Ailsa Craig SWMMP

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Table of Contents

List of Figures

List of Tables

1. Introduction

The Municipality of North Middlesex has retained EXP Services Inc. to develop the Ailsa Craig Stormwater Management Master Plan (SWMMP). The study aims to assess the performance and condition of existing municipal drainage infrastructure, identify deficiencies within the storm, sanitary, and water systems, and establish a coordinated, long-term renewal strategy that supports future growth while ensuring compliance with municipal and provincial standards.

This Master Plan was initiated in response to recurring capacity and condition concerns within the Ailsa Craig community. Increasing infill development, intensified land use, and more frequent high-intensity rainfall events have resulted in localized flooding, erosion, and infrastructure strain. The project provides the Municipality with a defensible, data-driven framework to prioritize infrastructure investments, improve system resilience, and ensure alignment with Ausable Bayfield Conservation Authority (ABCA) policies, and the Municipality of North Middlesex Infrastructure Design Guidelines and Construction Standards (2025).

1.1 Background

The community of Ailsa Craig currently faces significant challenges in managing stormwater due to limited existing capacity and the aging condition of underground infrastructure. As development pressure continues through infill and intensification, the risk of surface flooding and over-taxed outlets has increased. To address these issues, the Municipality initiated the Ailsa Craig SWMMP to evaluate drainage performance and develop a comprehensive, sustainable management strategy.

The study area covers the entire urban settlement area boundary of Ailsa Craig, as shown in **Figure 1**. The ultimate receiving watercourse for the community is the Ausable River. It bounds Ailsa Craig by the northwest, west, and southwest. The existing stormwater network consists of storm sewers running along most major corridors, municipal drains, open ditches, and diversion channels.

Regarding municipal drains, to the northeast is the Thirwell Award Drain, and to the southeast is the Cameron-Thirwell Drain. The flooding within these watercourses is outside of the control of North Middlesex and flood mitigation strategies for these features have not been considered. Stokes Drain A and Stokes Drain B located East of Queen Street are abandoned. The location of the municipal drains is shown in **Figure 1.**

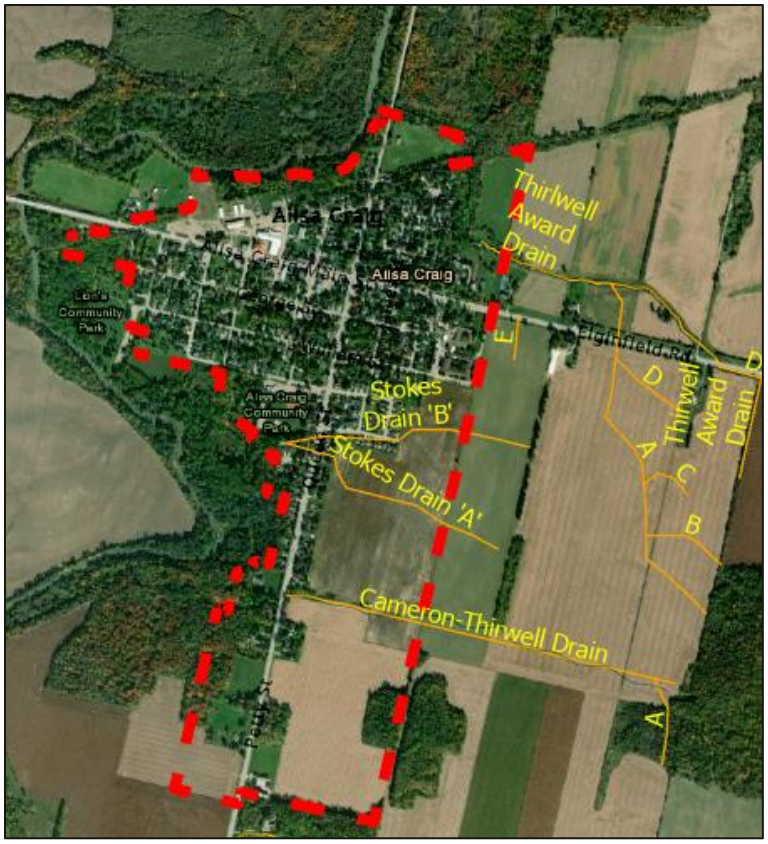

Figure 1. Ailsa Craig Boundaries and Municipal Drains

Historical mapping and records indicate that storm sewer pipe materials range from 1950-1994, with most of the system being installed between 1977 and 1993. Similar aging trends exist in the sanitary and watermain networks, highlighting the benefit of coordinated replacements to minimize surface disruption, as well as optimize investments.

The primary objective of the SWMMP is to confirm the hydraulic adequacy of the existing system under current and projected conditions, identify structurally or hydraulically deficient segments, and prepare a phased implementation strategy that addresses both capacity and condition constraints while supporting long-term growth.

1.2 Methodology And Executive Summary

The Ailsa Craig Stormwater Management Master Plan (SWMMP) was completed by EXP Services Inc. on behalf of the Municipality of North Middlesex to evaluate the performance, capacity, and condition of the existing stormwater, sanitary and watermain systems within the Ailsa Craig urban area. The study provides a coordinated strategy for infrastructure renewal, supporting future growth and compliance with municipal and provincial guidelines.

The assessment integrated GIS-based hydrologic and hydraulic analyses with infrastructure age, CCTV condition, and operational data to identify deficiencies and prioritize upgrades. Drainage catchments were delineated using LiDAR-based digital elevation models, and peak flows were estimated using the Rational Method with the 1 in 5-year design storm derived from local IDF parameters. Hydraulic capacity was calculated using Manning's Equation, applying municipal standards for minimum slopes and cover depths. Results indicated that approximately forty percent of the storm sewer network is operating beyond its design capacity, with much of the underground infrastructure installed between 1950 and 1994, some nearing the end of its service life.

A prioritization framework was developed, using a weighted scoring method to integrate hydraulic capacity, age, CCTV ratings, as well as observed operational issues. This approach identified corridors where multiple utilities are simultaneously deficient, allowing for coordinated replacement within existing municipal rights-of-way. Preliminary cost estimates for the highest-priority (red) projects total approximately $5.7 million, including contingencies and engineering. Implementation of the recommended upgrades will improve system reliability, reduce flood risks, and ensure long-term compliance with municipal and provincial requirements.

1.3 Project Collaboration

The Ailsa Craig Stormwater Management Master Plan was developed through coordination with multiple stakeholders to verify that technical recommendations align with municipal objectives, environmental requirements, and community interests.

Key stakeholders engaged or consulted during the preparation of this study include:

- Municipality of North Middlesex: Project owner and primary decision-making authority overseeing implementation and coordination with municipal infrastructure programs.
- Ausable Bayfield Conservation Authority (ABCA): Provided input regarding watershed management, flood control, and regulatory requirements under Ontario Regulation 147/06.
- Local Residents and Businesses: A Public Information Centre (PIC) was held on November 10th, 2025, to present the draft Master Plan and provide an opportunity for public review and comment.

This collaborative process ensured that the proposed infrastructure improvements address not only hydraulic capacity and asset condition but also community values, regulatory context, and long-term sustainability objectives for the Municipality of North Middlesex. For additional information on consultation activities, please refer to Section 4 of this report.

2. Stormwater Implementation Strategy

Evaluating storm sewer replacements requires multi-disciplinary considerations that integrate hydraulic capacity analysis with asset condition assessments. The goal is to ensure that infrastructure upgrades are technically justified, cost-effective, and coordinated across systems to minimize disruption and maximize long-term performance.

2.1 Existing Conditions

As part of the Ailsa Craig Stormwater Management Master Plan, the initial phase of work focused on reviewing all available data to establish a comprehensive understanding of the existing drainage infrastructure. A combination of desktop review, GIS analysis, and hydraulic modelling was used to prepare this plan. The process began with collecting and reviewing GIS shapefiles showing the road network, storm sewers, water and wastewater infrastructure, and parcel boundaries. As-built drawings, municipal drain reports, and closed-circuit television (CCTV) inspection records were examined to understand the condition and configuration of the system. ArcGIS was then used to map drainage catchments, identify network connectivity, and calculate service areas, slopes, and pipe lengths. This foundational work enabled the development of a baseline model for existing conditions and informed the identification of deficiencies and opportunities for improvement in the stormwater system.

2.2 Capacity Assessment

The storm sewer capacity assessment in Ailsa Craig was undertaken to evaluate the performance of the existing minor storm system in managing runoff from urbanized areas under current and projected conditions.

2.2.1 Hydrologic Assessment

The hydrologic assessment was completed using the Rational Method, applying a 5-year design storm as the baseline event, consistent with the Ministry of the Environment Conservation and Parks (MECP) standards for minor system design and the requirements of the Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA). Peak flows were determined using the standard Rational Method equation:

$$Q = 0.278CIA$$

where Q is peak flow (m³/s), C is the runoff coefficient, i is the rainfall intensity (mm/hr), and A is the drainage area (ha).

Rainfall intensities were calculated using the Municipality of North Middlesex Infrastructure Design Guidelines and Construction Standards. The Intensity–Duration–Frequency (IDF) relationship is given as:

$$i = A(t + C)^B$$

where t is the storm duration in hours (taken as the time of concentration, Tc), and A, B, and C are curve-fitting parameters. The applicable IDF parameters are provided in **Figure 1.**

Table 1. IDF Curve-Fitting Parameters for Ailsa Craig

Parameter	1 yr	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
A	27.0	30.7	41.8	49.3	58.5	65.1	71.4
B	-0.780	-0.798	-0.814	-0.820	-0.823	-0.824	-0.824
C	0.080	0.085	0.090	0.091	0.092	0.092	0.091

The time of concentration for each catchment was selected from the municipal guidelines, as noted below in **Table 2.** This table provides standard inlet times corresponding to average runoff coefficients, which were used unless site-specific conditions justified alternative values. These selections ensure consistency with municipal standards and provide a reliable basis for estimating flow travel times across the drainage area.

Table 2. Time of Concentration based on Average Runoff Coefficient

Average Runoff Coefficient (C)	Time of Concentration (Tc) (min)
0.4	23.0
0.5	17.5
0.6	14.5
0.7	12.5
0.8	11.5
0.9	10.5

Existing land uses consist primarily of low–medium density residential development with some institutional and commercial areas. Based on this mix, runoff coefficients in the range of 0.40 to 0.50 were applied for the catchments, resulting in Tc values between 17.5 and 23 minutes.

Catchment delineation was performed using GIS-based topographic data to define drainage boundaries and overland flow paths. For this study, the storm sewer system was divided into a series of small drainage areas, each representing the contributing flow to an individual pipe segment. To facilitate system-wide analysis, these smaller drainage areas were grouped into six major catchments, which represent the dominant drainage zones within the Ailsa Craig urban

boundary. The delineation process combined municipal mapping, storm sewer as-built records, and elevation data derived from a Digital Elevation Model (DEM) to verify consistency with surface topography and sewer connectivity.

A layout of the six major catchments is shown in **Figure 2**, and the detailed network of individual drainage areas is shown in **Figure 3**. These figures illustrate how localized drainage areas contributing to individual pipes were aggregated into broader catchments for hydrologic and hydraulic assessment.

It is important to note that the outlet for the Craigwiel Gardens Rebuild is located outside the municipal right-of-way. As a result, the associated drainage area has been excluded from the stormwater design analysis.

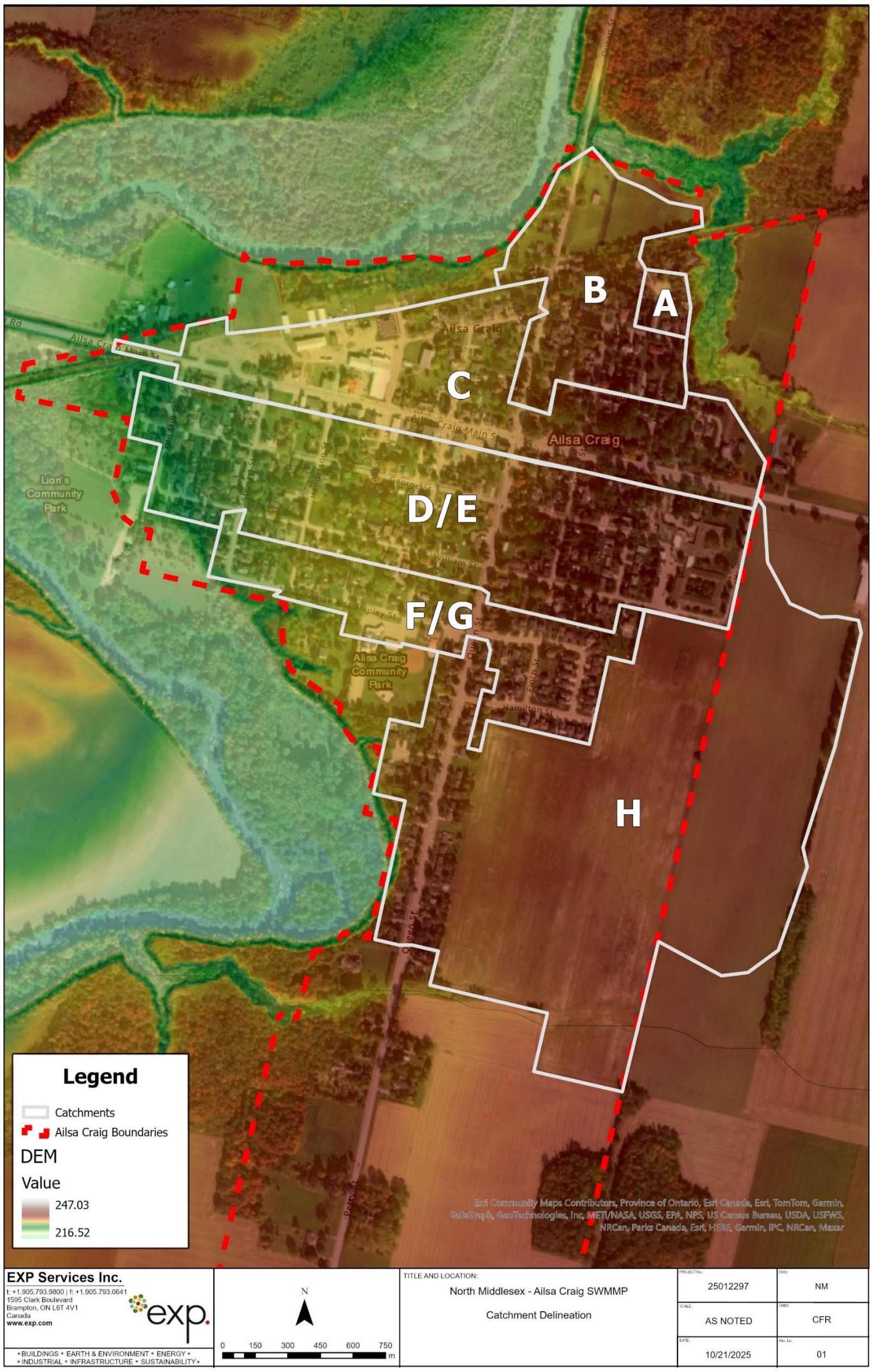

Figure 2. Catchment Delineation

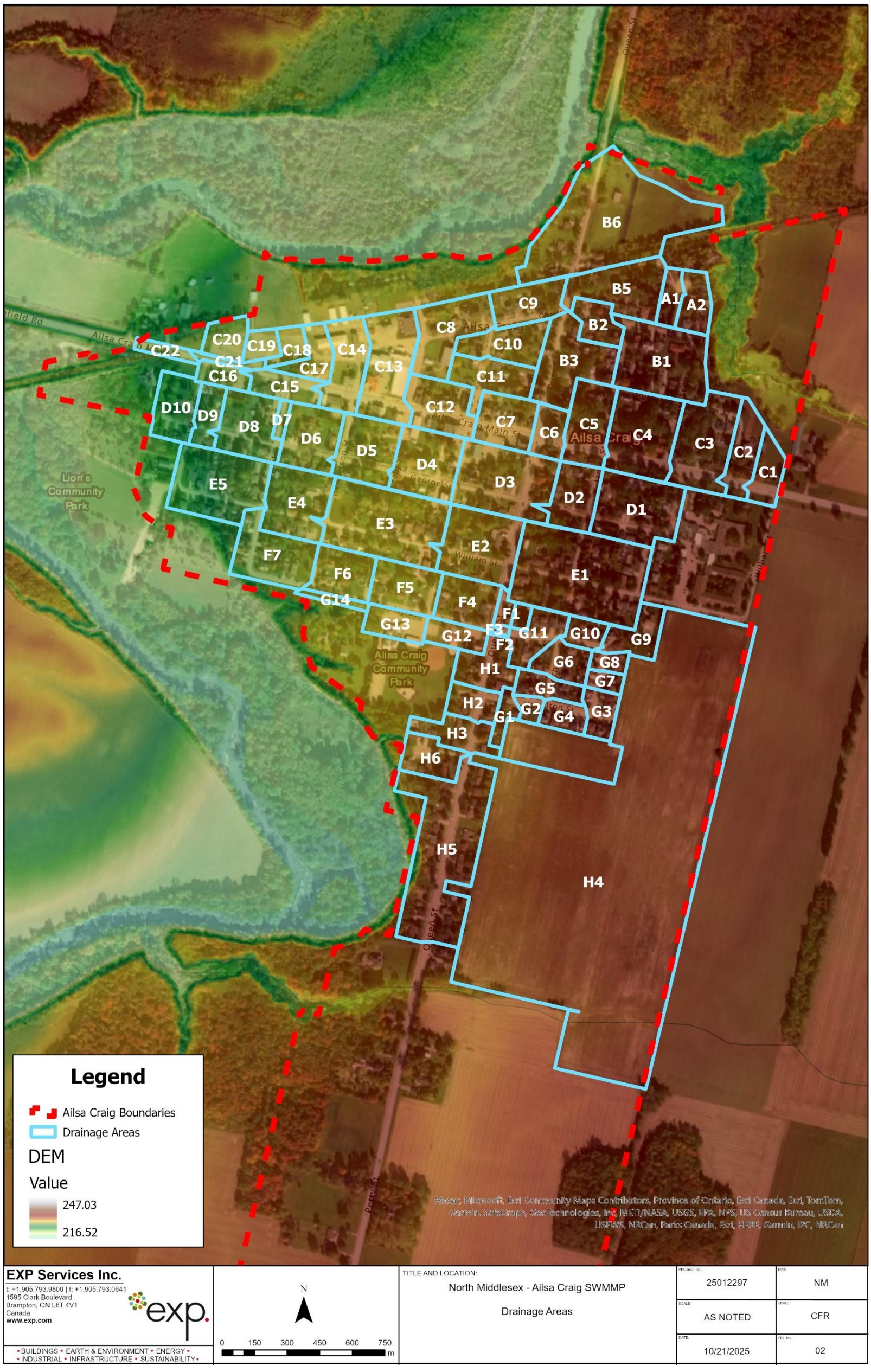

Figure 3. Drainage Areas

A summary of catchment characteristics is provided in **Table 3**, including total catchment area, the range of individual drainage area sizes within each catchment, runoff coefficient ranges based on land use, and the corresponding time of concentration (Tc) ranges applied in the Rational Method analysis. These values reflect a mix of low–medium density residential areas, institutional/commercial zones, and open space.

Table 3. Summary of Catchment Characteristics

Catchment	Total Area (ha)	Range of Drainage Area Sizes (ha)	Runoff Coefficient Range (C)	Tc Range (min)
A	0.83	0.32 – 0.50	0.4	23
B	8.78	0.48 – 3.89	0.4 – 0.5	17.5 -23
C	16.36	0.15 – 1.56	0.4 – 0.5	17.5 -23
D/E	41.45	0.12 – 3.07	0.4	23
F/G	23.16	0.01 – 1.22	0.4	23
H	9.20	0.46 – 3.25	0.4	23

Detailed characteristics for each individual drainage area, including, runoff coefficient, and time of concentration, are provided in **Appendix A**.

2.2.2 Hydraulic Assessment Inputs

The hydraulic assessment requires infrastructure properties to complete a standard storm sewer design sheet, applying Manning's equation to evaluate pipe capacity based on slope, diameter, and roughness coefficient. Due to the limited information available, several assumptions were made to complete the assessment.

List of Assumptions

To address gaps in the available pipe data, several assumptions were made to complete the stormwater capacity assessment. Supporting information such as as-built drawings, drainage reports, stormwater management plans, and CCTV inspections was reviewed to validate these assumptions as much as possible; however, in the absence of complete data, the outlined approach was necessary to facilitate the hydraulic and capacity evaluation presented in this report.

Invert elevations that were not available were estimated using digital elevation models (DEMs) and ground surface information, with a standard deduction of 1.5m applied to approximate cover depth, in alignment with North Middlesex Infrastructure Design Guidelines and Construction Standards. For pipes with missing information, minimum slope values were applied to ensure adequate conveyance and maintain self-cleansing velocity. The minimum slope values are summarized in **Table 4**, which was developed from the applicable guidelines.

Table 4. Minimum Slopes for Pipes

Diameter (mm)	Slope (%)
250	0.56
300	0.44
375	0.32
450	0.26
525	0.21
600	0.18
675	0.15
750	0.13
825	0.11
900 and larger	0.10

Pipe diameters were also assumed to meet the minimum sizes required by municipal standards. In cases where a manhole showed two outgoing pipes, these were treated as separate, disconnected systems rather than parallel outlets, to maintain a conservative basis for the assessment.

For areas identified for intensification or new greenfield development, it was assumed that on-site stormwater management controls would be required due to limited downstream capacity, with the understanding that developers may also need to contribute to sewer upgrades to maintain appropriate system sizing.

Furthermore, for the Ausable Bluffs subdivision, the storm design sheet was used to determine the flow from the outlet of the stormwater pond, and this was accommodated for within the proposed design.

