
6	Supply and install catchbasin - Type TwinC	2	ea.	$ 1,800.00	$ 3,600.00
7	Supply and install catchbasin - Type TwinK2	1	ea.	$ 1,800.00	$ 1,800.00
8	Road Reconstruction - Pavement	270	m	$ 175.00	$ 47,250.00
9	Install curb and gutter	540	m	$ 150.00	$ 81,000.00
Culvert/Pipe Improvements					
Location	**Existing Size (m)**	**Proposed Size (m)**	**Length (m)**	**Unit Price**	**Extension**
C2	N/A	0.3	10	$ 555.00	$ 5,550.00
C34	0.45	0.9	60	$ 1,100.00	$ 66,000.00
C39	N/A	0.45	10	$ 655.00	$ 6,550.00
C44	0.4	0.75	35	$ 500.00	$ 17,500.00
C111	N/A	0.3	32	$ 555.00	$ 17,760.00
C122	0.1	0.45	5	$ 325.00	$ 1,625.00
C136	N/A	0.3	5	$ 555.00	$ 2,775.00
C138	N/A	0.525	12	$ 680.00	$ 8,160.00
C140	N/A	0.3	75	$ 555.00	$ 41,625.00
SUBTOTAL					$ 401,096.50
CONTINGENCY (25%)					$ 100,274.13
ENGINEERING (15%)					$ 60,164.48
TOTAL					**$ 562,000.00**

APPENDIX F

Transportation Network Inspection Logs

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-1
Road: - -	**Surface**: -	**Length**:	**Width**:
From: Railway Ave E - **To**: End		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	0
Overall Rating (100 - Sum of Defects):	100

Notes: -

Photos:

MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-2
Road: 1 ST E	**Surface**: Asphalt	**Length**: 124	**Width**: 12.4
From: 1 Ave - **To**: 2 Ave		**Inspector**: I.M.	

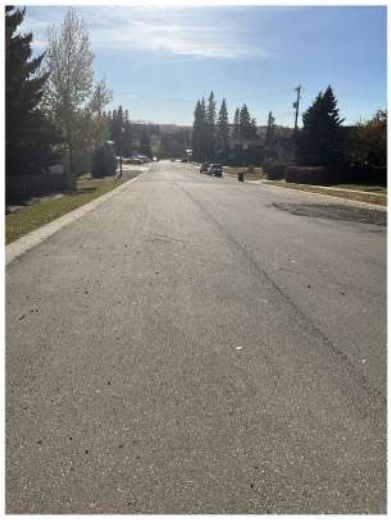


Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	4
Longitudinal Cracks (0-5):	2
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	2
Sum of Defects (0-100):	8
Overall Rating (100 - Sum of Defects):	92

Notes: Couple patches on the road after utilities repair.

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-3
Road: Railway AVE E	**Surface**: Asphalt	**Length**: 96	**Width**: 12
From: Lane - **To**: 3 St E		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	3
Longitudinal Cracks (0-5):	4
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	5
Sum of Defects (0-100):	12
Overall Rating (100 - Sum of Defects):	88

Notes: Old sealed cracks..

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-4
Road: Centre ST	**Surface**: Asphalt	**Length**: 121.5	**Width**: 24.6
From: 1 Ave - **To**: 2 Ave		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	3
Longitudinal Cracks (0-5):	3
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	2
Sum of Defects (0-100):	8
Overall Rating (100 - Sum of Defects):	92

Notes: Several cracks on the road. Width includes parking on the both side of the road. Several patches on the road after utility repairs.

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-5
Road: 2 AVE	**Surface**: Asphalt	**Length**: 84	**Width**: 9.6
From: 1 St E - **To**: Centre St		**Inspector**: I.M.	



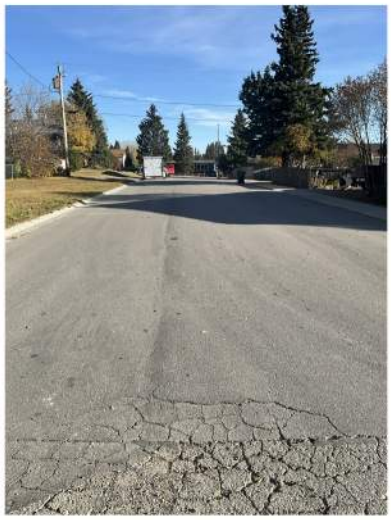
Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	1
Overall Rating (100 - Sum of Defects):	99

Notes: Alligator cracks at the beginning of the road.