Pipe Network Data

The pipe network data used in this assessment was compiled from multiple sources, including municipal as-built drawings, drainage reports, and GIS records. These sources provided information on pipe alignment, connectivity, and available attributes needed for the hydraulic analysis. The storm sewer system in Ailsa Craig consists of a wide range of pipe diameters, generally between 200 mm and 750 mm, reflecting both older and more recently installed infrastructure. The installation years available for the storm sewer network indicate a wide age distribution, ranging from as early as 1950 to 1994. A significant portion of the system dates to around 1977, representing the bulk of the infrastructure. This highlights the need to consider both hydraulic capacity and asset condition when prioritizing replacements. The age data was derived from municipal GIS records and cross-checked with available as-builts, and it provides important context for interpreting system performance and planning coordinated upgrades.

2.2.3 Hydraulic Assessment Results

The hydraulic assessment of the storm sewer system was conducted using a standardized storm sewer design sheet to evaluate the capacity and performance of existing infrastructure under defined design conditions. This methodical approach allowed for the calculation of flow rates, pipe velocities, and hydraulic gradients using Manning's equation, ensuring compliance with municipal and provincial design standards. Each pipe segment was assessed for adequacy based on contributing drainage area, estimated peak flow from the Rational Method, and the 5-year design storm intensity, which reflects typical minor system design criteria. The design sheet facilitated a clear comparison between existing pipe capacities and required conveyance, helping to identify undersized segments and prioritize upgrades. This assessment supports informed decision-making for infrastructure renewal and ensures alignment with the CLI ECA requirements for hydraulic performance and system connectivity.

A detailed storm sewer design spreadsheet has been included in **Appendix A**. It contains information for each segment, including drainage area, expected flow, calculated pipe capacity, velocity, slope, diameter, and a capacity check. To make the results easier to interpret at a system level, the pipe-specific data was aggregated into a summary by catchment, highlighting the range of capacity ratios and the percentage of pipes with adequate capacity. For example, in Catchment B capacity ratios ranged from 1.92 to 9.79, with 100% of pipes not meeting capacity requirements. This indicates that all pipes within the catchment are undersized under the 5-year design storm, reflecting localized deficiencies in the core storm sewer network.

In the proposed design, all storm sewers are meeting the allowable flow velocities per the Municipality of North Middlesex Infrastructure Design Guidelines and Construction Standards, with a minimum velocity of 0.90m/s and a maximum velocity of 6.0m/s.

Table 5: Storm Sewer Network

Location	Capacity Ratio	Sufficiency (%)
Catchment A	0.28-0.33	100
Catchment B	1.92-9.79	0
Catchment C	0.11-4.58	43
Catchment D/E	0.07-5.78	35
Catchment F/G	0.03-9.73	81
Catchment H	0.37-4.33	33

Figure 4 illustrates the existing storm sewer network, including pipe alignments and diameters.

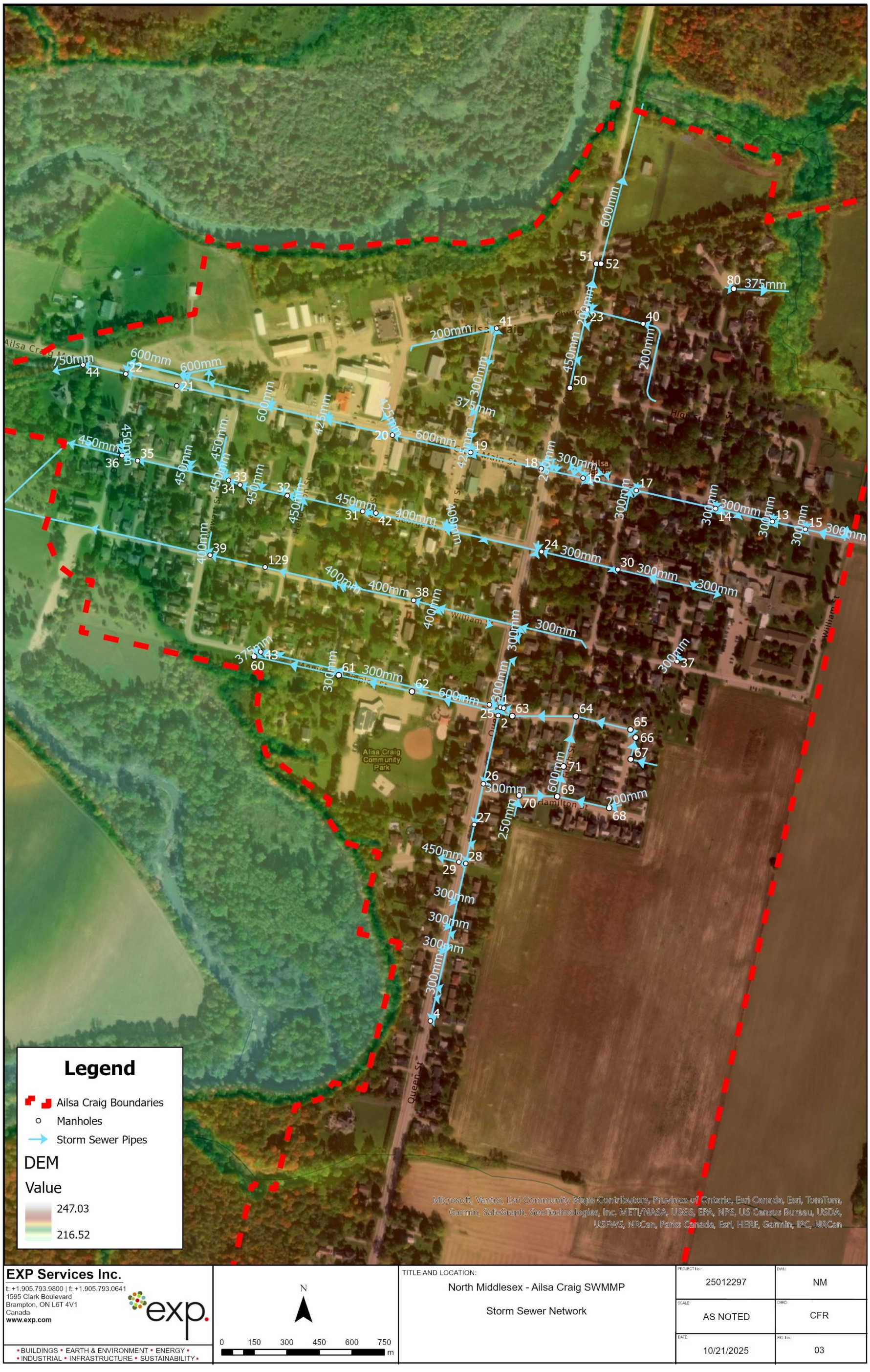

Figure 4. Storm Sewer Network Plan

2.3 Adjacent Infrastructure

When evaluating construction priorities for undersized storm sewers, the age of adjacent infrastructure, such as sanitary sewers and watermains, plays a critical role in decision-making. Older infrastructure is typically more susceptible to failure due to material degradation, historical design limitations, and cumulative wear. By aligning storm sewer upgrades with the replacement of aging sanitary and water systems, municipalities can reduce long-term maintenance costs, minimize service disruptions, and optimize capital investment. Coordinated construction also avoids redundant excavation and reinstatement, which can be particularly beneficial in urbanized areas with limited access or sensitive land uses. Prioritizing projects where multiple systems are nearing the end of their service life ensures a more resilient and efficient underground network.

A review of installation years for storm sewers, sanitary sewers, and watermains across the five catchments highlights that much of the infrastructure is considered moderately-aged, with several portions classified as old, and limited portions classified as new. As shown in **Table 5**, storm sewers were installed between 1950 and 1994, with the newest moderately-aged segments concentrated in Catchment A installed in 1990, and Catchment F/G spanning from 1977-1994. Sanitary sewers are from 1980, meaning the entire system is now classified as mid-aged. Watermains show a mixed pattern, with installations dating from the 1960s to 2024. While some catchments (e.g., A) remain entirely old, others such as C contain up to 86% new assets. This overall distribution demonstrates that the underground network is predominantly at or beyond its expected service life, reinforcing the need to consider coordinated renewal strategies.

Table 6: Summary of Pipe Installation Years by Catchments

Pipes	Catchment	Installation Year	Aging Condition		
			% Old	% Mid	% New
Storm Sewer	Catchment A	1990	0	100	0
	Catchment B	1977	0	100	0
	Catchment C	1977	0	100	0
	Catchment D/E	1950-1977	35	65	0
	Catchment F/G	1977-1994	0	100	0
	Catchment H	1977	0	100	0
Sanitary	Catchment A	1980	0	100	0
	Catchment B	1980	0	100	0
	Catchment C	1980	0	100	0
	Catchment D/E	1980	0	100	0
	Catchment F/G	1980	0	100	0
	Catchment H	1980	0	100	0
Watermain	Catchment A	1974	100	0	0
	Catchment B	1974-2024	40	0	60
	Catchment C	1974-2010	14	0	86
	Catchment D/E	1960-1974	100	0	0
	Catchment F/G	1974-1977	90	10	0
	Catchment H	1974-2010	80	0	20

2.4 Prioritization Schedule

A prioritization schedule for the replacement of storm, sanitary, and watermain infrastructure in North Middlesex should be developed with a strategic focus on the age and expected service life of each system component. Aging infrastructure is more vulnerable to failure due to material degradation and outdated construction standards, which

can lead to increased maintenance costs and service disruptions. By identifying corridors where all three systems have reached or exceeded their design life, municipalities can prioritize these areas for coordinated replacement. This approach not only minimizes the risk of emergency repairs but also avoids redundant excavation and reinstatement, especially in urbanized zones. Scheduling replacements based on age supports proactive infrastructure renewal, enabling bundled project delivery and optimized capital planning while ensuring long-term reliability and performance across the municipal network.

To establish infrastructure renewal priorities across the study area, a weighted scoring system was applied. This method assigns relative weights to multiple criteria, such as capacity, system age, CCTV condition, and known issues, and combines them into a single score. Higher scores represent segments with greater risk of failure or deficiency. The weighted approach provides greater flexibility to adjust the influence of each factor and allows more nuanced comparison between segments, particularly when multiple areas share similar categorical rankings.

2.4.1 Integration of CCTV Inspection into prioritization

As part of the prioritization process, CCTV inspections were used to assess the condition of underground infrastructure. The assessments provided an additional layer of information beyond construction age, highlighting operational and structural concerns that support decisions on maintenance and rehabilitation.

For the storm sewer system, the CCTV ratings summarize the condition of segments and have been added to the dataset to guide prioritization. Where defects or hydraulic concerns were identified, these ratings highlight locations requiring earlier intervention despite construction year or material type.

For the sanitary sewer system, flagged issues from CCTV inspections have also been reviewed. These include encrustation, infiltration, pipe defects, and other recurring concerns that may impact system performance. The findings have been incorporated into the prioritization process to ensure maintenance and rehabilitation needs are recognized in parallel with aging and storm condition factors. **Table 6** summarizes the flagged issues from CCTV for the sanitary sewer system. The complete aging calculations have been finalized and are included in **Appendix B** for reference.

Table 7: CCTV Flagged Issues

Street	Segment	Flagged Issues
Queen St	MH 50 → MH 23	Infiltration (dripper), deposits: encrustation
Ailsa Craig Main St	MH 13 → MH 14	Deposits attached: grease and encrustation
Ailsa Craig Main St	CB 12 → CB 13	Infiltration
Ailsa Craig Main St	CB 13 → MH 21	Infiltration
George St	MH 30 → MH 24	Water sag (2x), sewer tee/lateral crack
George St	Main 128 → MH 31	Water sag
George St	MH 31 → MH 32	Water sag
George St	MH 32 → MH 34	Water sag
George St	MH 34 → 35	Water sag
George St	MH 35 → MH 36	Water sag
William St	CB 20 → CB 23	Sewer tee/lateral crack, water sag (4x)
William St	CB 23 → MH 38	Sewer tee/lateral crack, sewer saddle – infiltration
William St	MH 38 → MH 129	Sewer tee/lateral crack (4x), water sag (3x), encrustation, infiltration
William St	MH 129 → MH 39	Water sag (2x), encrustation, infiltration
William St	MH 39 → West	Water sag, infiltration
Queen St	MH 4 → MH 28	Pipe deformation, multiple factory taps

2.4.2 Prioritization Scoring Methodology

To identify and rank infrastructure segments requiring rehabilitation or replacement, a weighted scoring system was developed to quantify the overall priority of each road segment based on multiple performance and condition criteria. This approach integrates the relative importance of various factors into a single composite score, providing a more transparent and flexible method than binary condition thresholds.

Each segment was evaluated according to six main criteria:

- Storm Sewer Capacity Ratio normalized based on exceedance above design capacity.
- Storm Sewer Age, Sanitary Sewer Age, and Watermain Age, each categorized as *Old* (>50 years), *Mid* (25–50 years), or *New* (<25 years).
- CCTV Condition Rating, based on the latest inspection results, converted to a normalized scale.
- Flagged Issues, accounting for known or reported operational or structural problems.

Each criterion was assigned a weighting factor (Table 6), reflecting its relative influence on system performance. The overall score for each segment was then computed using the following equation:

$$Priority\ Score\ =\ W_1\ f(C_R)\ +W_2 f(A_{STM})+W_3 f(A_{SAN})\ +W_4 f(A_W)\ +W_5 f(CCTV)\ +\ W_6 f(F_{W1})$$

where:

C_R = Capacity Ratio

A_{STM}, A_{SAN}, A_W = Condition of storm, sanitary, and watermain systems (Old = 1, Mid = 0.3, New = 0)

CCTV = CCTV condition rating normalized to a 0–1 scale

F_1 = Flagged issue (Yes = 1, No = 0)

W_1-W_6 = weighting coefficients for each category

Table 8. Weighting factors

Criteria	Weight
Capacity Condition	25%
Storm Sewer Age	20%
Sanitary Sewer Age	10%
Watermain Age	20%
Storm Sewer Condition using CCTVs	15%
Sani Sewer Condition using CCTVs	10%
	100%

2.5 Description of the Proposed Development

The proposed development for the Ailsa Craig Stormwater Management Master Plan will take place completely within the existing right-of-way (ROW) owned by the Municipality. The works will involve replacement of stormwater and sanitary sewers, along with watermains. The purpose of the upgrades is to ensure each of the sewers are at sufficient capacity for current conditions and future development. Outlet modifications do not form part of the proposed works and will be reviewed separately within another assignment.

Storm sewer capacity was evaluated based on the calculated capacity ratio, defined as the ratio of actual design flow to the pipe's conveyance capacity under the 1:5-year design storm. The following criteria were used to classify the degree of hydraulic adequacy:

Table 9. Storm Sewer Capacity Criteria

Capacity Class	Capacity Ratio Range	Description
1	< 1.0	Adequate capacity – pipe conveys flow below design limit
2	1.0 – 1.5	Moderately deficient – limited excess flow capacity
3	≥ 1.5	Significantly deficient – surcharge or insufficient capacity under design flow

Figure 5 shows the weighted infrastructure priority map. It integrates multiple parameters into a weighted scoring system that produces an overall renewal priority for each segment.

This map distinguishes between areas of hydraulic deficiency and overall renewal need, ensuring that both structural and hydraulic considerations are reflected in the proposed improvement program.

The complete hydraulic calculations, proposed sewer sizes, and upstream and downstream elevations have been prepared and are provided in **Appendix B** for reference. These details support prioritization and confirm the adequacy of the proposed design.

Figure 5: Weighted Infrastructure Priority Map

3. Cost Estimation

A preliminary cost estimate was developed for the proposed infrastructure renewal works identified through the prioritization analysis. The estimate reflects replacement of storm and sanitary sewers, watermains, and associated surface works within the municipal right-of-way. Costs were based on recent municipal tender prices, supplemented with historical data and engineering judgment.

The estimate was prepared for the highest-priority (red) streets identified by the weighted scoring method. Quantities are from the proposed design lengths/diameters and capacity checks; unit rates reflect typical 2025 prices for comparable projects in the region.

Key assumptions:

- All work is confined to the existing right-of-way (ROW); no property acquisition is required.
- Scope includes removals, granular materials, curb and gutter, asphalt paving, sidewalks, and surface reinstatement.
- A contingency allowance of 5% is applied.
- Engineering and Contract Administration costs are estimated at 20%, applied to the construction subtotal.
- HST is excluded from the estimate.
- The estimate is classified as Class D (±30%), suitable for master planning and early-stage budgeting.

Detailed itemized quantities and unit rates and the total estimated cost for Catchment D/E, have been provided in for the red-priority works are provided in **Table 11** and **Table 14.**

Detailed itemized quantities and unit rates and the total estimated cost for Catchment A, F/G, as well as H, have also been provided in **Table 10** and **Table 12** and **Table 13** and **Table 14.**

Table 10: Cost Estimate for Catchment A

Item	QTY.	Unit	Cost/Unit	Total Price
Removals (assumed 10% of construction)	1	LS	-	$15,677
Granular A & B (road, sidewalk, entrances)	12.2	m of road	$435	$5,307
Curb and Gutter/Subdrain	12.2	m of road	$178	$2,172
Asphalt (road, driveways)	12.2	m of road	$668	$8,150
Sidewalk (both sides)	12.2	m of road	$279	$3,404
Watermain, Valves, Tees, Services (250mm)	12.2	m of road	$1,143	$13,945
Sanitary Sewer and Manholes (200mm)	12.2	m of road	$756	$9,223
Storm Sewer, Catchbasins, and Manholes (250mm)	0	m of road	$1,344	$0
Storm Sewer, Catchbasins, and Manholes (300mm)	0	m of road	$1,390	$0
Storm Sewer, Catchbasins, and Manholes (375mm)	79	m of road	$1,460	$114,571
Storm Sewer, Catchbasins, and Manholes (450mm)	0	m of road	$1,532	$0
Storm Sewer, Catchbasins, and Manholes (525mm)	0	m of road	$1,609	$0
Storm Sewer, Catchbasins, and Manholes (600mm)	0	m of road	$1,690	$0
Storm Sewer, Catchbasins, and Manholes (675mm)	0	m of road	$1,774	$0
Storm Sewer, Catchbasins, and Manholes (750mm)	0	m of road	$1,860	$0
Storm Sewer, Catchbasins, and Manholes (825mm)	0	m of road	$1,950	$0
Total Construction Cost + 5% Contingency				$181,070
Total Price including engineering cost				$217,284

Table 11: Cost Estimation for Catchment D/E

Item	QTY.	Unit	Cost/Unit	Total Price
Removals (assumed 10% of construction)	1	LS	-	$384,545
Granular A & B (road, sidewalk, entrances)	794	m of road	$435	$345,372
Curb and Gutter/Subdrain	794	m of road	$178	$141,325
Asphalt (road, driveways)	794	m of road	$668	$530,364
Sidewalk (both sides)	794	m of road	$279	$221,514
Watermain, Valves, Tees, Services (250mm)	794	m of road	$1,143	$907,495
Sanitary Sewer and Manholes (200mm)	794	m of road	$756	$600,233
Storm Sewer, Catchbasins, and Manholes (250mm)	0	m of road	$1,344	$0
Storm Sewer, Catchbasins, and Manholes (300mm)	0	m of road	$1,390	$0
Storm Sewer, Catchbasins, and Manholes (375mm)	0	m of road	$1,460	$0
Storm Sewer, Catchbasins, and Manholes (450mm)	104	m of road	$1,532	$159,952
Storm Sewer, Catchbasins, and Manholes (525mm)	95	m of road	$1,609	$153,624
Storm Sewer, Catchbasins, and Manholes (600mm)	0	m of road	$1,690	$0
Storm Sewer, Catchbasins, and Manholes (675mm)	148	m of road	$1,774	$263,178
Storm Sewer, Catchbasins, and Manholes (750mm)	281	m of road	$1,860	$522,393
Storm Sewer, Catchbasins, and Manholes (825mm)	165	m of road	$1,950	$321,566
Total Construction Cost + 5% Contingency				$4,441,494
Total Price including engineering cost				$5,329,793

Table 12: Cost Estimate for Catchment for F/G

Item	QTY.	Unit	Cost/Unit	Total Price
Removals (assumed 10% of construction)	1	LS	-	$47,381
Granular A & B (road, sidewalk, entrances)	98	m of road	$435	$42,505
Curb and Gutter/Subdrain	98	m of road	$178	$17,393
Asphalt (road, driveways)	98	m of road	$668	$65,272
Sidewalk (both sides)	98	m of road	$279	$27,262
Watermain, Valves, Tees, Services (250mm)	98	m of road	$1,143	$111,685
Sanitary Sewer and Manholes (200mm)	98	m of road	$756	$73,870
Storm Sewer, Catchbasins, and Manholes (250mm)	0	m of road	$1,344	$0
Storm Sewer, Catchbasins, and Manholes (300mm)	98	m of road	$1,390	$135,820
Storm Sewer, Catchbasins, and Manholes (375mm)	0	m of road	$1,460	$0
Storm Sewer, Catchbasins, and Manholes (450mm)	0	m of road	$1,532	$0
Storm Sewer, Catchbasins, and Manholes (525mm)	0	m of road	$1,609	$0
Storm Sewer, Catchbasins, and Manholes (600mm)	0	m of road	$1,690	$0
Storm Sewer, Catchbasins, and Manholes (675mm)	0	m of road	$1,774	$0
Storm Sewer, Catchbasins, and Manholes (750mm)	0	m of road	$1,860	$0
Storm Sewer, Catchbasins, and Manholes (825mm)	0	m of road	$1,950	$0
Total Construction Cost + 5% Contingency				$547,247
Total Price including engineering cost				$656,696

Table 13: Cost Estimate for Catchment H

Item	QTY.	Unit	Cost/Unit	Total Price
Removals (assumed 10% of construction)	1	LS	-	$241,099
Granular A & B (road, sidewalk, entrances)	480	m of road	$435	$208,921
Curb and Gutter/Subdrain	480	m of road	$178	$85,489
Asphalt (road, driveways)	480	m of road	$668	$320,825
Sidewalk (both sides)	480	m of road	$279	$133,997
Watermain, Valves, Tees, Services (250mm)	480	m of road	$1,143	$548,957
Sanitary Sewer and Manholes (200mm)	480	m of road	$756	$363,090
Storm Sewer, Catchbasins, and Manholes (250mm)	0	m of road	$1,344	$0
Storm Sewer, Catchbasins, and Manholes (300mm)	94	m of road	$1,390	$130,471
Storm Sewer, Catchbasins, and Manholes (375mm)	56	m of road	$1,460	$81,997
Storm Sewer, Catchbasins, and Manholes (450mm)	53	m of road	$1,532	$81,882
Storm Sewer, Catchbasins, and Manholes (525mm)	216	m of road	$1,609	$348,209
Storm Sewer, Catchbasins, and Manholes (600mm)	0	m of road	$1,690	$0
Storm Sewer, Catchbasins, and Manholes (675mm)	60	m of road	$1,774	$107,151
Storm Sewer, Catchbasins, and Manholes (750mm)	0	m of road	$1,860	$0
Storm Sewer, Catchbasins, and Manholes (825mm)	0	m of road	$1,950	$0
Total Construction Cost + 5% Contingency				$2,784,693
Total Price including engineering cost				$3,341,631

Table 14: Summary of the Total Estimated Cost

	A	B	C	D/E	F/G	H	Total
Total Construction Cost + 5% Contingency	$181,070	$0	$0	$4,441,494	$547,247	$2,784,693	$7,954,504
Total Price including engineering cost	$217,284	$0	$0	$5,329,793	$656,696	$3,341,631	$9,545,404
Price Per Meter							$6,581.00

4. Consultation

4.1 Contact List

At the outset of the project, a contact list was developed for the applicable external agencies, Indigenous communities, Member of Parliaments (MPs), and Member of Provincial Parliament (MPP) listed below:

Conservation Authorities

- Ausable Bayfield Conservation Authority (ABCA)

Emergency Services

- London Police Services
- Middlesex Centre Fire Services
- North Middlesex – Fire & Emergency Services
- Ontario Provincial Police – Middlesex (Lucan)
- Ontario Provincial Police
- Middlesex London Paramedic Service

Provincial Agencies

- Ministry of Heritage, Sport, Tourism, and Cultural Industries
- Ministry of Indigenous Affairs
- Ministry of Natural Resources (Aylmer District)
- Ministry of Transportation
- Ontario Clean Water Agency

Public Works

- Middlesex County – Planning & Development

Transportation Services

- Huron Shores Area Transit
- Middlesex County Connect

Indigenous Communities

- Aamjiwnaang (Sarnia)
- Caldwell First Nation
- Chippewas of Kettle and Stoney Point First Nation
- Chippewas of Nawash Unceded First Nation
- Chippewas of the Thames First Nation
- Munsee-Delaware First Nation
- Oneida Nation of the Thames
- Walpole Island First Nation

MP & MPP

- MP – Middlesex-London
- MP – Huron-Bruce
- MPP – Lambton-Kent-Middlesex

The contact list was updated accordingly throughout the project where there were requests to be added or removed from the list.