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-6
Road: 1 AVE	**Surface**: Asphalt	**Length**: 85.5	**Width**: 14.1
From: Centre St - **To**: 1 St W		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	2
Longitudinal Cracks (0-5):	2
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	1
Sum of Defects (0-100):	5
Overall Rating (100 - Sum of Defects):	95

Notes: Scratches on the asphalt surface

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-7
Road: 1 AVE	**Surface**: Asphalt	**Length**: 89	**Width**: 11.7
From: 1 St E - **To**: Centre St		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	1
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	1
Overall Rating (100 - Sum of Defects):	99

Notes: Couple patches on the road at the beginning.

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-8
Road: 3 ST E	**Surface**: Gravel	**Length**: 84	**Width**: 9.7
From: Railway Ave E - **To**: 1 Ave		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	4
Sum of Defects (0-100):	4
Overall Rating (100 - Sum of Defects):	96

Notes: Road needs grading.

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-9
Road: 3 ST E	**Surface**: Gravel	**Length**: 92.4	**Width**: 11.8
From: 1 Ave - **To**: Webb Ave		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	4
Sum of Defects (0-100):	4
Overall Rating (100 - Sum of Defects):	96

Notes: Road needs grading. The width of the road includes the parking lot.

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-10
Road: 3 ST E	**Surface**: Gravel	**Length**: 75.5	**Width**: 7.4
From: Webb Ave - **To**: Boake Ave		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	4
Sum of Defects (0-100):	4
Overall Rating (100 - Sum of Defects):	96

Notes: Gravel needs grading. Washed gravel.

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-11
Road: 1 AVE	**Surface**: Asphalt	**Length**: 168	**Width**: 11
From: 3 St E - **To**: East St		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	0
Overall Rating (100 - Sum of Defects):	100

Notes: AC road.

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-12
Road: Railway AVE W	**Surface**: Gravel	**Length**: 210	**Width**: 6.7
From: Coyote Rd - **To**: End		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	4
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	6
Sum of Defects (0-100):	10
Overall Rating (100 - Sum of Defects):	90

Notes: Needs grading.

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-13
Road: Railway AVE E	**Surface**: Asphalt	**Length**: 250	**Width**: 8.2
From: East St - **To**: End		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	1
Longitudinal Cracks (0-5):	4
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	2
Sum of Defects (0-100):	7
Overall Rating (100 - Sum of Defects):	93

Notes: -

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-14
Road: East ST	**Surface**: Gravel	**Length**: 31	**Width**: 6.8
From: Cremona Hts - **To**: 1 Ave		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	4
Sum of Defects (0-100):	4
Overall Rating (100 - Sum of Defects):	96

Notes: Washed gravel

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-15
Road: 1 ST W	**Surface**: Asphalt	**Length**: 95	**Width**: 6.5
From: 1 Ave - **To**: End		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	0
Overall Rating (100 - Sum of Defects):	100

Notes: Several patches after road repairs (potholes).

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-16
Road: Boake AVE	**Surface**: Asphalt	**Length**: 169	**Width**: 10.7
From: 3 St E - **To**: East St		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	2
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	2
Overall Rating (100 - Sum of Defects):	98

Notes: Road has several scratches on the surface

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-17
Road: East ST	**Surface**: Gravel	**Length**: 61	**Width**: 6.8
From: Webb Ave - **To**: Cremona Hts		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	4
Sum of Defects (0-100):	4
Overall Rating (100 - Sum of Defects):	96

Notes: Section of the road from Webb avenue to Cremona Hls. Washed gravel.

Photos:

MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-18
Road: Railway AVE W	**Surface**: Gravel	**Length**: 90	**Width**: 7
From: Hwy 22 - **To**: Lane		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	4
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	5
Sum of Defects (0-100):	9
Overall Rating (100 - Sum of Defects):	91

Notes: Needs grading.

Photos:

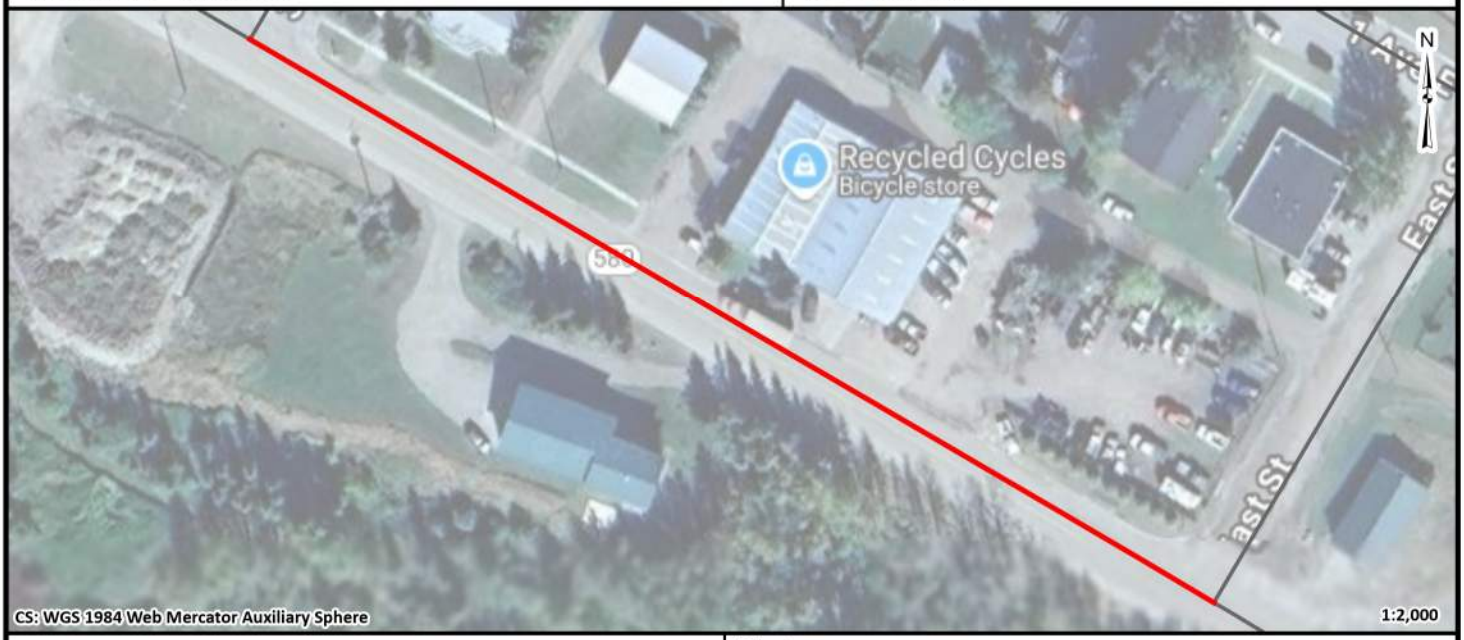




MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-19
Road: Railway AVE E	**Surface**: Asphalt	**Length**: 180	**Width**: 10.5
From: 3 St E - **To**: East St		**Inspector**: I.M.	



Manholes: -

Valves: -

Defect	Rating (0 = Good Condition)
Transverse Cracks (0-5):	2
Longitudinal Cracks (0-5):	2
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	4
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	2
Sum of Defects (0-100):	10
Overall Rating (100 - Sum of Defects):	90

Notes: -

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-20
Road: Edey CLOSE	**Surface**: Asphalt	**Length**: 230	**Width**: 11.2
From: Edey Close - **To**: Edey Close		**Inspector**: I.M.	



Manholes: -

Valves: -

Defect	Rating (0 = Good Condition)
Transverse Cracks (0-5):	2
Longitudinal Cracks (0-5):	2
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	1
Sum of Defects (0-100):	5
Overall Rating (100 - Sum of Defects):	95

Notes: Few patches on the road.

Photos:

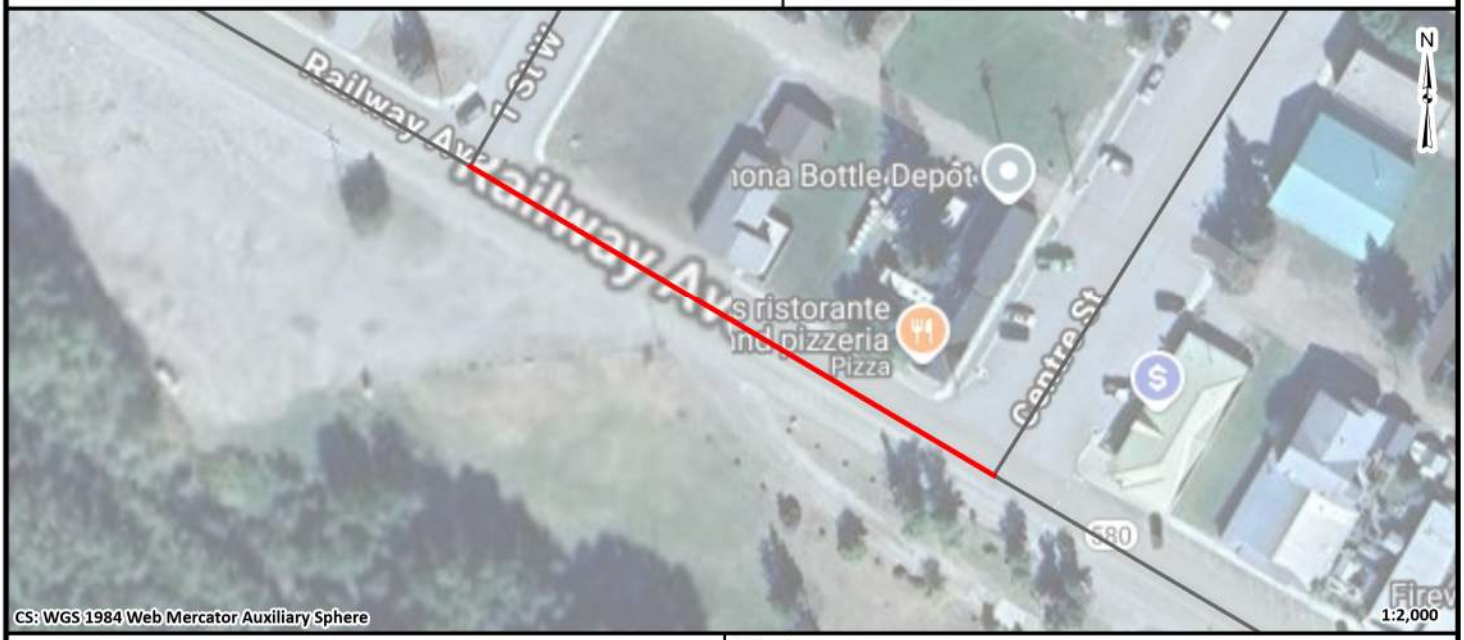




MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-21
Road: Railway AVE W	**Surface**: Asphalt	**Length**: 100	**Width**: 12
From: Centre St - **To**: 1 St W		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	2
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	1
Sum of Defects (0-100):	3
Overall Rating (100 - Sum of Defects):	97

Notes: -

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-22
Road: Centre ST	**Surface**: Asphalt	**Length**: 122	**Width**: 24.6
From: Railway Ave E - **To**: 1 Ave		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	3
Longitudinal Cracks (0-5):	3
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	1
Sum of Defects (0-100):	7
Overall Rating (100 - Sum of Defects):	93

Notes: Several cracks on the road surface.

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-23
Road: 1 ST W	**Surface**: Asphalt	**Length**: 117.6	**Width**: 12.6
From: Railway Ave W - **To**: 1 Ave		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	2
Longitudinal Cracks (0-5):	2
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	1
Sum of Defects (0-100):	5
Overall Rating (100 - Sum of Defects):	95

Notes: Several sealed cracks. Big patch on the intersection of 1 Ave and 1 St W.

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-24
Road: Edey CLOSE	**Surface**: Asphalt	**Length**: 86	**Width**: 11
From: 1 Ave - **To**: Ede Close (Loop)		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	3
Longitudinal Cracks (0-5):	3
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	1
Sum of Defects (0-100):	8
Overall Rating (100 - Sum of Defects):	92

Notes: Sealed cracks.

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-25
Road: Railway AVE E	**Surface**: Asphalt	**Length**: 101	**Width**: 12
From: 1 St E - **To**: Lane		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	3
Longitudinal Cracks (0-5):	3
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	2
Sum of Defects (0-100):	8
Overall Rating (100 - Sum of Defects):	92

Notes: Few patches on the road after utility repair..

Photos:

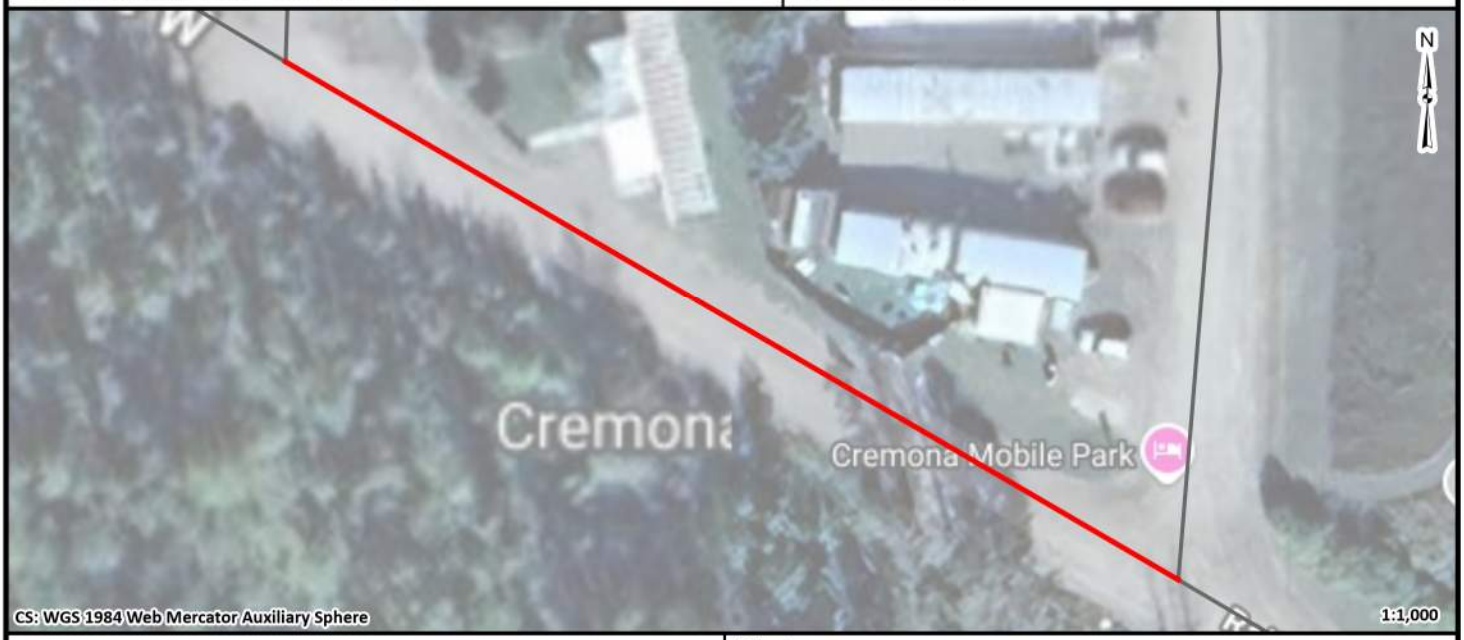




MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-26
Road: Railway AVE W	**Surface**: -	**Length**:	**Width**:
From: Highway View - **To**: Coyote Rd		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	0
Overall Rating (100 - Sum of Defects):	100

Notes: -

Photos:

an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-27
Road: 1 ST E	**Surface**: Asphalt	**Length**: 118	**Width**:
From: Highway View - **To**: Coyote Rd		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	3
Sum of Defects (0-100):	17
Overall Rating (100 - Sum of Defects):	83

Notes: Several longitudinal cracks sealed, several sections with alligator cracks.

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-28
Road: 3 AVE	**Surface**: Asphalt	**Length**: 86.5	**Width**: 6.8
From: 1 St E - **To**: Centre St		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	0
Overall Rating (100 - Sum of Defects):	100

Notes: Good shape, however, road grades to private property.

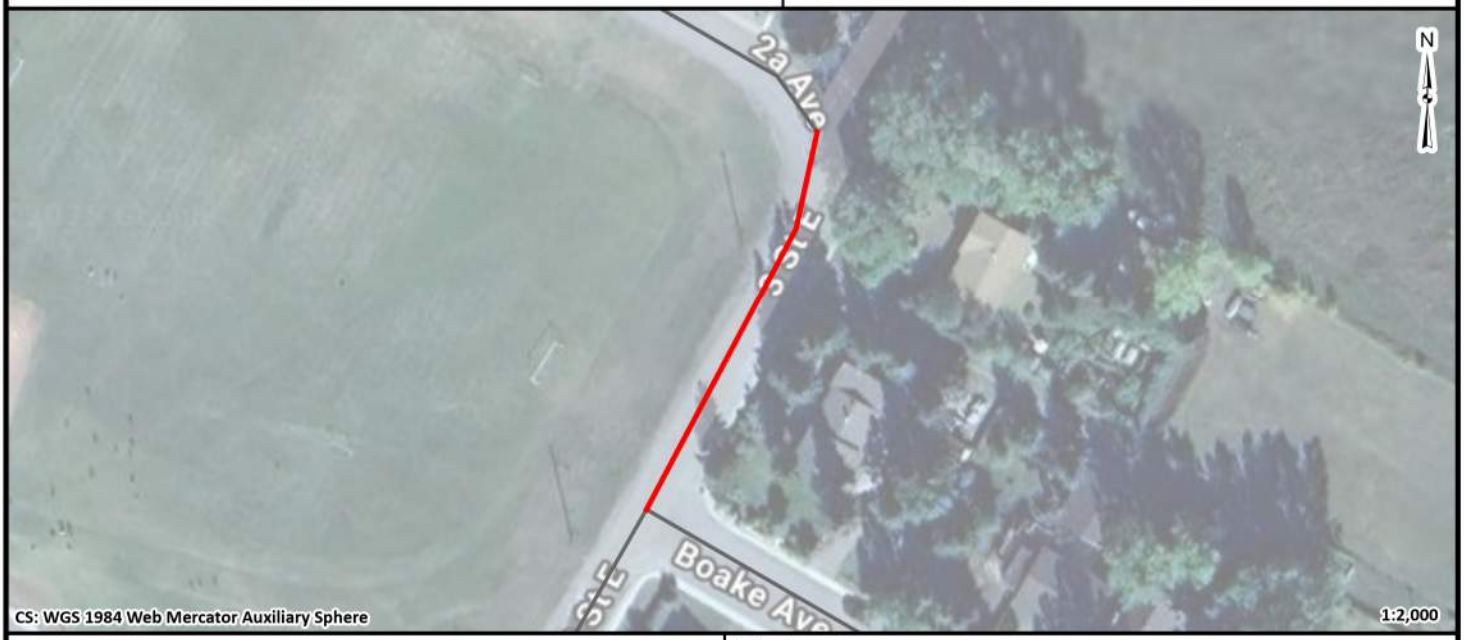
Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-30
Road: 3 ST E	**Surface**: Asphalt	**Length**: 86	**Width**: 8.2
From: Boake Ave - **To**: 2A Ave		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	3
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	3
Overall Rating (100 - Sum of Defects):	97