4.2 Public Information Centre

A Notice of Public Information Centre (PIC) was sent out to the stakeholders listed in **Section 5.1** on October 27, 2025, via email, with the exception of Caldwell First Nation and Chippewas of the Thames First Nation who received the Notice of PIC through NationsConnect. The Notice of PIC was also published on the Municipality's website for the public.

The PIC was held on November 10, 2025, to share information about the Ailsa Craig Stormwater Master Plan process, present findings from the existing conditions review and preliminary analysis and gather input from the community to help shape recommended solutions. The PIC was held in an open-house format with presentation slides on boards around the room to allow attendees to view the slides at their own leisure, while also having the opportunity to pose questions directly to members of the project team. The slides presented the following:

- Study objectives and scope;
- Existing infrastructure conditions and challenges;
- Hydrologic and hydraulic assessment results;
- Preliminary strategies for stormwater management and infrastructure renewal; and,
- Next steps in the Master Plan process.

Approximately 20 people attended the PIC, consisting of members from the public and some members from Council. There were 13 attendees listed on the sign-in sheet, while some members from Council didn't sign. Materials from the PIC, including the Notice of PIC and PIC slides, are included in **Appendix E**.

4.3 Comments Received

One (1) written comment was received during the PIC, which noted that there was a good display with information, staff and local representatives were very willing to share information, and they are looking forward to seeing the information posted online to gather more detail.

Following the PIC, a call was received from a resident on Church Street who noted that standing water occurs in their backyard during heavy rainfall events. It was also noted that there is no outlet for the water. This has been identified as a common issue for residents on the north side of Ailsa Craig due to the rail corridor being filled in.

In addition, an email was received from a resident on Rabbitwood Court, who did not attend the PIC but reviewed the presentation that was posted online and raised some drainage concerns. However, this residence is on private property and therefore, the Municipality is not responsible for these issues. It is although relevant to note the following concerns that were stated:

- The Rabbitwood cul de sac is significantly below the grade of Church and Ness Street, causing stormwater to drain to this resident's property from their two (2) above neighbours;
- Extreme heavy rainfall over a short period of time has caused a washout of the retaining blocks from the municipal storm drain, which are to be repaired; and,
- There has been at least one (1) major flood on Rabbitwood Court that was beyond the capacity of the current drainage system, causing water to be pooled for many hours.

Considering the above bullet points, this resident noted that Rabbitwood Court, as part of Drainage Zone A, requires higher prioritization than the prioritization suggests. A written comment was also received following the PIC from a resident on Queen Street who noted that a curb should be put on the east side of Queen Street north of Church Street. Along with that, it was noted that culverts should be placed in the road ditch, and the ditch should be filled in to prevent gravel from the shoulder washing into the ditch and plugging the culverts. The resident stressed that having the ditch filled would be better given there is very little shoulder on that road; therefore, having more room for parked cars would be more feasible. All copies of comments received are included in **Appendix E**.

4.4 Other Consultation

Separate emails were sent to the Ministry of Natural Resources and Forestry (MNRF) and the ABCA on September 9, 2025, both containing a Request for Information letter for any supplemental natural heritage background information. The MNRF responded on September 23, 2025, with a link to a Geohub webpage to assist with accessing all the natural heritage dates and values the MNRF has available for Ailsa Craig. The response notes that the webpage functions as a self-serve tool, outlines how to make data requests for restricted data, and includes links to the Natural Heritage Make a Map tool and natural heritage policies and documentation to reference when conducting a natural heritage screening exercise. A response has not been received from the ABCA at the time of writing this report. Copies of this correspondence can be found in **Appendix E**.

Conclusion

The Ailsa Craig Stormwater Management Master Plan provides a comprehensive assessment of the community's existing stormwater, sanitary, and watermain infrastructure, identifying both hydraulic deficiencies and condition-related concerns. The analysis confirmed that several sections of the storm sewer network are undersized under the 5-year design storm, while a substantial portion of the underground systems have reached or exceeded their expected service life.

The weighted scoring approach integrated multiple factors, including capacity, infrastructure age (storm, sanitary, and watermain), CCTV condition ratings, and known operational issues, resulting in the Weighted Infrastructure Priority Map. This provides a representation of both hydraulic and structural system performance.

This framework verifies that upgrades are focused on corridors with the greatest overall need, particularly where multiple systems are classified as old or deficient. The proposed implementation plan emphasizes coordinated, staged replacements within the existing municipal right-of-way, minimizing disruption while optimizing cost efficiency.

By aligning renewal priorities with municipal design standards, MECP requirements, and the Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA) framework, the Master Plan confirms both regulatory compliance and long-term sustainability. In addition, an Environmental Impact Study (**Appendix D**) was completed in support of the proposed works. The EIS confirms that the recommended infrastructure replacements can be implemented with minimal environmental impact, provided that standard mitigation measures are applied.

In conclusion, the Ailsa Craig SWMMP establishes a data-driven, transparent, and defensible strategy for infrastructure renewal. By integrating hydraulic capacity analysis with condition-based scoring, the Municipality of North Middlesex is equipped with a clear roadmap to address existing deficiencies, enhance system resiliency, and support future growth while maintaining reliable and sustainable stormwater management for the Ailsa Craig community.

References

- Municipality of North Middlesex. Infrastructure Design Guidelines and Construction Standards (2025)
- Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA, 2022)
- Ontario Ministry of Transportation Highway Drainage Design Standards (HDDS, 2008)
- Ministry of the Environment Stormwater Management Planning and Design Manual (SWMPDM, 2003)

Nisha Menezes, EIT
Design EIT, Water Resources

Cameron Rickert, P.Eng
Design Lead, Water Resources

Appendix A – Assessment of Storm Sewer Capacity in the Existing System

Intensity Option # 1

Project Name: Ailsa Craig

Project Number: BRM-25012297-A0

1) Intensity (i) = a*(t+c)^b **2) Intensity (i) = a*t^b** **3) Insert Intensity**

Manning's n = 0.013 Depth of Cover 1.50

Based on 1:5 Year Ailsa Craig

a= 41.8 a= i=

b= -0.814 b=

c= 0.09

Total Area (ha)= 141.33

Location								Storm Sewer Design										Manning						Existing Condition	
Upstream 4	Upstream 3	Upstream 2	Upstream 1	Downstream 1	Road /Stations	From MH	To MH	DA ID	Area (ha)	Run. Coef.	2.78AC	Accum. 2.78AC	T of In (min)	T of Flow (min)	T of Conc. (min)	Intensity (mm/hr)	Exp. Flow (L/s)	Capacity (L/s)	Velocity (m/s)	Wall Thickness (mm)	Length (m)	Pipe Dia. (mm)	Slope (%)	Invert US	Invert DS	Capacity Ratio	CAPACITY CHECK	VELOCITY CHECK
				15	Rabbitwood Crt	CB1	49	A1	0.32	0.40	0.36	0.36	23	0.23	23.00	76.84	27.74	99.18	0.90	25	12.20	375	0.32	230.239	230.200	0.28	OKAY	CHECK VELOCITY
			14	Ditch	Rabbitwood Crt	49	East Ditch	A2	0.50	0.40	0.56	0.92	23	0.57	23.23	76.35	70.33	213.30	1.93	25	66.30	375	1.48	230.180	229.199	0.33	OKAY	OKAY
					B																						
				18	James St	CB2	40	B1	1.78	0.40	1.98	1.98	23	2.45	23.00	76.84	152.45	27.05	0.86	25	126.50	200	0.68	230.840	229.979	5.64	DEFICIENT CAPACITY	CHECK VELOCITY
			17	20	Church St	40	23	B2	0.48	0.40	0.54	2.52	23	1.51	25.45	71.84	181.05	27.05	0.86	25	77.87	200	0.68	230.019	229.490	6.69	DEFICIENT CAPACITY	CHECK VELOCITY
				20	Church St	50	23	B3	1.39	0.40	1.55	1.55	23	15.21	23.00	76.84	119.12	17.05	0.11	25	97.86	450	0.004	229.800	229.450	6.99	DEFICIENT CAPACITY	CHECK VELOCITY
		18	19	21	Queen St	23	51	B5	1.23	0.40	1.37	5.44	23	9.76	38.21	54.19	294.86	30.11	0.11	25	62.36	600	0.002	229.450	229.300	9.79	DEFICIENT CAPACITY	CHECK VELOCITY
			20		Queen St	52	North Ditch	B6	3.89	0.50	5.41	10.85	17.5	4.03	47.97	45.98	499.03	260.50	0.92	25	222.55	600	0.18	227.949	227.548	1.92	DEFICIENT CAPACITY	OKAY
					C																						
				24	AC Main St	CB3	15	C1	0.51	0.40	0.57	0.57	23	1.00	23.00	76.84	43.88	64.14	0.91	25	54.69	300	0.44	234.960	233.640	0.68	OKAY	OKAY
			23	25	AC Main St	15	13	C2	0.70	0.40	0.78	1.35	23	0.89	24.00	74.70	100.84	60.54	0.86	25	45.93	300	0.39	233.640	233.460	1.67	DEFICIENT CAPACITY	CHECK VELOCITY
			24	26	AC Main St	13	14	C3	1.48	0.40	1.65	3.00	23	1.49	24.90	72.90	218.78	61.84	0.87	25	78.25	300	0.41	233.450	233.130	3.54	DEFICIENT CAPACITY	CHECK VELOCITY
			25	27	AC Main St	14	17	C4	1.56	0.40	1.74	4.74	23	0.62	26.39	70.10	332.33	899.34	3.18	25	118.86	600	2.15	233.090	230.540	0.37	OKAY	OKAY
			26	28	AC Main St	17	16	C5	1.00	0.40	1.11	5.85	23	0.55	27.01	69.00	403.97	551.75	1.95	25	64.40	600	0.81	230.520	230.000	0.73	OKAY	OKAY
			27	29	AC Main St	16	18	C6	0.47	0.40	0.52	6.37	23	0.28	27.56	68.07	433.67	967.97	3.42	25	57.54	600	2.49	229.990	228.560	0.45	OKAY	OKAY
			28	30	AC Main St	18	19	C7	0.84	0.50	1.16	7.54	17.5	0.90	27.84	67.60	509.42	508.80	1.80	25	97.57	600	0.69	228.530	227.860	1.00	DEFICIENT CAPACITY	OKAY
				31	Church St	CB7	41	C8	1.26	0.40	1.40	1.40	23	1.60	23.00	76.84	107.33	40.17	1.28	25	122.62	200	1.50	230.498	228.659	2.67	DEFICIENT CAPACITY	OKAY
			30	32	Jameson St	41	CB8	C9,C10	1.60	0.40	1.77	3.17	23	0.95	24.60	73.49	233.08	64.14	0.91	25	51.63	300	0.44	228.639	228.412	3.63	DEFICIENT CAPACITY	OKAY
			31	33	Jameson St	CB8	CB10	C11	0.84	0.40	0.93	4.10	23	2.18	25.55	71.65	293.91	64.14	0.91	25	118.64	300	0.44	228.392	227.870	4.58	DEFICIENT CAPACITY	OKAY
		32	29	34	AC Main St	19	20	C12	0.96	0.50	1.33	12.97	17.5	1.33	28.75	66.14	857.62	382.79	1.35	25	108.06	600	0.39	227.850	227.430	2.24	DEFICIENT CAPACITY	OKAY
			33	35	AC Main St	20	CB12	C13	1.49	0.50	2.07	15.03	17.5	1.02	30.08	64.11	963.91	428.60	1.52	25	92.35	600	0.49	227.290	226.840	2.25	DEFICIENT CAPACITY	OKAY
			34	36	AC Main St	CB12	CB13	C14	0.98	0.50	1.36	16.39	17.5	0.88	31.09	62.66	1027.20	435.58	1.54	25	81.47	600	0.50	226.840	226.430	2.36	DEFICIENT CAPACITY	OKAY
			35	37	AC Main St	CB13	21	C15	0.53	0.40	0.59	16.98	23	1.33	31.97	61.45	1043.66	437.90	1.55	25	123.87	600	0.51	226.430	225.800	2.38	DEFICIENT CAPACITY	OKAY
			36	38	AC Main St	21	22	C16	0.33	0.40	0.37	17.35	23	0.71	33.31	59.72	1036.15	736.78	1.67	25	70.78	750	0.44	225.630	225.320	1.41	DEFICIENT CAPACITY	OKAY
				39	AC Main St	-	CB35	C17	0.51	0.40	0.56	0.56	23	1.02	23.00	76.84	43.35	401.40	0.91	25	55.43	750	0.13	225.785	225.713	0.11	OKAY	OKAY
			38	40	AC Main St	CB35	CB34	C18	0.31	0.40	0.34	0.90	23	0.32	24.02	74.67	67.46	401.40	0.91	25	17.39	750	0.13	225.673	225.650	0.17	OKAY	OKAY
			39	41	AC Main St	CB34	CB36	C19	0.28	0.40	0.31	1.21	23	1.14	24.34	74.02	89.79	401.40	0.91	2	61.89	750	0.13	225.610	225.530	0.22	OKAY	OKAY
		39	40	42	AC Main St	CB36	CB37	C20	0.45	0.40	0.50	2.62	23	1.30	25.47	71.80	188.13	401.40	0.91	25	70.97	750	0.13	225.490	225.398	0.47	OKAY	OKAY
			41	43	AC Main St	CB37	22	C21	0.15	0.40	0.16	2.78	23	0.25	26.77	69.42	193.17	401.40	0.91	25	13.60	750	0.13	225.378	225.360	0.48	OKAY	OKAY
		37	42	44	AC Main St	22	44	C22	0.20	0.40	0.22	20.35	23	0.63	34.01	58.85	1197.85	681.57	1.54	25	58.70	750	0.37	225.320	225.100	1.76	DEFICIENT CAPACITY	OKAY
					D																						
				47	George St	-	30	D1	1.52	0.40	1.69	1.69	23	2.32	23.00	76.84	130.00	52.97	0.75	25	104.37	300	0.30	232.130	231.817	2.45	DEFICIENT CAPACITY	CHECK VELOCITY
			46	48	George St	30	24	D2	0.84	0.40	0.93	2.62	23	2.34	25.32	72.08	189.17	52.97	0.75	25	105.38	300	0.30	231.797	231.481	3.57	DEFICIENT CAPACITY	CHECK VELOCITY
			47	49	George St	24	Main	D3	1.82	0.40	2.03	4.65	23	1.17	27.67	67.89	315.80	241.79	1.92	25	134.54	400	1.35	231.461	229.647	1.31	DEFICIENT CAPACITY	OKAY
			48	50	George St	Main	31	D4	1.20	0.40	1.34	5.99	23	2.11	28.83	66.00	395.18	111.37	0.89	25	112.43	400	0.29	229.627	229.306	3.55	DEFICIENT CAPACITY	CHECK VELOCITY
			49	51	George St	31	32	D5	1.09	0.40	1.21	7.20	23	0.97	30.95	62.86	452.49	285.11	1.79	25	103.90	450	1.00	229.286	228.247	1.59	DEFICIENT CAPACITY	OKAY
			50		George St	32	34	D6	0.98	0.40	1.09	8.29	23	0.96	31.91	61.53	510.22	227.19	1.43	25	81.97	450	0.64	228.227	227.706	2.25	DEFICIENT CAPACITY	OKAY
				53	George St	CB15	CB16	D7	0.12	0.40	0.13	0.13	23	0.78	23.00	76.84	10.20	145.38	0.91	25	42.69	450	0.26	227.465	227.354	0.07	OKAY	OKAY
			52	54	George St	CB16	CB17	-	-	0.40	0.13	0.27	23	0.78	23.78	76.84	10.20	145.38	0.91	25	11.20	450	0.26	227.534	227.505	-	-	OKAY
			53	55	George St	CB17	34-1	-	-	0.40	0.13	0.40	23	0.78	24.56	76.84	10.20	145.38	0.91	25	13.44	450	0.26	227.609	227.574	-	-	OKAY
			54	56	George St	34	35	D8	1.06	0.40	1.18	1.58	23	0.97	25.34	72.05	113.84	342.60	2.15	25	125.36	450	1.44	227.686	225.876	0.33	OKAY	OKAY
			55	57	George St	35	36	D9	0.45	0.40	0.50	2.08	23	0.17	26.30	70.25	145.97	342.60	2.15	25	22.27	450	1.44	225.856	225.534	0.43	OKAY	OKAY
			56		George St	36	East	D10	0.76	0.40	0.84	2.92	23	0.73	26.48	69.95	204.15	368.00	2.31	25	100.75	450	1.67	225.514	223.836	0.55	OKAY	OKAY
					E																						
				60	William St	CB20	CB23	E1	3.06	0.40	3.40	3.40	23	1.75	23.00	76.84	261.12	64.14	0.91	25	95.47	300	0.44	231.217	230.797	4.07	DEFICIENT CAPACITY	OKAY
			59	61	William St	C23	38	E2	1.49	0.40	1.66	5.06	23	2.72	24.75	73.18	370.01	114.07	0.91	25	148.35	400	0.30	230.777	230.332	3.24	DEFICIENT CAPACITY	OKAY
			60	62	William St	38	129	E3	2.32	0.40	2.58	7.64	23	3.41	27.48	68.21	520.79	114.07	0.91	25	185.66	400	0.30	230.312	229.755	4.57	DEFICIENT CAPACITY	OKAY
			61	63	William St	129	39	E4	1.22	0.40	1.36	8.99	23	1.75	30.89	62.94	565.92	114.07	0.91	25	95.19	400	0.30	229.735	229.449	4.96	DEFICIENT CAPACITY	OKAY
			62		William St	39	West	E5	1.70	0.40	1.89	10.88	23	3.03	32.63	60.58	658.95	114.07	0.91	25	164.91	400	0.30	229.429	228.934	5.78	DEFICIENT CAPACITY	OKAY
					F																						
				67	Queen St	CB21	1	F1	0.28	0.40	0.31	0.31	23	1.79	23.00	76.84	23.85	64.14	0.91	25	97.71	300	0.44	231.056	230.626	0.37	OKAY	OKAY
				67	Annie Ada Shipley St	-	1	F2	0.03	0.40	0.03	0.03	23	0.27	23.00	76.84	2.22	64.14	0.91	25	14.51	300	0.44	230.670	230.606	0.03	OKAY	OKAY
		65	66	68	Annie Ada Shipley St	1	25	F3	0.01	0.40	0.02	0.35	23	0.28	24.79	73.10	25.92	64.14	0.91	25	15.08	300	0.44	230.586	230.520	0.40	OKAY	OKAY
			67	69	Annie Ada Shipley St	25	CB22	F4	0.79	0.40	0.88	1.23	23	1.06	25.07	72.56	89.36	112.07	1.59	25	100.51	300	1.343	230.500	229.150	0.80	OKAY	OKAY
			68	70	Annie Ada Shipley St	CB22	Main	F5	0.88	0.40	0.98	2.21	23	1.48	26.13	70.58	156.29	87.48	1.24	25	109.97	300	0.818	229.150	228.250	1.79	DEFICIENT CAPACITY	OKAY
			69	71	Annie Ada Shipley St	Main	43	F6	0.80	0.40	0.89	3.11	23	1.32	27.61	67.99	211.13	94.04	1.33	25	105.75	300	0.946	228.250	227.250	2.25	DEFICIENT CAPACITY	OKAY
			70		Annie Ada Shipley St	42	60	F7	1.22	0.40	1.35	4.46	23	0.66	28.93	65.84	293.65	30.18	0.27	25	10.80	375	0.030	227.250	226.930	9.73	DEFICIENT CAPACITY	CHECK VELOCITY
					G																						
				74	Hamilton St	South	CBMH70	G1	0.25	0.40	0.28	0.28	23	0.57	23.00	76.84	21.60	46.06	0.94	25	32.00	250	0.60	231.000	230.808	0.47	OKAY	OKAY
			73	75	Hamilton St	CBMH70	69	G2	0.17	0.40	0.19	0.47	23	0.90	23.57	75.61	35.86	68.38	0.97	25	52.00	300	0.50	230.768	230.508	0.52	OKAY	OKAY
				76	Robin St	CB30	68	G3	0.42	0.40	0.47	0.47	23	0.33	23.00	76.84	35.79	27.05	0.86	25	17.00	200	0.68	233.412	233.296	1.32	DEFICIENT CAPACITY	CHECK VELOCITY
			75	77	Hamilton St	68	69	G4	0.37	0.40	0.41	0.88	23	0.66	23.33	76.12	66.63	513.72	1.82	25	72.00	600	0.70	233.256	232.752	0.13	OKAY	OKAY
		74	76	78	Finch St	69	71	G5	0.43	0.40	0.48	1.83	23	0.73	24.46	73.76	135.21	363.25	1.28	25	56.30	600	0.35	229.150	228.953	0.37	OKAY	OKAY
			77	83	Finch St	71	64	G6	0.54	0.40	0.60	2.43	23	0.90	25.19	72.32	175.63	363.25	1.28	25	69.50	600	0.35	228.973	228.710	0.48	OKAY	OKAY
				80	Robin St	East	67	G7	0.20	0.40	0.22	0.22	23	0.28	23.00	76.84	17.22	614.01	2.17	25	36.60	600	1.00	231.656	231.290	0.03	OKAY	OKAY
			79	81	Robin St	67	66	G8	0.21	0.40	0.23	0.46	23	0.23	23.28	76.23	34.78	620.12	2.19	25	30.30	600	1.02	231.280	230.971	0.06	OKAY	OKAY
			80	82	Robin St	66	65	G9	0.59	0.40	0.66	1.11	23	0.10	23.51	75.73	84.39	569.41	2.01	25	12.00	600	0.86	229.330	229.227	0.15	OKAY	OKAY
			81	83	Robin St	65	64	G10	0.32	0.40	0.36	1.47	23	0.58	23.61	75.52	111.00	610.93	2.16	25	75.80	600	0.99	229.190	228.440	0.18	OKAY	OKAY
		78	82	84	Robin St	64	63	G11	0.73	0.40	0.81	4.71	23	0.29	26.10	70.63	332.58	513.72	1.82	25	31.60	600	0.70	229.990	229.769	0.65	OKAY	OKAY
			83	85	Annie Ada Shipley St	63	62	G12	0.44	0.40	0.49	5.20	23	1.27	26.39	70.11	364.49	487.36	1.72	25	131.00	600	0.63	229.295	228.470	0.75	OKAY	OKAY
			84	86	Annie Ada Shipley St	62	61	G13	0.49	0.40	0.55	5.75	23	1.04	27.65	67.91	390.41	491.21	1.74	25	108.70	600	0.64	228.460	227.770	0.79	OKAY	OKAY
			85		Annie Ada Shipley St	61	60	G14	0.15	0.40	0.16	5.91	23	1.03	28.70	66.22	391.38	521.01	1.84	25	114.40	600	0.72	227.760	226.936	0.75	OKAY	OKAY
					H																						
				89	Queen St	2	26	H1	0.71	0.40	0.79	0.79	23	1.72	23.00	76.84	60.54	64.14	0.91	25	93.86	300	0.44	230.580	230.167	0.94	OKAY	OKAY
			88	90	Queen St	26	27	H2	0.46	0.40	0.51	1.30	23	1.03	24.72	73.24	95.26	64.14	0.91	25	56.18	300	0.44	230.147	229.900	1.49	DEFICIENT CAPACITY	OKAY
			89	93	Queen St	27	28	H3	0.64	0.40	0.71	2.01	23	0.98	25.76	71.26	143.42	64.14	0.91	25	53.43	300	0.44	229.880	229.645	2.24	DEFICIENT CAPACITY	OKAY
				93	Ausable Bluffs SWM Pond	Pond Outlet	28	H4	0.88	0.40	0.97	0.97	23	0.73	23.00	76.84	74.85	201.72	0.93	25	40.90	525	0.22	229.614	229.605	0.37	OKAY	OKAY
				93	Queen St	4	28	H5	3.25	0.40	3.61	3.61	23	3.97	23.00	76.84	277.46	64.14	0.91	25	216.40	300	0.44	230.577	229.625	4.33	DEFICIENT CAPACITY	OKAY
	90	91	92		Atkinson St	28	CB	H6	0.60	0.40	0.67	7.27	23	0.79	26.97	69.07	502.09	201.60	1.27	25	60.40	450	0.50	229.605	229.303	2.49	DEFICIENT CAPACITY	OKAY