Notes: Several transverse cracks

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-31
Road: Railway AVE W	**Surface**: Asphalt	**Length**: 131	**Width**: 12
From: 1 St W - **To**: 2 St W		**Inspector**: I.M.	



Manholes: -

Valves: -

Defect	Rating (0 = Good Condition)
Transverse Cracks (0-5):	5
Longitudinal Cracks (0-5):	5
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	3
Sum of Defects (0-100):	13
Overall Rating (100 - Sum of Defects):	87

Notes: -

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-32
Road: Webb AVE	**Surface**: Asphalt	**Length**: 169	**Width**: 8.5
From: 3 St E - **To**: East St		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	1
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	1
Overall Rating (100 - Sum of Defects):	99

Notes: Road has one patch 12.7x8.5 in the middle of the road.

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-33
Road: - -	**Surface**: Gravel	**Length**: 78	**Width**: 6
From: Coyote Rd - **To**: End		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	4
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	5
Sum of Defects (0-100):	9
Overall Rating (100 - Sum of Defects):	91

Notes: Needs grading..

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-34
Road: 1 ST E	**Surface**: Asphalt	**Length**: 94	**Width**: 12.4
From: 2 Ave - **To**: 2A Ave		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	3
Longitudinal Cracks (0-5):	2
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	2
Sum of Defects (0-100):	7
Overall Rating (100 - Sum of Defects):	93

Notes: Couple patches after utility repair.

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-35
Road: East ST	**Surface**: Gravel	**Length**: 84.6	**Width**: 6.8
From: Boake Ave - **To**: Webb Ave		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	4
Sum of Defects (0-100):	4
Overall Rating (100 - Sum of Defects):	96

Notes: Section of the road from Boak Avenue to Webb Avenue

Photos:

MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-36
Road: 2 ST W	**Surface**: Asphalt	**Length**: 240	**Width**: 10.2
From: Railway Ave E - **To**: Edey Close		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	2
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	1
Sum of Defects (0-100):	5
Overall Rating (100 - Sum of Defects):	95

Notes: Few patches on the road.

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-37
Road: Coyote Rd	**Surface**: Gravel	**Length**: 85	**Width**: 6.5
From: End - **To**: Smurf Aly		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	2
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	5
Sum of Defects (0-100):	7
Overall Rating (100 - Sum of Defects):	93

Notes: Needs grading.

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-39
Road: 1 AVE	**Surface**: Asphalt	**Length**: 255	**Width**: 10.2
From: 1 St W - **To**: Edey Close		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	2
Longitudinal Cracks (0-5):	2
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	2
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	1
Sum of Defects (0-100):	7
Overall Rating (100 - Sum of Defects):	93

Notes: Few patches on the road after utility repair.

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-40
Road: 1 ST E	**Surface**: Asphalt	**Length**: 86.5	**Width**: 12.4
From: 2A Ave - **To**: 3 Ave		**Inspector**: I.M.	