Appendix B – Infrastructure Aging Data and Condition Assessment

Project Name: Ailsa Craig
Project Number:

Based on 1:5 Year Ailsa Craig

Capacity Class:
1: <1
2. Between 1 and 1.5
3. >=1.5

Condition:
Old: 50+ years
Mid-Age: 25–50 years
New: <25 years

CCTV Rating:
[1,2): Good
[2,3): Fair
[3,4]: Poor
(4,5]: Very Poor

Priority:
- 1 (Highest Priority): All three systems are "Old".
- 2 (Second Priority): At least two are "Old".
- 3 (Third Priority): Storm is "Old" but others are not.
- 4 (Lowest Priority): Otherwise (significant Mid/New).

50 Old
25 Mid
> above New

Catchment	Road /Stations	From MH/CB	To MH/CB	Capacity Ratio	Capacity Condition	Installation Year: Storm Sewer	Installation Year: Sanitary	Installation Year: Watermain	Condition: Storm Sewer	Condition: Sanitary	Condition: Watermain	CCTV Condition Rating (Storm)	CCTV Flagged Issues (Sanitary)	Priority	Score	Length	Cost
A	Rabbitwood Crt: STM-MAIN-420	CB1	49	0.28	1	1990	1980	1974	Mid	Mid	Old		No	4	33%	12.2	$ -
	Rabbitwood Crt: STM-MAIN-421	49	East Ditch	0.33	1	1990	1980	1974	Mid	Mid	Old		No	4	33%	66.3	$ -
B	James St: James St at High St - STM-MAIN-202	CB2	40	5.64	3	1977	1980	1974	Mid	Mid	Old		No	1	58%	126.5	$ -
	Church St: James St to Queen St - STM-MAIN-105	40	23	6.69	3	1977	1980	1974	Mid	Mid	Old		No	1	58%	77.9	$ -
	Church St: James St to Queen St - STM-MAIN-104	50	23	6.99	3	1977	1980	2024	Mid	Mid	New		Yes	1	48%	97.9	$ -
	Queen St: Queen St at Church St - STM-MAIN 401	23	51	9.79	3	1977	1980	2024	Mid	Mid	New		No	1	38%	62.4	$ -
	Queen St: Queen St at Church St - STM-MAIN 403	52	North Ditch	1.92	3	1977	1980	2024	Mid	Mid	New		No	1	38%	222.6	$ -
C	AC Main St: William St - STM-MAIN-425	CB3	15	0.68	1	1977	1980	2010	Mid	Mid	New		No	4	13%	0.0	$ -
	AC Main St: STM-MAIN-57	15	13	1.67	3	1977	1980	2010	Mid	Mid	New		No	1	38%	54.7	$ -
	AC Main St: STM-MAIN-53	13	14	3.54	3	1977	1980	2010	Mid	Mid	New		Yes	1	48%	45.9	$ -
	AC Main St: STM-MAIN-222	14	17	0.37	1	1977	1980	2010	Mid	Mid	New		No	4	13%	78.3	$ -
	AC Main St: STM-MAIN-50	17	16	0.73	1	1977	1980	2010	Mid	Mid	New		No	4	13%	118.9	$ -
	AC Main St: STM-MAIN-51	16	18	0.45	1	1977	1980	2010	Mid	Mid	New	2	No	3	15%	64.4	$ -
	AC Main St: STM-MAIN-74	18	19	1.00	2	1977	1980	2010	Mid	Mid	New		No	2	25%	57.5	$ -
	Church St - STM-MAIN-194	CB7	41	2.67	3	1977	1980	1974	Mid	Mid	Old		No	1	58%	97.6	$ -
	Jameson St - STM-MAIN-193	41	CB8	3.63	3	1977	1980	1974	Mid	Mid	Old		No	1	58%	122.6	$ -
	Jameson St - STM-MAIN-196/78	CB8	CB10	4.58	3	1977	1980	1974	Mid	Mid	Old		No	1	58%	51.6	$ -
	AC Main St: STM-MAIN-81	19	20	2.24	3	1977	1980	2010	Mid	Mid	New		No	1	38%	118.6	$ -
	AC Main St: STM-MAIN-86	20	CB12	2.25	3	1977	1980	2010	Mid	Mid	New		No	1	38%	108.1	$ -
	AC Main St: STM-MAIN-221	CB12	CB13	2.36	3	1977	1980	2010	Mid	Mid	New		Yes	1	48%	92.4	$ -
	AC Main St: STM-MAIN-220	CB13	21	2.38	3	1977	1980	2010	Mid	Mid	New		Yes	1	48%	81.5	$ -
	AC Main St: STM-MAIN-99	21	22	1.41	2	1977	1980	2010	Mid	Mid	New		No	2	25%	123.9	$ -
	AC Main St: STM-MAIN-96	-	CB35	0.11	1	1977	1980	2010	Mid	Mid	New		No	4	13%	70.8	$ -
	AC Main St: STM-MAIN-95	CB35	CB34	0.17	1	1977	1980	2010	Mid	Mid	New		No	4	13%	55.4	$ -
	AC Main St: STM-MAIN-94	CB34	CB36	0.22	1	1977	1980	2010	Mid	Mid	New		No	4	13%	17.4	$ -
	AC Main St: STM-MAIN-100	CB36	CB37	0.47	1	1977	1980	2010	Mid	Mid	New		No	4	13%	61.9	$ -
	AC Main St: STM-MAIN-101	CB37	22	0.48	1	1977	1980	2010	Mid	Mid	New		No	4	13%	71.0	$ -
	AC Main St: STM-MAIN-223	22	44	1.76	3	1977	1980	2010	Mid	Mid	New		No	1	38%	13.6	$ -
D	George St: STM-MAIN-422	-	30	2.45	3	1970	1980	1974	Old	Mid	Old		No	1	72%	104.4	$ 574,061
	George St: STM-MAIN-119	30	24	3.57	3	1977	1980	1974	Mid	Mid	Old		Yes	1	68%	105.4	$ -
	George St: STM-MAIN-123	24	Main 128	1.31	2	1977	1980	1974	Mid	Mid	Old		No	2	45%	134.5	$ -
	George St: STM-MAIN-215	Main 128	31	3.55	3	1977	1980	1974	Mid	Mid	Old		Yes	1	68%	112.4	$ -
	George St: STM-MAIN-130	31	32	1.59	3	1977	1980	1974	Mid	Mid	Old		Yes	1	68%	103.9	$ -
	George St: STM-MAIN-134/135	32	34	2.25	3	1977	1980	1974	Mid	Mid	Old		Yes	1	68%	82.0	$ -
	George St: STM-MAIN-143	CB15	CB16	0.07	1	1977	1980	1974	Mid	Mid	Old		No	4	33%	42.7	$ -
	George St: STM-MAIN-142	CB16	CB17			1977	1980	1974	Mid	Mid	Old		No		58%	11.2	$ -
	George St: STM-MAIN-141	CB17	34-1			1977	1980	1974	Mid	Mid	Old		No		58%	13.4	$ -
	Geroge St: STM-Main-136	34	35	0.33	1	1977	1980	1974	Mid	Mid	Old	2	Yes		45%	125.4	$ -
	George St: STM-MAIN-137	35	36	0.43	1	1977	1980	1974	Mid	Mid	Old	2	Yes		45%	22.3	$ -
	George St: STM-MAIN-138	36	East	0.55	1	1977	1980	1974	Mid	Mid	Old	3	No	3	37%	100.8	$ -
E	William St: STM-MAIN-219	CB20	CB23	4.07	3	1950	1980	1960	Old	Mid	Old		Yes	1	82%	95.5	$ 525,095
	William St: STM-MAIN-150/218	C23	38	3.24	3	1950	1980	1960	Old	Mid	Old		Yes	1	82%	148.4	$ 815,927
	William St: STM-MAIN-189/217	38	129	4.57	3	1950	1980	1960	Old	Mid	Old		Yes	1	82%	185.7	$ 1,021,149
	William St: STM-MAIN-216	129	39	4.96	3	1950	1980	1960	Old	Mid	Old	2	Yes	1	84%	95.2	$ 523,561
	William St: STM-MAIN-188	39	West	5.78	3	1950	1980	1960	Old	Mid	Old		Yes	1	82%	164.9	$ 906,981
F	Queen St: STM-MAIN-111	CB21	1	0.37	1	1977	1980	1977	Mid	Mid	Mid		No	4	19%	97.7	$ -
	AnnieAS: STM-Main-159/158	-	1	0.03	1	1977	1980	1990	Mid	Mid	Mid		No	4	19%	14.5	$ -
	AnnieAS: STM-Main-161	1	25	0.40	1	1977	1980	1974	Mid	Mid	Old		No	4	33%	15.1	$ -
	AnnieAS: STM-Main-214	25	CB22	0.80	1	1977	1980	1974	Mid	Mid	Old		No	4	33%	100.5	$ -
	AnnieAS: STM-Main-206	CB22	Main-187/206	1.79	3	1990	1980	1974	Mid	Mid	Old		No	1	58%	110.0	$ -
	AnnieAS: STM-Main-187	Main-187/206	43	2.25	3	1990	1980	1974	Mid	Mid	Old		No	1	58%	105.7	$ -
	AnnieAS: STM-Main-205	42	60	9.73	3	1994	1980	1974	Mid	Mid	Old		No	1	58%	10.8	$ -
G	Hamilton St: STM-MAIN-442	South	CBMH70	0.47	1	1993	1980	1974	Mid	Mid	Old		No	4	33%	32.0	$ -
	Hamilton St: STM-MAIN-441	CBMH70	69	0.52	1	1993	1980	1974	Mid	Mid	Old		No	4	33%	52.0	$ -
	Robin St: STM-MAIN-439	CB30	68	1.32	2	1993	1980	1974	Mid	Mid	Old		No	2	45%	17.0	$ -
	Hamilton St: STM-MAIN-440	68	69	0.13	1	1993	1980	1974	Mid	Mid	Old		No	4	33%	72.0	$ -
	Finch St: STM-MAIN-445	69	71	0.37	1	1993	1980	1974	Mid	Mid	Old		No	4	33%	56.3	$ -
	Finch St: STM-MAIN-444	71	64	0.48	1	1993	1980	1974	Mid	Mid	Old		No	4	33%	69.5	$ -
	Robin St: STM-MAIN-438	East	67	0.03	1	1993	1980	1974	Mid	Mid	Old		No	4	33%	36.6	$ -
	Robin St: STM-MAIN-437	67	66	0.06	1	1993	1980	1974	Mid	Mid	Old		No	4	33%	30.3	$ -
	Robin St: STM-MAIN-436	66	65	0.15	1	1993	1980	1974	Mid	Mid	Old		No	4	33%	12.0	$ -
	Robin St: STM-MAIN-435	65	64	0.18	1	1993	1980	1974	Mid	Mid	Old		No	4	33%	75.8	$ -
	Robin St: STM-MAIN-434	64	63	0.65	1	1993	1980	1974	Mid	Mid	Old		No	4	33%	31.6	$ -
	AnnieAS: STM-MAIN-433/432	63	62	0.75	1	1994	1980	1974	Mid	Mid	Old		No	4	33%	131.0	$ -
	AnnieAS: STM-MAIN-431	62	61	0.79	1	1994	1980	1974	Mid	Mid	Old		No	4	33%	108.7	$ -
	AnnieAS: STM-MAIN-430	61	60	0.75	1	1994	1980	1974	Mid	Mid	Old		No	4	33%	114.4	$ -
H	Queen St: STM-MAIN-164	2	26	0.94	1	1977	1980	2010	Mid	Mid	New		No	4	13%	93.9	$ -
	Queen St: STM-MAIN-166	26	27	1.49	2	1977	1980	1974	Mid	Mid	Old		No	2	45%	56.2	$ -
	Queen St: STM-MAIN-169	27	28	2.24	3	1977	1980	1974	Mid	Mid	Old		No	1	58%	53.4	$ -
	Queen St: STM-MAIN-173/186	4	28	4.33	3	1977	1980	1974	Mid	Mid	Old		Yes	1	68%	216.4	$ -
	Atkinson St: STM-MAIN-170/171	28	CB	2.49	3	1977	1980	1974	Mid	Mid	Old		No	1	58%	60.4	$ -

Criteria	Weight
Capacity	25%
Storm Age	20%
Sani Age	10%
WM Age	20%
Storm Cond	15%
Sani Cond	10%
	100%

max	84%
mean	42%

High Priority 70%
Medium Priority 60%

Appendix C – Assessment of Storm Sewer Capacity in the Proposed System

Intensity Option # 1

Project Name: Ailsa Craig
Project Number: BRM-25012297-A0

1) Intensity (i) = a*(t+c)^b 2) Intensity (i) = a*t^b 3) Insert Intensity

Manning's n = 0.013 Depth of Cover 1.500

Based on 1:5 Year Ailsa Craig

a= 41.8 a= i= Total Area (ha)= 141.33

b= -0.814 b=

c= 0.09

Location								Storm Sewer Design								Manning										Proposed				
Upstream 4	Upstream 3	Upstream 2	Upstream 1	Downstream 1	Road /Stations	From MH	To MH	DA ID	Area (ha)	Run. Coef.	2.78AC	Accum. 2.78AC	T of In (min)	T of Flow (min)	T of Conc. (min)	Intensity (mm/hr)	Exp. Flow (L/s)	Capacity (L/s)	Velocity (m/s)	Wall Thickness (mm)	Length (m)	Existing Pipe Dia. (mm)	Pr. Pipe Dia (mm)	Slope (%)	Invert US	Invert DS	Capacity Ratio	Proposed Pipe Dia. (mm)	US Invert (m)	DS Invert (m)	CAPACITY CHECK	VELOCITY CHECK
				15	Rabbittwood Crt	CB1	49	A1	0.32	0.40	0.36	0.36	23	0.23	23.00	76.84	27.74	99.18	0.90	25	12.20	375	375	0.32	230.239	230.200	0.28	375.00	230.24	230.20	OKAY	CHECK VELOCITY
			14	Ditch	Rabbittwood Crt	49	East Ditch	A2	0.50	0.40	0.56	0.92	23	0.57	23.23	76.35	70.33	213.30	1.93	25	66.30	375	375	1.48	230.180	229.199	0.33	375.00	230.18	229.20	OKAY	OKAY
					B																									
				18	James St	CB2	40	B1	1.78	0.40	1.98	1.98	23	1.43	23.00	76.84	152.45	235.10	1.48	25	126.50	200	450	0.68	230.840	229.979	0.65	450.00	230.84	229.98	OKAY	OKAY
			17	20	Church St	40	23	B2	0.48	0.40	0.54	2.52	23	0.88	24.43	73.84	186.09	235.10	1.48	25	77.87	200	450	0.68	230.019	229.490	0.79	450.00	230.02	229.49	OKAY	OKAY
				20	Church St	50	23	B3	1.39	0.40	1.55	1.55	23	1.52	23.00	76.84	119.12	170.51	1.07	25	97.86	450	450	0.358	229.800	229.450	0.70	450.00	229.80	229.45	OKAY	OKAY
		18	19	21	Queen St	23	51	B5	1.23	0.40	1.37	5.44	23	0.90	25.30	72.11	392.37	412.26	1.15	25	62.36	600	675	0.241	229.450	229.300	0.95	675.00	229.45	229.30	OKAY	OKAY
				20	Queen St	52	North Ditch	B6	3.89	0.50	5.41	10.85	17.5	2.77	26.21	70.43	764.44	1158.55	1.34	25	222.55	600	1050	0.18	227.949	227.548	0.66	1050.00	227.95	227.55	OKAY	OKAY
					C																									
				24	AC Main St	CB3	15	C1	0.51	0.40	0.57	0.57	23	1.00	23.00	76.84	43.88	64.14	0.91	25	54.69	300	300	0.44	234.960	233.640	0.68	300.00	234.96	233.64	OKAY	OKAY
			23	25	AC Main St	15	13	C2	0.70	0.40	0.78	1.35	23	0.77	24.00	74.70	100.84	109.76	0.99	25	45.93	300	375	0.39	233.640	233.460	0.92	375.00	233.64	233.46	OKAY	OKAY
				24	AC Main St	13	14	C3	1.48	0.40	1.65	3.00	23	1.03	24.77	73.14	219.51	275.02	1.27	25	78.25	300	525	0.41	233.450	233.130	0.80	525.00	233.45	233.13	OKAY	OKAY
				25	AC Main St	14	17	C4	1.56	0.40	1.74	4.74	23	0.62	25.80	71.18	337.41	899.34	3.18	25	118.86	600	600	2.15	233.090	230.540	0.38	600.00	233.09	230.54	OKAY	OKAY
				26	AC Main St	17	16	C5	1.00	0.40	1.11	5.85	23	0.55	26.42	70.04	410.03	551.75	1.95	25	64.40	600	600	0.81	230.520	230.000	0.74	600.00	230.52	230.00	OKAY	OKAY
				27	AC Main St	16	18	C6	0.47	0.40	0.52	6.37	23	0.28	26.97	69.07	440.07	967.97	3.42	25	57.54	600	600	2.49	229.990	228.560	0.45	600.00	229.99	228.56	OKAY	OKAY
				28	AC Main St	18	19	C7	0.84	0.50	1.16	7.54	17.5	0.84	27.25	68.59	516.88	696.56	1.95	25	97.57	600	675	0.69	228.530	227.860	0.74	675.00	228.53	227.86	OKAY	OKAY
				31	Church St	CB7	41	C8	1.26	0.40	1.40	1.40	23	0.84	23.00	76.84	107.33	526.72	2.43	25	122.62	200	525	1.50	230.498	228.659	0.20	525.00	230.50	228.66	OKAY	OKAY
			30	32	Jameson St	41	CB8	C9,C10	1.60	0.40	1.77	3.17	23	0.65	23.84	75.04	237.99	285.27	1.32	25	51.63	300	525	0.44	228.639	228.412	0.83	525.00	228.64	228.41	OKAY	OKAY
			31	33	Jameson St	CB8	CB10	C11	0.84	0.40	0.93	4.10	23	1.37	24.49	73.70	302.32	407.29	1.44	25	118.64	300	600	0.44	228.392	227.870	0.74	600.00	228.39	227.87	OKAY	OKAY
		32	29	34	AC Main St	19	20	C12	0.96	0.50	1.33	12.97	17.5	1.08	28.09	67.19	871.27	894.89	1.67	25	108.06	600	825	0.39	227.850	227.430	0.97	825.00	227.85	227.43	OKAY	OKAY
			33	35	AC Main St	20	CB12	C13	1.49	0.50	2.07	15.03	17.5	0.82	29.17	65.48	984.53	1001.99	1.87	25	92.35	600	825	0.49	227.290	226.840	0.98	825.00	227.29	226.84	OKAY	OKAY
			34	36	AC Main St	CB12	CB13	C14	0.98	0.50	1.36	16.39	17.5	0.67	29.99	64.24	1053.22	1284.25	2.02	25	81.47	600	900	0.50	226.840	226.430	0.82	900.00	226.84	226.43	OKAY	OKAY
			35	37	AC Main St	CB13	21	C15	0.53	0.40	0.59	16.98	23	1.02	30.66	63.27	1074.50	1291.07	2.03	25	123.87	600	900	0.51	226.430	225.800	0.83	900.00	226.43	225.80	OKAY	OKAY
			36	38	AC Main St	21	22	C16	0.33	0.40	0.37	17.35	23	0.63	31.68	61.85	1073.06	1196.08	1.88	25	70.78	750	900	0.44	225.630	225.320	0.90	900.00	225.63	225.32	OKAY	OKAY
				39	AC Main St	-	CB35	C17	0.51	0.40	0.56	0.56	23	1.02	23.00	76.84	43.35	401.40	0.91	25	55.43	750	750	0.13	225.785	225.713	0.11	750.00	225.79	225.71	OKAY	OKAY
			38	40	AC Main St	CB35	CB34	C18	0.31	0.40	0.34	0.90	23	0.32	24.02	74.67	67.46	401.40	0.91	25	17.39	750	750	0.13	225.673	225.650	0.17	750.00	225.67	225.65	OKAY	OKAY
			39	41	AC Main St	CB34	CB36	C19	0.28	0.40	0.31	1.21	23	1.14	24.34	74.02	89.79	401.40	0.91	2	61.89	750	750	0.13	225.610	225.530	0.22	750.00	225.61	225.53	OKAY	OKAY
		39	40	42	AC Main St	CB36	CB37	C20	0.45	0.40	0.50	2.62	23	1.30	25.47	71.80	188.13	401.40	0.91	25	70.97	750	750	0.13	225.490	225.398	0.47	750.00	225.49	225.40	OKAY	OKAY
			41	43	AC Main St	CB37	22	C21	0.15	0.40	0.16	2.78	23	0.25	25.77	69.42	193.17	401.40	0.91	25	13.60	750	750	0.13	225.378	225.360	0.48	750.00	225.38	225.36	OKAY	OKAY
		37	42	44	AC Main St	22	44	C22	0.20	0.40	0.22	20.35	23	0.51	32.30	61.01	1241.89	1671.80	1.93	25	58.70	750	1050	0.37	225.320	225.100	0.74	1050.00	225.32	225.10	OKAY	OKAY
					D																									
				47	George St	-	30	D1	1.52	0.40	1.69	1.69	23	1.77	23.00	76.84	130.00	156.16	0.98	25	104.37	300	450	0.30	231.980	231.667	0.83	450.00	231.98	231.67	OKAY	OKAY
			46	48	George St	30	24	D2	0.84	0.40	0.93	2.62	23	1.61	24.77	73.15	191.97	235.55	1.09	25	105.38	300	525	0.30	231.647	231.331	0.81	525.00	231.65	231.33	OKAY	OKAY
			47	49	George St	24	Main 128	D3	1.82	0.40	2.03	4.65	23	0.97	26.39	70.11	326.11	499.32	2.31	25	134.54	400	525	1.35	231.311	229.497	0.65	525.00	231.31	229.50	OKAY	OKAY
			48	50	George St	Main 128	31	D4	1.20	0.40	1.34	5.99	23	1.49	27.36	68.41	409.59	449.54	1.26	25	112.43	400	675	0.29	229.477	229.156	0.91	675.00	229.48	229.16	OKAY	OKAY
			49	51	George St	31	32	D5	1.09	0.40	1.21	7.20	23	0.74	28.85	65.98	474.90	840.59	2.35	25	103.90	450	675	1.00	229.136	228.097	0.56	675.00	229.14	228.10	OKAY	OKAY
			50		George St	32	34	D6	0.98	0.40	1.09	8.29	23	0.73	29.59	64.84	537.64	669.84	1.87	25	81.97	450	675	0.64	228.077	227.556	0.80	675.00	228.08	227.56	OKAY	OKAY
				53	George St	CB15	CB16	D7	0.12	0.40	0.13	0.13	23	0.78	23.00	76.84	10.20	145.38	0.91	25	42.69	450	450	0.26	227.315	227.204	0.07	450.00	227.32	227.20	OKAY	OKAY
			52	54	George St	CB16	CB17	-	-	0.40	0.13	0.27	23	0.78	23.78	76.84	10.20	145.38	0.91	25	11.20	450	450	0.26	227.384	227.355	-	450.00	227.38	227.36	-	OKAY
			53	55	George St	CB17	34-1	-	-	0.40	0.13	0.40	23	0.78	24.56	76.84	10.20	145.38	0.91	25	13.44	450	450	0.26	227.459	227.424	-	450.00	227.46	227.42	-	OKAY
			54	56	George St	33	35	D8	1.06	0.40	1.18	1.58	23	0.74	25.34	72.05	113.84	1010.11	2.82	25	125.36	450	675	1.44	227.536	225.726	0.11	675.00	227.54	225.73	OKAY	OKAY
			55	57	George St	35	36	D9	0.45	0.40	0.50	2.08	23	0.13	26.08	70.67	146.84	1010.11	2.82	25	22.27	450	675	1.44	225.706	225.384	0.15	675.00	225.71	225.38	OKAY	OKAY
			56		George St	36	East	D10	0.76	0.40	0.84	2.92	23	0.55	26.21	70.43	205.57	1084.98	3.03	25	100.75	450	675	1.67	225.364	223.686	0.19	675.00	225.36	223.69	OKAY	OKAY
					E																									
				60	William St	CB20	CB23	E1	3.06	0.40	3.40	3.40	23	1.21	23.00	76.84	261.12	285.27	1.32	25	95.47	300	525	0.44	230.992	230.572	0.92	525.00	230.99	230.57	OKAY	OKAY
			59	61	William St	CB23	38	E2	1.49	0.40	1.66	5.06	23	1.92	24.21	74.28	375.55	460.41	1.29	25	148.35	400	675	0.30	230.552	230.107	0.82	675.00	230.55	230.11	OKAY	OKAY
			60	62	William St	38	129	E3	2.32	0.40	2.58	7.64	23	2.24	26.13	70.57	538.84	609.77	1.38	25	185.66	400	750	0.30	230.087	229.530	0.88	750.00	230.09	229.53	OKAY	OKAY
			61	63	William St	129	39	E4	1.22	0.40	1.36	8.99	23	1.15	28.37	66.74	600.00	609.77	1.38	25	95.19	400	750	0.30	229.510	229.224	0.98	750.00	229.51	229.22	OKAY	OKAY
			62		William St	39	West	E5	1.70	0.40	1.89	10.88	23	1.87	29.52	64.94	706.39	786.22	1.47	25	164.91	400	825	0.30	229.204	228.709	0.90	825.00	229.20	228.71	OKAY	OKAY
					F																									
				67	Queen St	CB21	1	F1	0.28	0.40	0.31	0.31	23	1.79	23.00	76.84	23.85	64.14	0.91	25	97.71	300	300	0.44	231.056	230.626	0.37	300.00	231.06	230.63	OKAY	OKAY
				67	Annie Ada Shipley St	-	1	F2	0.03	0.40	0.03	0.03	23	0.27	23.00	76.84	2.22	64.14	0.91	25	14.51	300	300	0.44	230.670	230.606	0.03	300.00	230.67	230.61	OKAY	OKAY
		65	66	68	Annie Ada Shipley St	1	25	F3	0.01	0.40	0.02	0.35	23	0.28	24.79	73.10	25.92	64.14	0.91	25	15.08	300	300	0.44	230.586	230.520	0.40	300.00	230.59	230.52	OKAY	OKAY
			67	69	Annie Ada Shipley St	25	CB22	F4	0.79	0.40	0.88	1.23	23	1.06	25.07	72.56	89.36	112.07	1.59	25	100.51	300	300	1.343	230.500	229.150	0.80	300.00	230.50	229.15	OKAY	OKAY
			68	70	Annie Ada Shipley St	CB22	Main-187/206	F5	0.88	0.40	0.98	2.21	23	1.28	26.13	70.58	156.29	158.61	1.44	25	109.97	300	375	0.818	229.150	228.250	0.99	375.00	229.15	228.25	OKAY	OKAY
			69	71	Annie Ada Shipley St	Main-187/206	43	F6	0.80	0.40	0.89	3.11	23	1.01	27.40	68.33	212.20	277.25	1.74	25	105.75	300	450	0.946	228.250	227.250	0.77	450.00	228.25	227.25	OKAY	OKAY
			70		Annie Ada Shipley St	42	60	F7	1.22	0.40	1.35	4.46	23	0.06	28.42	66.66	297.31	490.75	3.09	25	10.80	375	450	2.963	227.250	226.930	0.61	450.00	227.25	226.93	OKAY	OKAY
					G																									
				74	Hamilton St	South	CBMH70	G1	0.25	0.40	0.28	0.28	23	0.57	23.00	76.84	21.60	46.06	0.94	25	32.00	250	250	0.60	231.000	230.808	0.47	250.00	231.00	230.81	OKAY	OKAY
			73	75	Hamilton St	CBMH70	69	G2	0.17	0.40	0.19	0.47	23	0.90	23.57	75.61	35.86	68.38	0.97	25	52.00	300	300	0.50	230.768	230.508	0.52	300.00	230.77	230.51	OKAY	OKAY
				76	Robin St	CB30	68	G3	0.42	0.40	0.47	0.47	23	0.28	23.00	76.84	35.79	49.04	1.00	25	17.00	200	250	0.68	233.412	233.296	0.73	250.00	233.41	233.30	OKAY	OKAY
		75	77		Hamilton St	68	69	G4	0.37	0.40	0.41	0.88	23	0.66	23.28	76.22	66.72	513.72	1.82	25	72.00	600	600	0.70	233.256	232.752	0.13	600.00	233.26	232.75	OKAY	OKAY
	74		76	78	Finch St	69	71	G5	0.43	0.40	0.48	1.83	23	0.73	24.44	73.76	135.21	363.26	1.28	25	56.30	600	600	0.35	229.150	228.953	0.37	600.00	229.15	228.95	OKAY	OKAY
			77	83	Finch St	71	64	G6	0.54	0.40	0.60	2.43	23	0.90	25.19	72.32	175.63	363.25	1.28	25	69.50	600	600	0.35	228.973	228.710	0.48	600.00	228.97	228.71	OKAY	OKAY
				80	Robin St	East	67	G7	0.20	0.40	0.22	0.22	23	0.28	23.00	76.84	17.22	614.01	2.17	25	36.60	600	600	1.00	231.656	231.290	0.03	600.00	231.66	231.29	OKAY	OKAY
			79	81	Robin St	67	66	G8	0.21	0.40	0.23	0.46	23	0.23	23.28	76.23	34.78	620.12	2.19	25	30.30	600	600	1.02	231.280	230.971	0.06	600.00	231.28	230.97	OKAY	OKAY
			80	82	Robin St	66	65	G9	0.59	0.40	0.66	1.11	23	0.10	23.51	75.73	84.39	569.41	2.01	25	12.00	600	600	0.86	229.330	229.227	0.15	600.00	229.33	229.23	OKAY	OKAY
			81	83	Robin St	65	64	G10	0.32	0.40	0.36	1.47	23	0.58	23.61	75.52	111.00	610.93	2.16	25	79.80	600	600	0.99	229.190	228.440	0.18	600.00	229.19	228.44	OKAY	OKAY
		78	82	84	Robin St	64	63	G11	0.73	0.40	0.81	4.71	23	0.29	26.10	70.63	332.58	513.72	1.82	25	31.60	600	600	0.70	229.990	229.769	0.65	600.00	229.99	229.77	OKAY	OKAY
			83	85	Annie Ada Shipley St	63	62	G12	0.44	0.40	0.49	5.20	23	1.27	26.39	70.11	364.49	487.36	1.72	25	131.00	600	600	0.63	229.295	228.470	0.75	600.00	229.30	228.47	OKAY	OKAY
			84	86	Annie Ada Shipley St	62	61	G13	0.49	0.40	0.55	5.75	23	1.04	27.65	67.91	390.41	491.21	1.74	25	108.70	600	600	0.64	228.460	227.770	0.79	600.00	228.46	227.77	OKAY	OKAY
			85		Annie Ada Shipley St	61	60	G14	0.15	0.40	0.16	5.91	23	1.03	28.70	66.22	391.38	521.01	1.84	25	114.40	600	600	0.72	227.760	226.936	0.75	600.00	227.76	226.94	OKAY	OKAY
					H																							0.00	0.00	0.00		
				89	Queen St	2	26	H1	0.71	0.40	0.79	0.79	23	1.72	23.00	76.84	60.54	64.14	0.91	25	93.86	300	300	0.44	230.580	230.167	0.94	300.00	230.58	230.17	OKAY	OKAY
			88	90	Queen St	26	27	H2	0.46	0.40	0.51	1.30	23	0.89	24.72	73.24	95.26	116.30	1.05	25	56.18	300	375	0.44	230.147	229.900	0.82	375.00	230.15	229.90	OKAY	OKAY
			89	93	Queen St	27	28	H3	0.64	0.40	0.71	2.01	23	0.75	25.61	71.53	143.96	189.12	1.19	25	53.43	300	450	0.44	229.880	229.645	0.76	450.00	229.88	229.64	OKAY	OKAY
				93	Ausable Bluffs SWM Pond	Pond Outlet	28	H4	0.88	0.40	0.97	0.97	23	0.73	23.00	76.84	74.89	201.72	0.93	25	40.90	525	525	0.22	229.614	229.605	0.37	525.00	229.61	229.60	OKAY	OKAY
				93	Queen St	4	28	H5	3.25	0.4	3.61	3.61	23	2.74	23.00	76.84	277.46	285.27	1.32	25	216.40	300	525	0.44	230.577	229.625	0.97	525.00	230.58	229.62	OKAY	OKAY
	90	91	92		Atkinson St	28	CB	H6	0.60	0.40	0.67	7.27	23	0.61	26.36	70.15	509.96	594.39	1.66	25	60.40	450	675	0.50	229.605	229.303	0.86	675.00	229.60	229.30	OKAY	OKAY

Appendix D – Environmental Impact Study

Ailsa Craig SWMMP

The Municipality of North Middlesex

Type of document:
Scoped Environmental Impact Study

EXP Project number:
BRM-25007863-A0

Date submitted:
2025-12

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Table of Contents

List of Figures

1 Introduction

The Municipality of North Middlesex has retained EXP Services Inc. (EXP) to complete a Scoped Environmental Impact Study (EIS) for the Ailsa Craig Stormwater Management Masterplan. It was determined during the proposal stage that the project is classified as 'exempt' from the Municipal Class Environmental Assessment (EA) (February 2024) guidance, given the proposed works fall under Appendix 1, Table B (Municipal Water and Wastewater Projects), Project Descriptions 37 and 39. Although a formal EA is not required, a Scoped EIS has been undertaken to determine the effects that will be caused or that might reasonably be expected to be affected, directly or indirectly (Municipality of North Middlesex Official Plan, March 2023, Section 9.7.1).

The study area for the project follows the urban settlement area boundary for Ailsa Craig as defined on Schedule A2 of the Official Plan (2023). The study area is shown in **Figure 1**.

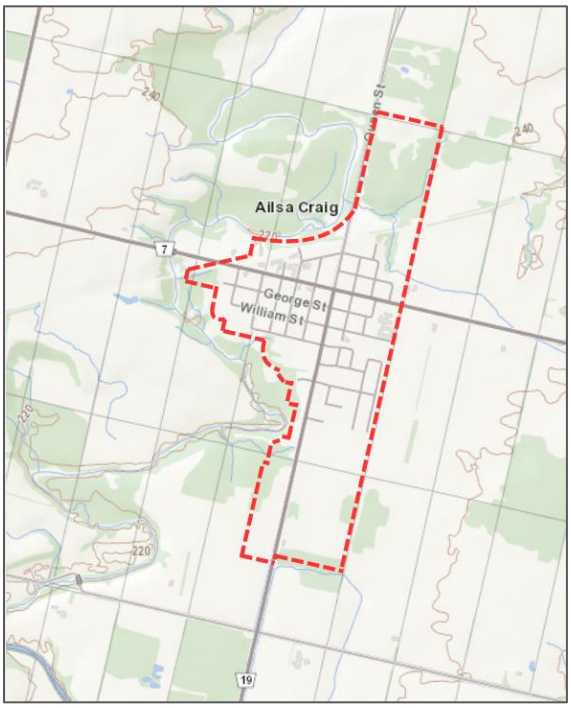


Figure 1. Study Area

1.1 Scoped Environmental Impact Study

Upon review of the Municipality of North Middlesex Official Plan (2023) and scope of this assignment, it was assessed that a "Scoped Environmental Impact Study" shall be undertaken. As outlined in Section 9.7.1.1 of the Official Plan, the Scoped EIS will address the following:

- A description of the proposed use;
- A description of the significant natural features and their functions that will be affected or that might reasonably be expected to be affected, directly or indirectly;
- A description of the effects that will be caused or that might reasonably be expected to be caused to the significant features by the proposed use; and,
- A description of the actions necessary to prevent, change, mitigate or remedy the effects upon or might reasonably be expected upon the significant features.
- Recommended mitigation and compensation measures based on the general scope of the proposed works.

An EIS is required for the recommended stormwater upgrades, to address potential impacts of the proposed works. An EIS is a requirement of the municipal planning process and is intended to address policies of the Municipality of North Middlesex, Middlesex County, and the Ausable Bayfield Conservation Authority.

This EIS considers applicable policies of the Province of Ontario's Provincial Policy Statement (PPS; Ministry of Municipal Affairs and Housing; MMAH 2024) and associated provincial implementation on guidance contained in the County of Middlesex Official Plan (2023), the Municipality of North Middlesex Official Plan (2023), and the Ausable Bayfield Conservation Authority (ABCA) regulations and policies.

2 Natural Heritage Planning Considerations

An assessment of the quality and extent of natural heritage features found on, and within the study area and the potential impacts to these features from the proposed development was undertaken to comply with requirements of the following regulatory agencies, local municipality, and/or legislation:

- Provincial Policy Statement (2024);
- Endangered Species Act (2007);
- Fisheries Act (2019);
- Migratory Birds Convention Act (1994);
- Municipality of North Middlesex Official Plan (2023);
- County of Middlesex Official Plan (2023);
- ABCA; and
- Stormwater Infrastructure Guidelines.

An EIS is required for the recommended stormwater upgrades, to address potential impacts of the proposed works. An EIS is a requirement of the municipal planning process and is intended to address policies of the Municipality of North Middlesex, Middlesex County, and the ABCA.

2.1 Provincial Policy Statement

The PPS (MMAH 2024) provides policy direction on matters of provincial interest related to land use planning and development. It "supports a comprehensive, integrated and long-term approach to planning, and recognize linkages among policy areas." The PPS is to be read in its entirety and land use planners and decision-makers need to consider all relevant policies and how they work together. This report addresses those policies that are specific to Natural Heritage (Section 4.1) with some reference to other policies with relevance to Natural Heritage and impact assessment consideration.

Development and site alteration shall not be permitted in significant wetlands, or in significant coastal wetlands. Development and site alteration shall not be permitted in significant woodlands, significant valleylands, or significant Areas of Natural Scientific Interest (ANSI), unless it is demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Development and site alteration shall not be permitted in the habitat of endangered and threatened species or in fish habitat, except in accordance with provincial and federal requirements. Development and site alteration may be permitted on lands adjacent to fish habitat provided it has been demonstrated that there will be no negative impacts on the natural feature or its ecological functions.