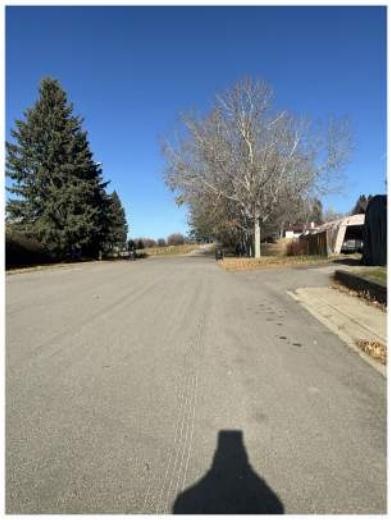


Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	2
Longitudinal Cracks (0-5):	1
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	1
Sum of Defects (0-100):	4
Overall Rating (100 - Sum of Defects):	96

Notes: Scratches on the asphalt surface.

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-41
Road: East ST	**Surface**: Gravel	**Length**: 86	**Width**: 3
From: End - **To**: -		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	5
Sum of Defects (0-100):	5
Overall Rating (100 - Sum of Defects):	95

Notes: Section of the road from Boak Ave to driveway

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-42
Road: Coyote Rd	**Surface**: Gravel	**Length**: 80	**Width**: 6.5
From: Railway Ave W - **To**: Smurf Aly		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	4
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	5
Sum of Defects (0-100):	9
Overall Rating (100 - Sum of Defects):	91

Notes: Needs grading.

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-43
Road: Highway View -	**Surface**: Gravel	**Length**: 180	**Width**: 6
From: Railway Ave E - **To**: End		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	3
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	5
Sum of Defects (0-100):	8
Overall Rating (100 - Sum of Defects):	92

Notes: Needs grading.

Photos:

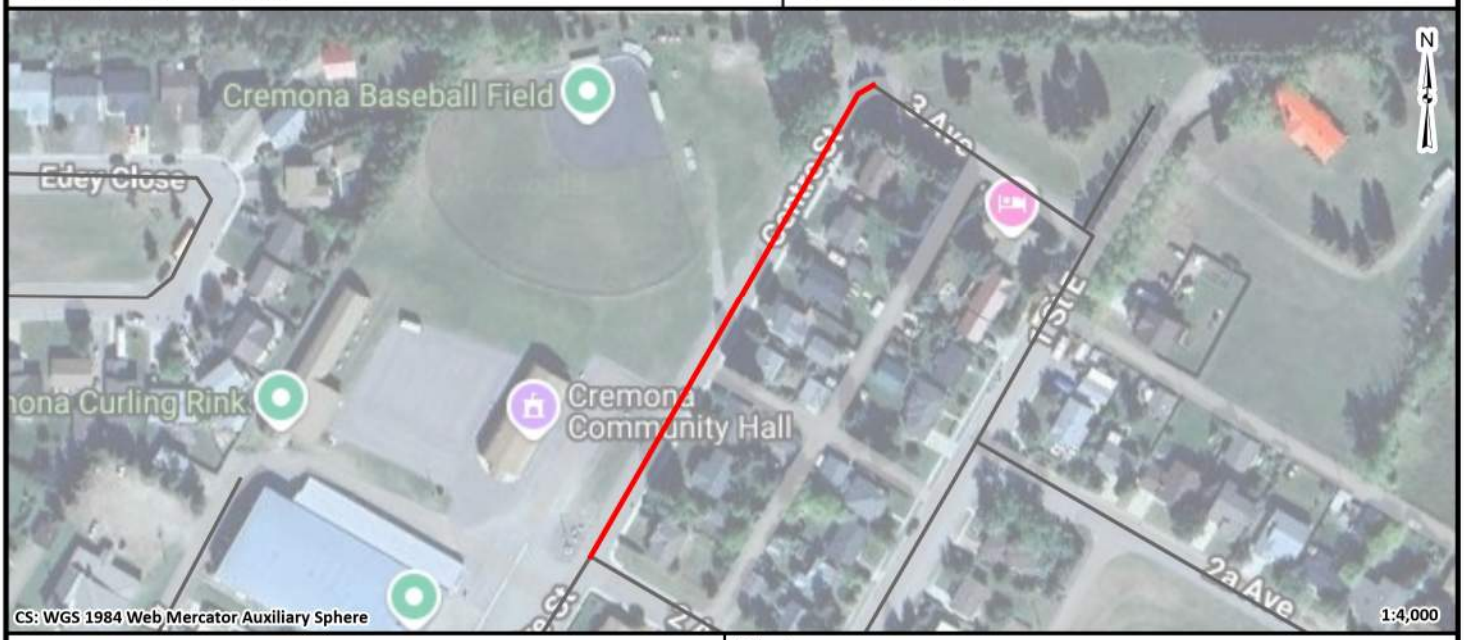




an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-44
Road: Centre ST	**Surface**: Asphalt	**Length**: 180	**Width**: 8.6
From: 2A Ave - **To**: 3 Ave		**Inspector**: I.M.	