2.2 Endangered Species Act, 2007

The provincial *Endangered Species Act* (2007) (ESA) was developed to:

- Identify species at risk (SAR), based upon best available science;
- Protect SAR and their habitats and to promote the recovery of SAR; and

- Promote stewardship activities that would support those protection and recovery efforts.

The ESA protects all Threatened, Endangered, and Extirpated species listed on the SAR in Ontario List (SARO; Ontario Regulation 230/08). These species are legally protected from harm or harassment and their associated habitats are legally protected from damage or destruction, as defined under the ESA.

It should be noted that for the purposes of this EIS, SAR will be considered for those species designated as either Endangered or Threatened on the SARO list. Habitats for species with a designation of Special Concern on the SARO list are treated as a Species of Conservation Concern (SOCC) and are protected under the PPS as a type of SWH.

2.3 Federal Fisheries Act

Fisheries and Oceans Canada (DFO) administers the federal *Fisheries Act* (1985) which defines fish habitat as "spawning grounds and other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes" [subsection (2)1]. The *Fisheries Act* prohibits the death of fish by means other than fishing [subsection 34.4 (1)] and the harmful alteration, disruption or destruction of fish habitat [HADD; subsection 35. (1)]. A HADD is defined as "any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes".

Some projects may be eligible for exemption from the DFO review process, as specified under Step 3 of the DFO Fish and Fish Habitat Protec on Program review process, such as clear-span bridges and bridge maintenance projects where DFO mitigation measures are applied, artificial waterbodies with no hydrological connection to occupied fish habitat, and projects that follow the Standards and Codes of Practice defined by DFO. All other projects or activities that have the potential to impact fish or fish habitat should be submitted to DFO through the "Request for Review" process. DFO will review the proposed project to determine whether there is potential to (1) impact an aquatic SAR, (2) cause the death of fish or (3) result in HADD of fish habitat. The death of fish by means other than fishing or a HADD of fish habitat can be authorized by DFO under paragraphs 34.4(2)(b) or 35(2)(b) of the *Fisheries Act*. Authorizations require the preparation and submission of an application package identifying the impacts on fish and fish habitat as well as the avoidance, mitigation and offsetting measures that will be implemented as well as any monitoring that is proposed.

2.4 Migratory Birds Convention Act

The *Migratory Birds Conven on Act* (1994) provides protection to migratory birds, their habitats and nests at the federal level by prohibiting the destruction of active migratory bird nests. Currently, 700 migratory bird species are protected under this Act, including songbirds, woodland birds, waterfowl, shorebirds and seabirds. Although no permit is required by the legislation, appropriate ming constraints on potentially disruptive activities such as vegetation clearing (e.g., tree removal) where migratory birds may be nesting are required to avoid contravention of this Act. The requirement to ensure that there are no birds nest present within the work area rests with the proponent of the activity.

2.5 Municipality of North Middlesex Official Plan (2023)

The study area constitutes the area of Ailsa Craig located within the Municipality of North Middlesex. The Municipality of North Middlesex Official Plan (2023) was adopted by Council on June 23, 2003 and approved by the County of Middlesex on March 2004.

2.5.1. Natural Heritage

In partnership with the ABCA, Middlesex County and the Province, the Municipality strives to protect the natural environment. Section 7.0 (Environmental Policies) outlines the policies and Open Space Area Land Use designation developed to address the environmental objectives of the Plan. Policies include Watershed Management and the Natural Environment, along with the Open Space Area Land Use Designation.

The purpose of the Watershed Management policies is to protect water resources from contamination and degradation associated with certain land use and activities. In doing so, quality of life experienced by both existing residents and businesses is maintained and helps in supporting future growth. The Municipality contains one (1) major watershed system – the Ausable River, draining lands along the northerly, westerly, and southerly boundaries, branching out into numerous unnamed creeks. Policies that provide linkage between watershed management and the Official Plan include:

- The Municipality working cooperatively with ABCA in dealing with land management issues within the Ausable River Watershed that extend beyond the Municipal boundaries.
- The Municipality will encourage both the preparation of watershed and subwatershed management plans to assist in water resource and land use planning on an ecosystem basis.
- The Municipality will encourage the protection of SAR, either aquatic or terrestrial, and species recovery strategies.
- The Municipality will support ABCA in the preparation and implementation of the subwatershed studies.
- The Municipality will support initiatives of the County, the Conservation Authority and other agencies in identifying strategies to protect groundwater resources.
- Applications for proposals requiring access to significant amounts of groundwater or surface water from streams or ponds will only be considered by the Municipality where the applicant has illustrated that the Ministry of the Environment, Conservation and Parks (MECP) has been consulted, and that the Ministry is considering an application for a water taking permit.
- Applications for development that need a private water source may be required to submit a detailed hydrogeological study to determine the suitability of the lands for groundwater extraction.

In relation to Natural Environment policies, the Official Plan separates natural environmental considerations into three (3) categories:

(1) Hazard Lands, as shown on Schedule "A" of the Official Plan: these lands that are susceptible to flooding or erosion, have steep slopes or soil instability, or exhibit other hazards, including human-made hazards. The following policies apply to Hazard Lands:

- No new development shall be permitted on Hazard Lands other than uses associated with the management of Hazard Lands.
- An EIS shall be required for all development or site alteration proposals within or abutting lands identified as Hazard Lands.
- Land proposed for development is subject to site plan control. The site plan shall relate specifically to the implementation of the findings of the EIS. The site plan shall correctly and precisely delineate those lands impacted by flooding or erosion.
- The Municipality shall work cooperatively with the ABCA in the management of flood plains to ensure proper land use, minimize the level of risk to life, property damage and social disruption from flooding, and minimize the need for large capital expenditures for flood protection purposes.

Hazard lands are present to the north and west of the study area in the form of the Ausable River.

(2) Environmentally Significant Features, being those lands that display sensitive features including significant wetlands, significant portions of the habitat of endangered and threatened species, and major watercourses, including municipal drains. The following policies apply to Environmentally Significant Features:

- Development and site alteration shall not be permitted on Environmentally Significant Features.
- An EIS shall be required for all development proposals within or adjacent to areas identified as Environmentally Significant Features.

- Development proposals adjacent to or abutting an Environmentally Significant Feature shall not result in a negative impact on the natural areas and functions or ecological processes of the Feature.

No Environmentally Significant Features are present within the Ailsa Craig study area being used for this assignment.

(3) Natural Heritage Features are identified on Schedule "C" of the Official Plan and their delineation are based on the Middlesex County Natural Heritage Study. The PPS encourages the protection and enhancement of natural heritage features. The following policies apply to Natural Heritage Features:

- Natural Heritage Features identified on Schedule "C" of the Official Plan shall be subject to the policies of the underlying land use designation and the policies of this Section 7.3.4. of the Official Plan.
- Development or site alteration proposed within or on lands adjacent to a Natural Heritage Feature(s) shall be subject to the completion of an EIS. Development or site alteration within or adjacent to such features will be prohibited unless it can be shown that there will be no unmitigated impacts on the form or function of such Features.

As per Schedule "C" of the Official Plan, Natural Heritage Features are present in the study area in the form of woodlands and mineral and aggregate resources located directly within the study area, and locally significant wetlands to the southwest of the study area.

In addition to the above noted Natural Environment policies, the Official Plan provides "General Environmental Polices" that must be adhered to as part of any development. These general policies relate to no limitation of agricultural uses within or adjacent to Natural Heritage features; encouraging the retention of woodlots; encourages the use of the Ministry of Natural Resources (NHR) *Natural Heritage Reference Manual*; encourages development proposals for creating new habitat, vegetation regeneration, and conserving natural landforms and functions; protects private lands from public use; and, ensures existing drains are maintained.

Uses on land designated as an Open Space Area, as shown on Schedule "A" of the Official Plan, must adhere to the following:

- land shall be for the preservation and conservation of land and/or environment, as well as for the provision of outdoor recreational and educational opportunities.
- Uses such as agriculture, forestry, parks and recreation shall be permitted; however, it will depend on the particular physical and environmental constraints of any given site.
- Lands designated Open Space Area should be managed in such a fashion as to complement adjacent land uses and protect such uses from any physical hazards.
- Development and site alteration shall be prohibited on lands identified as Environmentally Significant Features on Schedule "A" of the Official Plan.
- Agriculture, parks, recreation and forestry operations on lands designated Open Space Area should maintain the unique natural characteristics of such lands, where possible and appropriate.
- The use of lands designated Open Space Area shall not contribute to problems of erosion, flooding, pollution or the deterioration of the natural environment.
- Buildings and structures shall be permitted on lands designated Open Space Area provided that they are clearly incidental and/or accessory to the main permitted use, but not in hazard lands, unless the buildings or structures are required for flood control, municipal services and/or utilities.
- Where Open Space Area lands are under private ownership, it shall not be construed that these lands shall be free and open to the general public, nor that the Municipality or any other public agency shall acquire them.

Ailsa Craig contains several land use designations as shown on Schedule "A2" of the Official Plan including residential areas, open space areas, institutional areas, urban reserve areas, and employment areas. There is additionally a waste disposal site present on the west side of the study area.

2.5.2. Stormwater

Section 8.3.5 of the Official Plan outlines policies to be followed relating to stormwater management and servicing. The specific policies include the following:

- Use stormwater management measures to manage the storage and control the flow of water to receiving watercourses;
- Use stormwater management measures which prevent siltation and erosion, and do not negatively impact the water quality of receiving watercourses;
- Ensure that natural heritage features are avoided and that, where appropriate, consideration is given to enhancing vegetation, wildlife habitats and corridors in and along the storm water management system and the receiving watercourses;
- Employ the best available methods in the planning, construction and eventual use of the stormwater management systems; and,
- Ensure that the design of stormwater management facilities consider long-term maintenance and safety requirements.

The assignment has, where applicable, followed the above policies in the development of the Parkhill Stormwater Management Masterplan.

2.6 County of Middlesex Official Plan (2023)

Similar to the Municipality of North Middlesex Official Plan (2023), the County of Middlesex Official Plan (2023) also outlines policies and plans to provide direction of future and growth with the County. Schedule “C” (Natural Heritage System) shows the study area to contain plots of natural heritage to the northwest, west, and southwest, and natural hazard areas to the northwest, west, and southwest on Schedule “D” (Natural Hazard Areas). These hazard areas reflect ABCA’s regulation limits (under Ontario Regulation 41/24). Schedule “E” of the County Plan additionally tells us that the study area is directly over an aggregate resource area.

2.7 Ausable Bayfield Conservation Authority

2.7.1. Ontario Regulation (O.Reg.) 41/24: Prohibited Activities, Exemptions and Permits

Effective April 1, 2024, Ontario Regulation (O.Reg.) 41/24: Prohibited Activities, Exemptions and Permits has come into force, replacing the former O.Reg. 147/06: Ausable Bayfield Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. O. Reg. 41/24 allows Conservation Authorities to implement Section 28 Conservation Authorities Act, 1990 (amended 2024), which states under Section 28(1) that:

- 28 (1) No person shall carry on the following activities, or permit another person to carry on the following activities, in the area of jurisdiction of an authority:
  - 1. Activities to straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse or to change or interfere in any way with a wetland.
  - 2. Development activities in areas that are within the authority’s area of jurisdiction and are,

i. hazardous lands,

ii. wetlands,

iii. river or stream valleys the limits of which shall be determined in accordance with the regulations,

iv. areas that are adjacent or close to the shoreline of the Great Lakes-St. Lawrence River system or to an inland lake and that may be affected by flooding, erosion or dynamic beach hazards, such areas to be further determined or specified in accordance with the regulations, or,

v. other areas in which development should be prohibited or regulated, as may be determined by the regulations. 2017, c. 23, Sched. 4, s. 25.

Pursuant to O. Reg. 41/24, any interference with or development in or on areas stated in the Conservation Authorities Act (e.g., hazardous lands, wetlands, river or stream valleys) requires permission from the Conservation Authority. The Conservation Authority may issue permits under Section 28.1 and may attach conditions on the permits per Section 9(1) of the Regulation. A review of the ABCA watershed explorer mapping tool was completed to understand whether hazardous lands, wetlands, shorelines and areas susceptible to flooding, and associated allowances were found within, or adjacent to, the boundaries of the Ailsa Craig study area. Regulated areas are present within Ailsa Craig in the form of watercourses lining the border of the study area from northeast, southwest, west, and north of the area.

2.8 Municipality of North Middlesex: Infrastructure Design Guidelines and Construction Standards (2025)

The Infrastructure Design Guidelines and Construction Standards provide a means of standardization for the design and construction of sanitary and storm sewers, watermains and roads in the Municipality of North Middlesex. The standards highlight that they should be read in conjunction with existing standard methods of design as outlined in the Municipal Engineers Association Design Manual, MECP Manuals and Guidelines, the MECP Stormwater Management Planning and Design Manual, Ministry of Transportation Ontario (MTO) Geometric Design Standards (roads) and the Ontario Provincial Standard Specification and Drawing Manuals.

Section 3.7 (Stormwater Practices) outlines the planning and design of stormwater quality and quantity controls that include Low Impact Development (LID) or source control concepts as well as traditional stormwater control measures. The Municipality encourages innovation as part of any stormwater project and provides information relating to Best Management Practices, LID, Stormwater Management Ponds, and operation and maintenance in accordance with the conditions of Consolidated Linear Infrastructure Environmental Compliance Approvals (CLI-ECA).

3 Summary of Data Collection Approaches and Methods

3.1 Background Information Review

EXP conducted a background search for supporting information to provide additional insight into the overall character of the study area as shown in **Figure 1**. Resources reviewed included:

- Ministry of Natural Resources (MNR) Land Information Ontario (LIO) Natural Features Mapping;
- Natural Heritage Information Centre (NHIC) database;
- Ontario Breeding Bird Atlas;
- Ontario Reptile and Amphibian Atlas;
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Map;
- Ministry of Agriculture, Food and Rural Affairs (OMAFRA) AgMaps;
- MECP Source Protection Information Atlas; and,
- Google Earth aerial images.

The results of these background reviews are discussed in the following sections. Additional background materials made available to EXP by reviewing agencies have been reviewed and incorporated into this EIS, as appropriate. MNR Aylmer and ABCA were contacted on September 9, 2025 for pertinent information for the study area relating to terrestrial and aquatic species. On September 23, 2025, MNR Aylmer provided confirmation that EXP Services has acquired all the pertinent natural heritage information for the project location of Ailsa Craig.

3.1.1. Land Information Ontario Natural Features Summary

Based on the MNR's GEO geographic database, the following features were found within the study area (**Figure 2**):

- Woodlands are present predominantly in outer borders of Ailsa Craig – woodlands are denoted by the green on **Figure 2**; and watercourses include Ausable River to the west, and Thirlwell Award Drain to the northeast.
- No unevaluated or provincially significant wetlands are present within the study area (based on a different geographic database for wetlands)

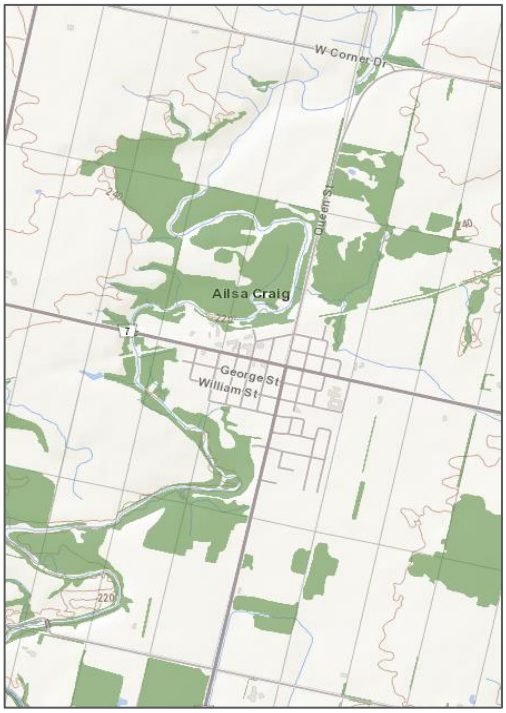


Figure 2. Woodlands and Watercourses

3.1.2. NHIC Database Results

The NHIC database (MNR, 2025) was searched for Threatened, Endangered, and Extirpated SAR, along with provincially significant plants and vegetation communities within the study area. The database provides data by 1km^2 area squares. Six (6) 1km^2 squares fall within the study area and the species and natural heritage features that have been found within these squares include the following:

Species at Risk

- Northern Riffleshell: SARO and COSEWIC – Endangered
- Kidneyshell: SARO and COSEWIC – Endangered
- Lake Sturgeon (Great Lakes – Upper St. Lawrence River population): SARO – Endangered, COSEWIC – Threatened
- False Hop Sedge: SARO and COSEWIC – Endangered
- Wavy-rayed Lampmussel: SARO – Threatened, COSEWIC – Special Concern
- Eastern Sand Darter (Southwestern Ontario Population): SARO and COSEWIC – Threatened
- Eastern Meadowlark: SARO and COSEWIC – Threatened
- Riddell's Goldenrod: SARO and COSEWIC – Special Concern

- Midland Painted Turtle: COSEWIC – Special Concern
- Grass Pickerel: SARO and COSEWIC – Special Concern
- Snapping Turtle: SARO and COSEWIC – Special Concern
- Northern Sunfish (Great Lakes – Upper St. Lawrence populations): SARO and COSEWIC – Special Concern
- Eastern Milksnake: COSEWIC – Special Concern
- Northern Map Turtle: SARO and COSEWIC – Special Concern
- Eastern Wood-pewee: SARO and COSEWIC – Special Concern

3.1.3. Ontario Breeding Bird Atlas

The Ontario Breeding Bird Atlas (OBBA) contains detailed information on the population and distribution status of Ontario birds (BSC et al. 2007). The data is presented on 100 km^2 area squares with one (1) square overlapping the study area (17TMH57). It should be noted that the study area is a small component of the overall bird atlas square, and therefore it is unlikely that all bird species are found within the study area. Habitat type, availability and size are all contributing factors in bird species presence and use.

A total of 89 bird species were recorded in atlas square, with the following species of interest noted:

- Species listed as Threatened or Endangered on the SARO List:
  - Northern Bobwhite – Endangered
  - King Rail – Endangered
  - Barn Owl – Endangered
  - Yellow-breasted Chet – Endangered
  - Prothonotary Warbler – Endangered
  - Red-headed Woodpecker – Endangered
  - Acadian Flycatcher – Endangered
  - Eastern Whip-poor-will – Threatened
  - Chimney Swift – Threatened
  - Bank Swallow – Threatened
  - Bobolink – Threatened
  - Eastern Meadowlark – Threatened
  - Louisiana Waterthrush – Threatened
  - Cerulean Warbler – Threatened
- Species of Conservation Concern (i.e., listed as Special Concern on the SARO List or identified as an S1-S3 species; B= breeding population, N= non-breeding population, M= migrant population):
  - Black Tern – Special Concern
  - Common Nighthawk – Special Concern
  - Wood Thrush – Special Concern
  - Grasshopper Sparrow – Special Concern
  - Peregrine Falcon – Special Concern
  - Eastern Wood-Pewee – Special Concern
  - Golden-winged Warbler – Special Concern
  - Barn Swallow – Special Concern
  - Canada Warbler – Special Concern

3.1.4. Ontario Reptile and Amphibian Atlas

The Ontario Reptile and Amphibian Atlas contains detailed information on the population and distribution status of Ontario herpetofauna (Ontario Nature 2020). The data is presented on 100 km^2 area squares with one (1) square overlapping the study area (17MH57). It should be noted that the study area is a small component of the overall atlas square, and therefore it is unlikely that all herpetofauna species are found within the study area. Habitat type, availability and size are all contributing factors in herpetofauna species presence and use.

A total of 13 species were recorded in the atlas square, that overlaps with the study area. Of these species, the following species of interest is noted: Midland Painted Turtle: COSEWIC – Special Concern, Northern Map Turtle: SARO and COSEWIC – Special Concern, Snapping Turtle: SARO and COSEWIC – Special Concern, and Eastern Milksnake: COSEWIC – Special Concern.

3.1.5. Fisheries and Oceans Canada Aquatic Species at Risk Distribution Mapping

Aquatic species at risk distribution mapping (DFO, 2025) was reviewed to identify any known occurrences of aquatic SAR, including fish and mussels, within the subwatershed where the study area is located. Within the study area, there are four (4) listed DFO SAR associated with the Ausable River including the Black Redhorse (Threatened), Snuffbox (Endangered), Northern Riffleshell (Endangered), and Kidneyshell (Endangered).

3.1.6. OMAFRA AgMaps

The online facility AgMaps provides agricultural and drainage information for Ontario. Within the study area, four (4) drains are present: Cameron-Thirwell Drain, Stokes Drain 'A', Stokes Drain 'B', and Thirwell Award Drain which is a Class 'C' constructed drain with permanent flow. **Figure 3** shows the location of the drains.

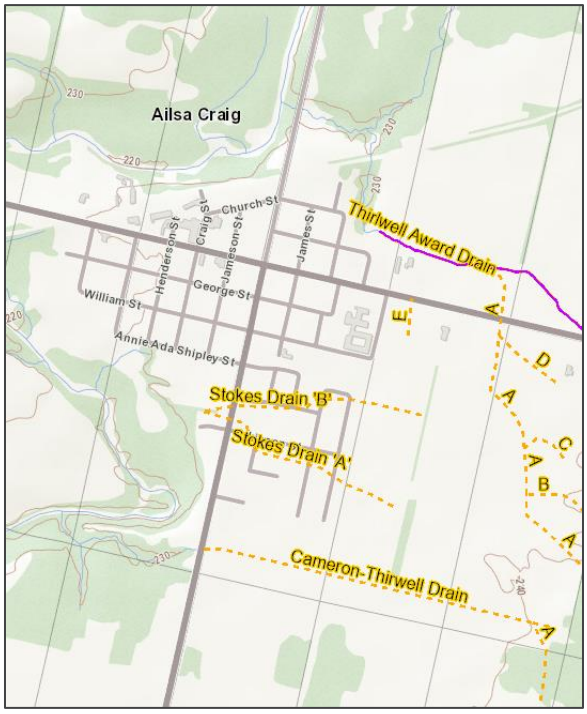


Figure 3. Drains within the Study Area

3.1.7. MECP Source Protection Information Atlas

No Highly Vulnerable Aquifers (HVA), Significant Groundwater Recharge Area (SGRA), or Wellhead Protection Areas are present within the study area (MECP, Source Protection Information Atlas (online)).

4. Environmental Setting and Characteristics

4.1. Physical Environment

The following physiographic, geological and soil maps were reviewed as part of this EIS:

- Ontario Ministry of Energy and Mines (MEM) website, Surficial Geology of Southern Ontario, 2010 (KML format), and;
- Ontario MEM website, Physiography of Southern Ontario, 2007.

The topography of the study area consists of flat, broad lands, with some sloping uplands, plateaus, and lowlands towards the west of the study area. The bedrock geology of the study area is composed primarily of clay plain, till plain, sand plain, and till moraine with the rock types of limestone, dolostone, and shale present. The physiography of the study area is sand plains within the physiographic region of the Huron Slope.

4.2. Biological Environment

The study area occurs within the Carolinian or Deciduous Forest Zone (also referred to as the mixed wood plains), an area characterized by a relatively warmer climate that supports plant species typical of more southern areas. This zone is referred to by the Province as Ecoregion 7E. Broadleaved trees, including American Beech (*Fagus grandifolia*), Sugar Maple (*Acer saccharum*), Basswood (*Tilia americana*), Red Maple (*Acer rubrum*), White Oak (*Quercus alba*) and Bur Oak (*Quercus marcrocarpa*), dominate natural upland forest cover in this region (Rowe 1972). This region also contains Canada's main distribution of Black Walnut (*Juglans nigra*), Sycamore (*Platanus occidentalis*), Swamp White Oak (*Quercus bicolor*) and Shagbark Hickory (*Carya ovata*).

5. Analysis of Ecological and Natural Heritage Significance

Types of significant natural heritage features are defined in the PPS, and are as follows:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Fish habitat;
- Habitat of endangered and threatened species; and,
- Significant ANSIs.

The presence/absence of these elements within the study area is discussed in detail in the following sections. The Natural Heritage Reference Manual (MNR, 2010) was referenced to assess the potential significance of natural areas and associated functions. Where significant natural features are present, the sensitivity of those features is also discussed.

5.1. Significant Wetlands

Within Ontario, significant wetlands have been previously identified by the MNR or by their designates. Other evaluated or unevaluated wetlands may be identified for conservation by the municipality or the conservation authority. MNR's database was consulted, and no provincially significant wetlands are within 120m of the study area.

5.1.3. Other Wetlands

No other wetlands (e.g. unevaluated) are present within 120m of the study area.

5.2. Significant Coastal Wetlands

No significant coastal wetlands are present within 120m of the study area.

5.3. Significant Woodlands

Significant woodlands are identified by the planning authority in consideration of criteria established by the MNR. Under the NHRM (2010), woodlands are defined as:

> *"...treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels."*

The Municipality of North Middlesex Official Plan (2023), Section 7.3.4, defines a significant woodland as:

> *"All woodlands 4 hectares or greater in area and all woodlots of any size straddling or immediately adjacent to a watercourse."*

Based on the description of the above from the Official Plan, four (4) areas of woodlands would be considered significant within the study area. The areas are shaded below in **Figure 4**.

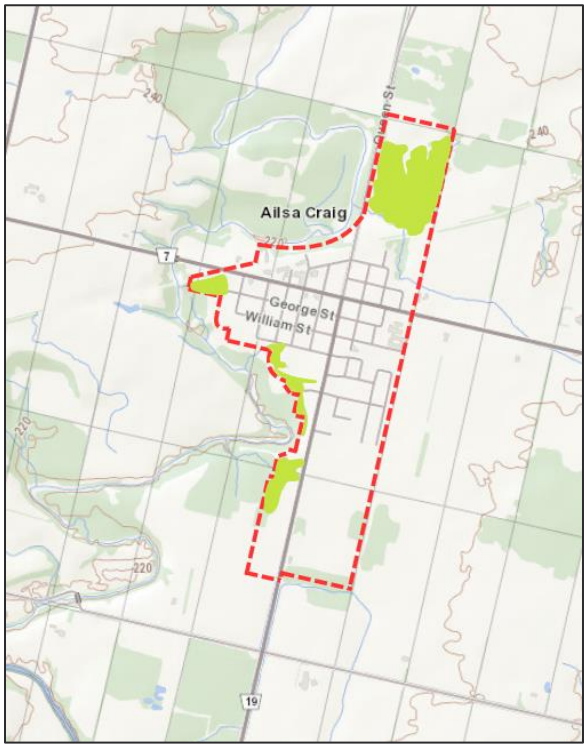


Figure 4. Significant Woodland Areas

5.3.3. Other Woodlands

All other woodlands are shown in **Figure 2** as derived from the NHIC online database (MNR, 2025).

5.4. Significant Valleylands

No significant valleylands were identified within 120m of the study area.

5.5. Fish Habitat

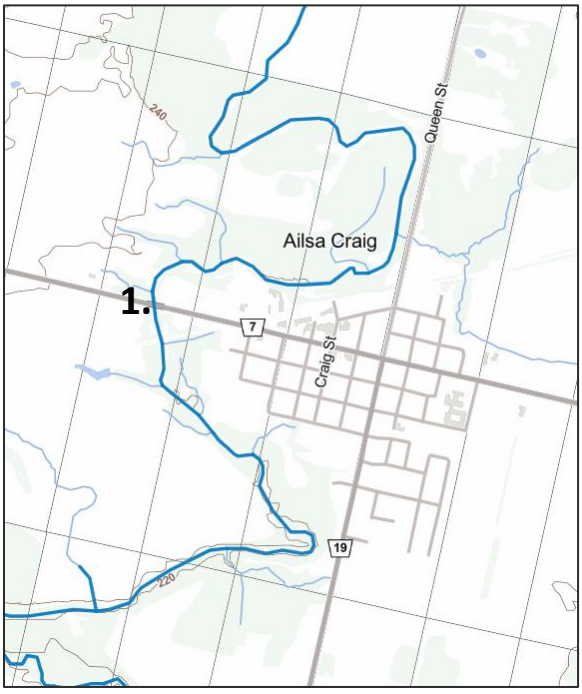
Fish habitat, as defined in the federal *Fisheries Act*, c. F-14, means, "spawning grounds and any other areas including nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes". Fish, as defined in S.2 of the Fisheries Act, c. F-14, includes "parts of fish, shellfish,

crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals."

The aquatic resources area line segment online mapping provides data on physical characteristics and fish species of lakes, rivers or streams in Ontario. Upon review of direct fish habitat of the Ausable River watercourse to the northwest, southwest, and west of the study area, the following fish species were identified:

- Baitfish
- Blackside Darter
- Bluegill
- Bluntnose Minnow
- Brook Stickleback
- Brown Bullhead
- Carps and Minnows
- Central Mudminnow
- Central Stoneroller
- Common Carp
- Common Shiner
- Creek Chub
- Emerald Shiner
- Golden Redhorse
- Green Sunfish
- Greenside Darter
- Hornyhead Chub
- Johnny Darter
- Johnny Darter x Tesselated Darter
- Largemouth Bass
- New World Silversides
- Northern Hog Sucker
- Northern Pike
- Northern Sunfish
- Pikes
- Pumpkinseed
- Rainbow Darter
- Rainbow Trout
- Redfin Shiner
- River Chub
- River Redhorse
- Rock Bass
- Rosyface Shiner
- Silver Redhorse
- Smallmouth Bass
- Spotfin Shiner
- Spottail Shiner
- Sticklebacks
- Stonecat
- Striped Shiner
- Suckers
- Walleye
- White Bass
- White Sucker
- Yellow Bullhead

The Northern Sunfish (Great Lakes – Upper St. Lawrence populations), and the River Redhorse are both listed as Special Concern. This is in addition to the SAR fish species noted in **Section 3.1.2** and **3.1.5** that include Black Redhorse, Snuffbox, Northern Riffleshell, and Kidneyshell. The species indicate when work can be undertaken in-water based upon their spawning season and months. Upon review of the species, and verification with MNR Aylmer, the permitted in-water timing window for watercourses is July 1 to March 31. The watercourse locations are shown in **Figure 5**.



1. Ausable River

Figure 5. Direct Fish Habitat in Study Area

5.6. Significant ANSIs

No significant ANSIs are identified on or within 120m of the study area.

5.7. Ausable Bayfield Conservation Authority - Regulated Features (O.Reg. 41/24)

As noted in **Section 2.7.1,** regulated areas under O.Reg. 41/24 are present within the Ailsa Craig study area. **Figure 6** shows the regulated area boundaries within the study area associated with the aforementioned watercourses.

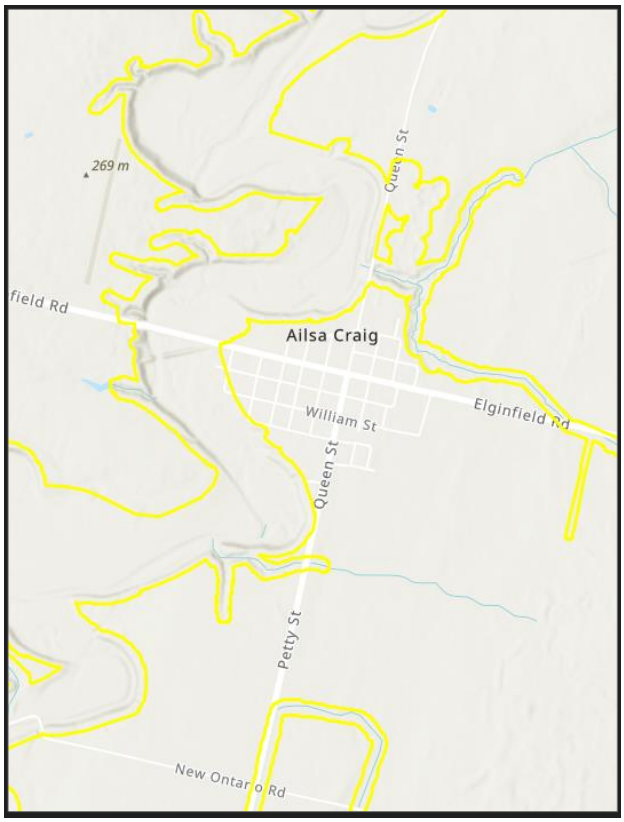


Figure 6. ABCA O.Reg. 41/24 Regulated Areas

5.8. Summary of Ecological Components Subject to Impact Assessment

Following the summary above, the following natural heritage features are either present or within 120m of the study area and will be assessed:

- Areas of significant woodland (**Figure 4**) and other woodlands;
- Watercourses and fish habitat (**Figure 5**); and,
- ABCA regulated areas under O.Reg. 41/24 (**Figure 6**).

Additionally, the proposed works will be reviewed against the background information in **Section 3**.

6. Stormwater Implementation Strategy

Evaluating storm sewer replacements requires multi-disciplinary considerations that integrate hydraulic capacity analysis with asset condition assessments. The goal is to ensure that infrastructure upgrades are technically justified, cost-effective, and coordinated across systems to minimize disruption and maximize long-term performance.

6.1. Existing Conditions

As part of the Ailsa Craig Stormwater Management Master Plan, the initial phase of work focused on reviewing all available data to establish a comprehensive understanding of the existing drainage infrastructure. A combination of desktop review, GIS analysis, and hydraulic modelling was used to prepare this plan. The process began with collecting and reviewing GIS shapefiles showing the road network, storm sewers, water and wastewater infrastructure, and parcel boundaries. As-built drawings, municipal drain reports, and closed-circuit television (CCTV) inspection records were examined to understand the condition and configuration of the system. ArcGIS was then used to map drainage catchments, identify network connectivity, and calculate service areas, slopes, and pipe lengths. This foundational work enabled the development of a baseline model for existing conditions and informed the identification of deficiencies and opportunities for improvement in the stormwater system.

6.2. Capacity Assessment

The storm sewer capacity assessment in Ailsa Craig was undertaken to evaluate the performance of the existing minor storm system in managing runoff from urbanized areas under current and projected conditions.

6.2.3. Hydrologic Assessment

The hydrologic assessment was completed using the Rational Method, applying a 5-year design storm as the baseline event, consistent with MECP standards for minor system design. The hydraulic assessment requires infrastructure properties to complete a standard storm sewer design sheet, applying Manning's equation to evaluate pipe capacity based on slope, diameter, and roughness coefficient. Due to the limited information available, several assumptions were made to complete the assessment; these assumptions are provided in the supporting Ailsa Craig Stormwater Management Plan.

6.2.4. Hydraulic Assessment Results

The hydraulic assessment of the storm sewer system was conducted using a standardized storm sewer design sheet to evaluate the capacity and performance of existing infrastructure under defined design conditions. This methodical approach allowed for the calculation of flow rates, pipe velocities, and hydraulic gradients using Manning's equation, ensuring compliance with municipal and provincial design standards. Each pipe segment was assessed for adequacy based on contributing drainage area, estimated peak flow from the Rational Method, and the 5-year design storm intensity, which reflects typical minor system design criteria. The design sheet facilitated a clear comparison between existing pipe capacities and required conveyance, helping to identify undersized segments and prioritize upgrades. This assessment supports informed decision-making for infrastructure renewal and ensures alignment with the ECI ECA requirements for hydraulic performance and system capacity. **Figure 7** provides a summary of the six (6) catchment areas and a ratio capacity of expected flows, with sufficiency of each catchment. Location of the catchment areas is provided in the supporting Ailsa Craig Stormwater Management Plan.

Figure 7. Storm Sewer Network Summary

Location	Capacity Ratio	Sufficiency (%)
Catchment A	0.28-0.33	100
Catchment B	1.92-9.79	0
Catchment C	0.11-4.58	43
Catchment D/E	0.07-5.78	35
Catchment F/G	0.03-9.73	81
Catchment H	0.37-4.33	33

6.3. Adjacent Infrastructure

A construction priority assessment was completed to determine what infrastructure requires upgrading the soonest. When evaluating construction priorities for undersized storm sewers, the age of adjacent infrastructure, such as sanitary sewers and watermains, plays a critical role in decision-making. Older infrastructure is typically more susceptible to failure due to material degradation, historical design limitations, and cumulative wear. By aligning storm sewer upgrades with the replacement of aging sanitary and water systems, municipalities can reduce long-term maintenance costs, minimize service disruptions, and optimize capital investment.

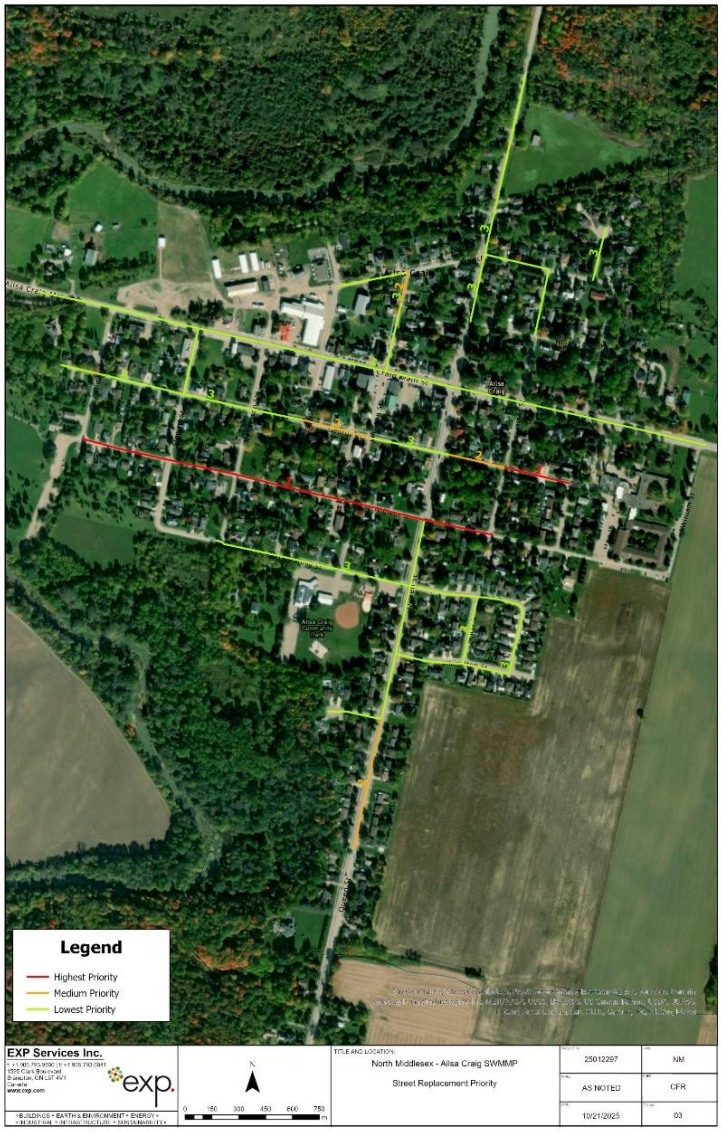
A review of installation years for storm sewers, sanitary sewers, and watermains across the six catchments highlights that much of the infrastructure is considered moderately-aged, with several portions classified as old, and limited portions classified as new. Sanitary sewers are from 1980, meaning the entire system is now classified as middle-aged.

Watermains show a mixed pattern, with installations dating from the 1960s to 2024. This overall distribution demonstrates that the underground network is predominately at or beyond its expected service life, reinforcing the need to consider coordinated renewal strategies.

6.4. Prioritization Schedule

A prioritization schedule for the replacement of storm, sanitary, and watermain infrastructure in North Middlesex should be developed with a strategic focus on the age and expected service life of each system component. **Figure 8** shows the proposed plan and location of the upgrades in the street network and is colour-coded according to the replacement priority.

Figure 8. Street Replacement Priorities



6.5. Description of the Proposed Development

The proposed development for the Ailsa Craig Stormwater Master Plan will take place completely with the existing right-of-way (ROW) owned by the Municipality. The works will involve replacement of stormwater and sanitary sewers, along with watermains. The purpose of the upgrades is to ensure each of the sewers are at sufficient capacity for current conditions and future development. Outlet modifications do not form part of the proposed works and will be reviewed separately within another assignment.

To allow for the replacement of the sewer and watermain infrastructure, pavement removal and replacement will be required within the ROW along with minor grading. All proposed works will be contained within the ROW, including laydown areas, with no property acquisition required as part of the development.

7. Impact Assessment and Ecological/Environmental Monitoring

This section of the scoped EIS assesses the potential effects on the natural features and ecological functions that could occur over the short term and long-term following implementation of the development plan. It also identifies appropriate mitigation measures to limit negative impacts.

The ecological components that were subject to an impact assessment, as identified in **Section 5.9**, are discussed below. In addition, the proposed works have been reviewed in line with the background information in **Section 3** to determine any further impacts, along with additional impacts to the surrounding environment (e.g. air quality, noise, and excess soils). Mitigation measures are also discussed to prevent and reduce potential impacts.

7.1. Natural Heritage Features

7.1.1. Areas of Significant Woodland, Other Woodlands, and Vegetation

As the location of upgrades will take place within the existing ROW, no potential impacts to areas identified as significant woodlands (**Figure 4**) and other woodlands (**Figure 2**) are expected. Where proposed works are in close proximity to trees or shrubs, the work area will be segregated from these features.

If it is established by the Contractor that tree removal is required, removals shall take place outside of the Migratory Bird Period for the region (April 1 to August 15). If this not feasible to the project schedule, a Qualified Avian Biologist will be retained by the Contractor to check for bird nesting and activities prior to removal. The Contractor shall not handle or remove any bird nesting. If nesting is discovered, the Contract Administrator, municipality, and Environment and Climate Change Canada (ECCC) will be informed. A permit/approval may be required to remove the nest, and consultation shall take place with a Qualified Avian Biologist to determine requirements.

Although not anticipated, mitigation measures pertaining to woodland or vegetation impacts have been provided if the proposed development is to be amended.

7.1.2. Watercourses and Fish Habitat

No loss of aquatic habitat or adverse effects to fish species or Ausable River and its tributaries are anticipated as a result of the proposed works. No specific mitigation is required other than implementation of standard construction best management practices (BMPs) to minimize off-site disturbance effects. No modifications to outfalls are proposed as part of the works, therefore no changes to discharge or water quality to watercourse or drains identified on **Figure 3** are anticipated. Although in-water works are not required in the Ausable River and its tributaries identified in **Figure 4**, if this is to change, the permitted timing window from July 1 to March 31 will be followed by the Contractor.

Where works are to take place near a watercourse, erosion and sediment control measures will be implemented in line with OPSS.MUNI 182. These measures, including silt fencing, shall be maintained in an effective, functioning, stable condition to prevent sedimentation to the adjacent watercourse. Routine inspections will be completed daily by the Contractor, and repair will be undertaken as required.

Accidental spills of potentially hazardous materials (e.g., fuel and oil from heavy equipment), could cause stress or injury to the surrounding fauna and flora including fish in adjacent watercourses. In order to mitigate the potential for adverse effects on aqua c habitats due to potential accidental spills during construction, it is recommended that a spill prevention and response plan be prepared to outline the material handling and storage protocols, mi ga on measures (e.g., spill kits on-site), monitoring measures and spill response plans (i.e., emergency contact procedures, including the Spills Action Centre, and response measures including containment and clean-up). Implementation of an effective spill prevention and response plan is anticipated to be largely effective in preventing adverse effects on natural heritage features.

Overall, no adverse effects are expected to fish habitat from the proposed development following the mitigation measures outlined above.