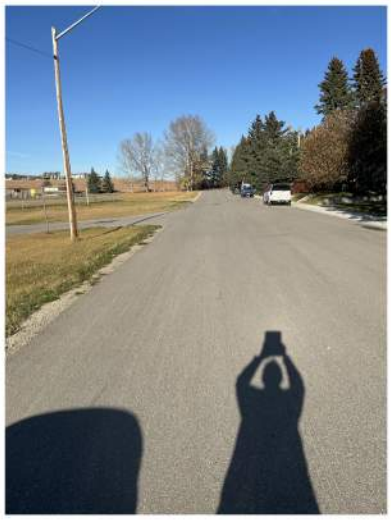


Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	1
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	1
Overall Rating (100 - Sum of Defects):	99

Notes: Two cracks at beginning of the road.

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-45
Road: East ST	**Surface**: Gravel	**Length**: 92	**Width**: 8.2
From: 1 Ave - **To**: Railway Ave E		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	4
Sum of Defects (0-100):	4
Overall Rating (100 - Sum of Defects):	96

Notes: Washed gravel and uneven surfaces.

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-46
Road: 2A AVE	**Surface**: Asphalt	**Length**: 190	**Width**: 9.1
From: 1 St E - **To**: 3 St E		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	2
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	1
Sum of Defects (0-100):	3
Overall Rating (100 - Sum of Defects):	97

Notes: Few transverse cracks. Scratches on the asphalt surface..

Photos:





MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		Job Number: 2490-019	Asset ID: Road-47
Road: 1 ST E	Surface: -	Length:	Width:
From: 3 Ave - To: End		Inspector: I.M.	



Manholes:	-
Valves:	-

Defect	Rating (0 = Good Condition)
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	0
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	0
Overall Rating (100 - Sum of Defects):	100

Notes: -

Photos:

an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-49
Road: Cremona HTS	**Surface**: Other	**Length**: 88	**Width**: 9.7
From: East St - **To**: End		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	1
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	1
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	0
Sum of Defects (0-100):	2
Overall Rating (100 - Sum of Defects):	98

Notes: Asphalt sealed road

Photos:



MPE an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-50
Road: Railway AVE W	**Surface**: Asphalt	**Length**: 96	**Width**: 8.5
From: 2 St W - **To**: Hwy 22		**Inspector**: I.M.	

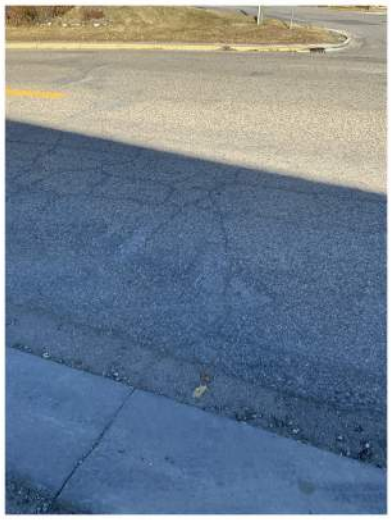


Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	2
Longitudinal Cracks (0-5):	2
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	2
Sum of Defects (0-100):	8
Overall Rating (100 - Sum of Defects):	92

Notes: Old sealed cracks.

Photos:





an Englobe company

ROAD INSPECTION RECORD

Project: Cremona Infrastructure Audit		**Job Number**: 2490-019	**Asset ID**: Road-51
Road: Railway AVE E	**Surface**: Asphalt	**Length**: 99	**Width**: 15
From: Centre St - **To**: 1 St E		**Inspector**: I.M.	



Manholes:	-
Valves:	-

Defect	**Rating (0 = Good Condition)**
Transverse Cracks (0-5):	0
Longitudinal Cracks (0-5):	5
Alligator Cracks (0-10):	0
Shrinkage Cracks (0-5):	0
Rutting (0-10):	0
Corrugations (0-5):	0
Ravelling (0-5):	0
Shoving / Pushing (0-10):	0
Potholes (0-10):	0
Excess Asphalt (0-10):	0
Polished Aggregate (0-5):	0
Deficient Drainage (0-10):	0
Riding Quality (0-10):	3
Sum of Defects (0-100):	8
Overall Rating (100 - Sum of Defects):	92

Notes: -

Photos:





an Englobe company

ROAD INSPECTION RECORD