7.1.3. ABCA Regulated Areas under O.Reg. 41/24

The proposed works fall within the areas regulated under O.Reg. 41/24. As such, prior written approval and a permit from the ABCA will be required prior to the commencement of the project. The application is typically sent with 60-90% detail design drawings giving ABCA sufficient detail to assess and approve the permit request.

Details on potential tree or shrub removal will need submitted with the application, along with proposed compensation for the removals. Additionally, erosion and sediment control measures shall be detailed on the design drawings to inform ABCA how sedimentation will be controlled, particularly around watercourses.

7.2. Surrounding Environment and Other Parameters

7.2.1. Construction Noise

Construction noise will be generated as a result of equipment and vehicles. The Contractor shall adhere to the following:

- Equipment shall be maintained in an operating condition that prevents unnecessary noise, including but not limited to non-defective muffler systems, properly secured components, and the lubrication of moving parts.
- Idling of equipment shall be restricted to the minimum necessary to perform the specified work.
- Installation of hydraulic drill dust collectors is recommended.

7.2.2. Short-term Effects to Air Quality (including dust emissions)

Short-term air quality effects will be generated by the use of equipment, vehicles, during pavement removal and replacement, and grading. Dust shall be controlled using water and not chemical suppressants in dust-sensitive areas (e.g., adjacent watercourses per the MTO general conditions of contract (OPSS.MUNI.182)). Air quality effects will be reduced through implementation of the noted mitigation measures and monitoring by the Contractor.

7.2.3. Excess Soil and Waste Management

Excess soil will be generated as part of the project as a result of required excavation. Excavation shall be contained within the Region's ROW. All activities involving the management of excess soil will be completed in accordance with O. Reg. 416/19 and the MECP's guidance documents titled 'Management of Excess Soil – A Guide for Best Management Practices' (2014) and the 'Rules for Soil Management and Excess Quality Standards' (2020).

If hazardous contaminants are found in the sediment at elevated levels, the removed fill will require special handling as well as disposal at an approved facility in line with Part XV.1 of the Environmental Protection Act (EPA), O. Reg.

406/19, and O. Reg. 153/04. Contaminated soils will be handled and removed off-site in line with the mitigation and monitoring noted.

Additional waste that is expected to be generated in performing the work includes: asphalt concrete, aggregates, and packaging (i.e. wood, plastic, metal). Executing waste management strategies during the reconstruction project involves the following:

- On-Site Waste Management: Setting up designated areas for waste separation and storage.
- Monitoring and Reporting: Regularly tracking waste generation and diversion rates, adjusting practices as needed.
- Collaboration: Working with recycling facilities and re-use organizations receiving these materials to ensure proper handling of materials.

These processes should be evaluated as the project progresses and at the completion of the project to assess the effectiveness of the waste management plan and identify areas for improvement. A final waste audit should be conducted to determine the actual waste diversion rates achieved, and the results compared against targets and document successes and challenges.

7.2.4. Archaeological Resources

The proposed work areas have previously been disturbed by prior construction work. If something of archaeological significance is uncovered during construction the following direction is to be followed in accordance with OPSS.PROV 100 General Conditions of Contract G3.07.05:

- Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*.
- The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11 the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

7.2.5. Built Heritage Resources and Cultural Heritage Landscapes

The proposed work areas do not possess cultural heritage value or interest and no Cultural Heritage Evaluation Report was required as part of the assignment.

8. References

Ausable Bayfield Conservation Authority (2009). *Stormwater Management Policies and Technical Guidelines*.

Chapman, L. J. & Putnam, D. F. (1984). *Physiography of Southern Ontario*. Ontario Geological Survey.

County of Middlesex Official Plan (2023).

Fisheries Act (R.S.C., 1985, c. F-14).

Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Map.

Ministry of the Environment, Conservation and Parks (MECP) Source Protection Information Atlas.

Ministry of Agriculture, Food and Rural Affairs (OMAFRA) AgMaps.

Migratory Birds Convention Act, 1994 (S.C. 1994, c. 22).

Ministry of Natural Resources. (n.d.). *Significant Wetlands and the Ontario Wetland Evaluation System*. Government of Ontario.

Ministry of Natural Resources and Forestry. (n.d.). Make A Map: Natural Heritage Areas. Government of Ontario.

Municipality of North Middlesex Official Plan, March 2023.

Municipality of North Middlesex (2025). *Infrastructure Design Guidelines and Construction Standards*.

Ontario Breeding Bird Atlas 3 (Atlas-3).

Ontario GeoHub. (n.d.). Areas of Natural and Scientific Interest (ANSI). Government of Ontario.

Ontario Heritage Act (1990), R.S.O. c. O. 18.

Ontario Ministry of Energy and Mines (MEM) website, Surficial Geology of Southern Ontario, 2010

Ontario's Provincial Policy Statement (Ministry of Municipal Affairs and Housing, 2024).

Ontario Reptile and Amphibian Atlas, Ontario Nature.

The Endangered Species Act, 2007 (ESA) in Ontario, formally known as S.O. 2007, c. 6.

The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002.

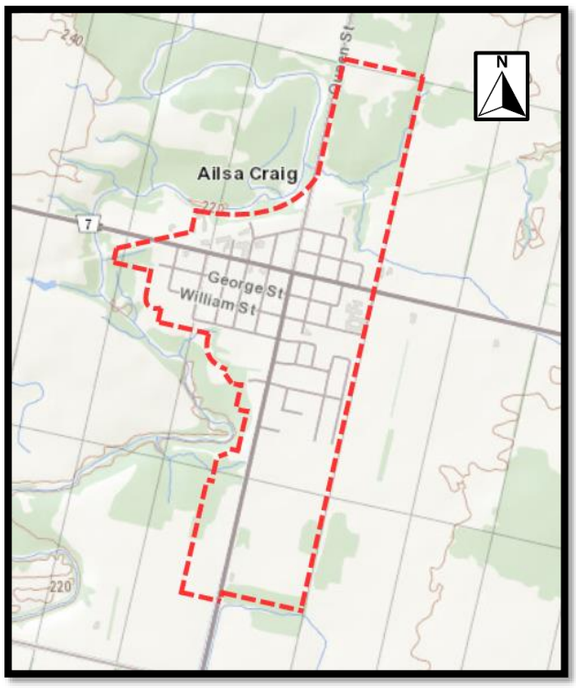
Appendix E – Consultation Materials

Notice of PIC

Notice of Public Information Centre
Municipality of North Middlesex
Ailsa Craig Stormwater Management Masterplan

THE PROJECT

EXP Services Inc. has been retained by the Municipality of North Middlesex to prepare a Stormwater Management Master Plan for Ailsa Craig. With limited existing infrastructure and increasing pressures from infill and intensification, effective runoff management has become a critical priority, particularly in light of more frequent and severe storm events. The Master Plan will assess current conditions, identify key drainage challenges, and recommend practical, long-term strategies to enhance system performance, reduce flooding risks, and build resilient, sustainable infrastructure to support the community's future growth.



CONSULTATION

A Public Information Centre (PIC) is being planned to present and gather feedback on the study process. The PIC will be in an open-house format and will present the following: existing conditions; deficiencies in stormwater infrastructure; priority issues; solutions and recommendations for infrastructure; as well as next steps in the process. The PIC will take place as follows:

Date: Monday, November 10, 2025

Time: 5:00 p.m. to 7:00 p.m**.**

Location: Ailsa Craig Community Centre, 155 Annie Ada Shipley Street, Ailsa Craig, ON N0M 1A0

The PIC will provide an opportunity for the public and stakeholders to provide input and comments. Please submit all comments on the PIC by **December 1, 2025,** to either of the contacts below or via comment sheet at the event. For further information on the study please visit: https://www.northmiddlesex.on.ca/services/stormwater-drainage.

For more information about the study and PIC, please contact the following:

Faishal Diwan, B.Eng.
Manager of Infrastructure
Municipality of North Middlesex
229 Parkhill Main Street
Parkhill, ON N0M 2K0
Phone: 519-294-6244 ext. 3218
Email: faishald@northmiddlesex.on.ca

Cameron Rickert, P.Eng.
Stormwater Engineer
EXP Services Inc.
15701 Robin's Hill Road
London, ON N5V 0A5
Phone: 519-963-3000
Email: cameron.rickert@exp.com

All information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act and Municipal Freedom of Information and Protection of Privacy Act*. Except for personal information, all comments will become part of the public record.

This notice was first issued on October 27, 2025.

PIC Slides

Public Information Centre – November 10, 2025

Stormwater Management Master Plan – Ailsa Craig

Acknowledgement of Ancestral Lands

We acknowledge that this land on which we are gathered today is part of the ancestral land of the Attawandaron, Anishinabeg, Haudenosaunee, and Lunaapeewak peoples. It is through the connection with the spirit of the land, water and air that we recognize their unique cultures, traditions, and values. Together as treaty people, we have a shared responsibility to act with respect for the environment that sustains all life, protecting the future for those generations to come.

Language Pronunciations:
Attawandaron (Add-a-won-da-run),
Anishinabeg (Ah-nish-in-a-beg)
Haudenosaunee (Hoden-oh-show-nee)
Lunaapeewak (Len-ahpay-wuk)

Public Information Centre

Purpose of the PIC

- Share information on the Ailsa Craig Stormwater Management Master Plan process
- Present the findings of the existing conditions review and preliminary analysis
- Gather input from the community to help shape recommended solutions

What Will Be Presented

- Study objectives and scope
- Existing infrastructure conditions and challenges
- Hydrologic and hydraulic assessment results
- Preliminary strategies for stormwater management and infrastructure renewal
- Next steps in the Master Plan process

How You Can Participate

- Review the display materials and ask questions to the project team
- Provide feedback through comment forms and online submissions
- Share local knowledge of flooding, drainage, or infrastructure issues
- Stay engaged through future PICs and project updates

Introduction

Why do we need a Stormwater Management Master Plan?

The community of Ailsa Craig faces significant stormwater management challenges due to limited existing infrastructure, ongoing urban intensification, and increasingly severe rainfall events. These factors contribute to localized flooding, erosion, and system capacity issues. As the community continues to grow, the need for effective stormwater solutions becomes increasingly urgent.

Stewart Street, South of Main Street
April 2024

Introduction

Problem & Opportunity Statement

- Address deficiencies in the existing stormwater system and infrastructure gaps
- Provide solutions to reduce flooding risks
- Support future development through sustainable, long-term drainage strategies
- Verify compliance with municipal, provincial, and conservation authority requirements

The SWMMP will Address the Following:

- Evaluate existing stormwater infrastructure performance and identify deficiencies
- Develop strategies to improve capacity, reduce flood risk, and enhance system resilience
- Incorporate updated hydrologic and hydraulic modeling to reflect current and future conditions
- Provide a framework for cost-effective, sustainable infrastructure replacement for the Ailsa Craig community

Public Information Centre Objectives

Present Findings of Existing Stormwater Conditions

Present Alternative Solutions to address System Deficiencies

Gather Feedback and Discuss Next Steps in the Master Plan Process

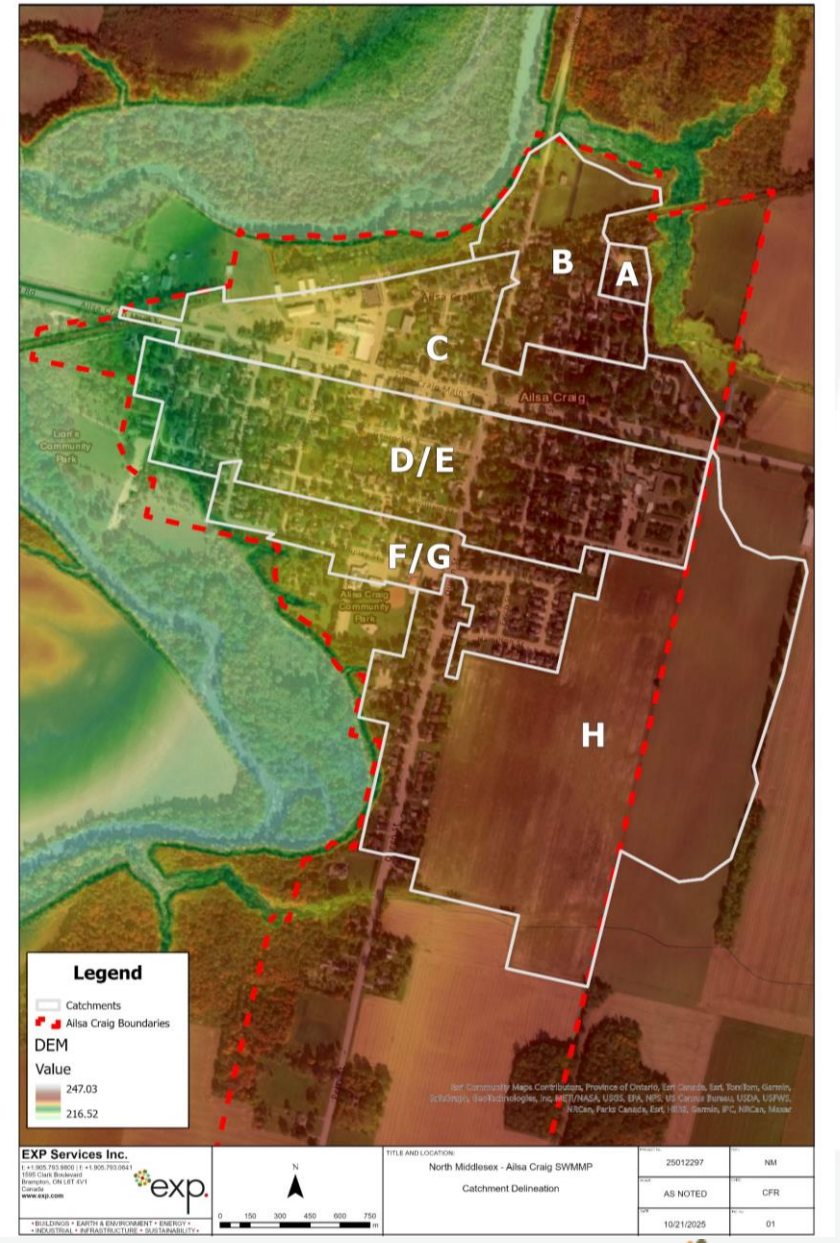
Glossary for the Public:

- **Stormwater Management Master Plan (SWMMP):** A long-term plan that guides how a community will handle rainwater to reduce flooding, protect property, and improve the environment.
- **Rational Method**: An engineering method used to estimate how much rainwater becomes runoff during a storm.
- **Catchment**: An area of land where rainwater drains into the same sewer system or watercourse.
- **Drainage Area**: A smaller section within a catchment that directs water into a specific pipe or manhole.
- **Runoff Coefficient**: A number that shows how much rainfall soaks into the ground vs. how much runs off into sewers.
- **Time of Concentration (Tc):** The time it takes for rainwater from the farthest point in a catchment to reach the sewer system.
- **Manning's Equation**: A formula engineers use to calculate how much water a pipe can carry, based on its size and slope.

Study Area

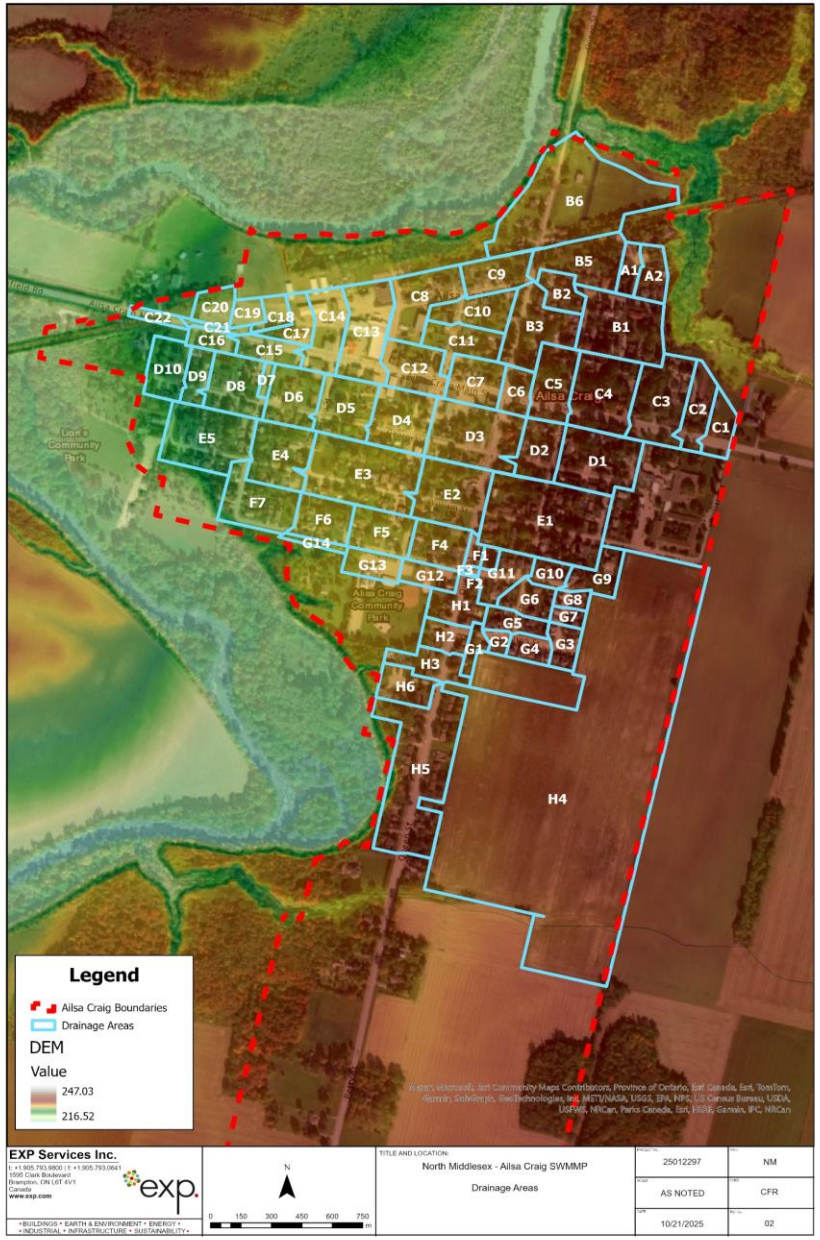
The Master Plan study area includes the entire urban boundary of Ailsa Craig, encompassing residential, institutional, and commercial lands supported by a storm sewer network and outlet drains. For the purposes of hydrologic and hydraulic assessment, the drainage system was divided into six major catchments, each representing a dominant portion of the urban area:

- **Catchment A:** Encompasses Rabbitwood Court and surrounding areas.
- **Catchment B:** Encompasses Church Street, Ness Street east of Queen Street, as well as portions of Queen Street.
- **Catchment C:** Encompasses Ailsa Craig Main Street, and portions of surrounding streets such as McAndrew Street, Ness Street, James Street, Queen Street, Jameson Street, Craig Street, Henderson Street, Stewart Street, and Old Mill Street.
- **Catchment D/E:** Encompasses the majority of William Street, and portions of surrounding streets such as Ness Street, James Street, Queen Street, Jameson Street, Henderson Street, Stewart Street, and Old Mill Street.
- **Catchment F/G:** Encompasses portions of Annie Ada Shipley Street, and surrounding streets such as Queen Street, Jameson Street, Craig Street, Henderson Street, and Stewart Street.
- **Catchment H:** Encompasses portions of Queen Street, Hamilton Street, and Atkinson Street.



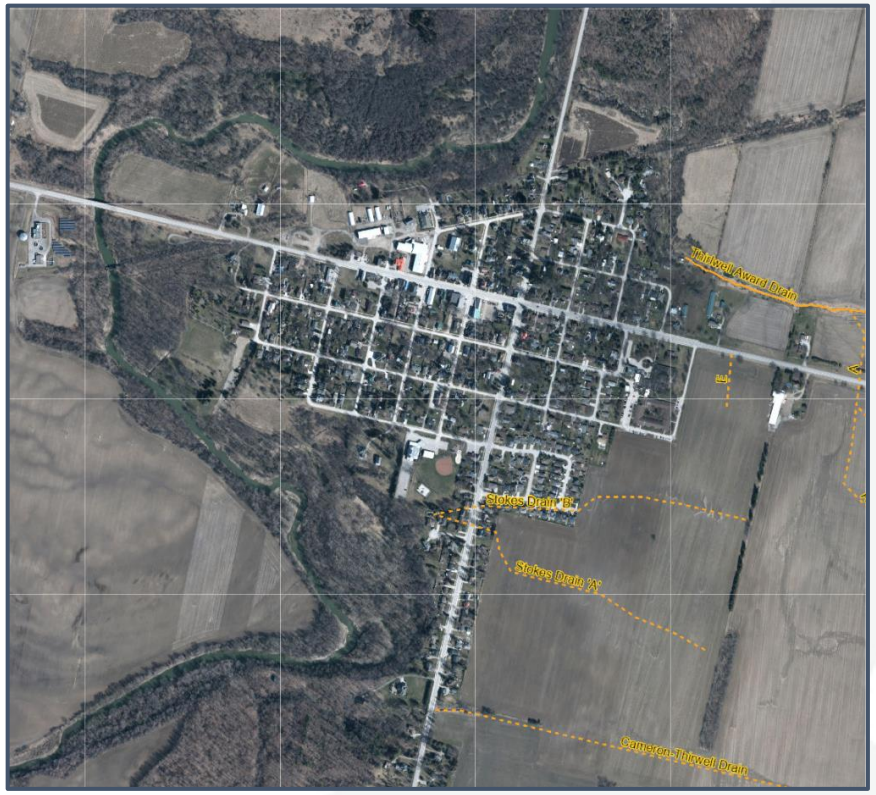
Drainage Areas

The storm sewer system within Ailsa Craig was divided into a series of individual drainage areas, each representing the contributing flow to a pipe segment or manhole. These areas were aggregated into six major catchments (A through H). The delineation was completed using GIS topographic data, DEM elevation information, and municipal mapping to verify consistency with overland flow paths and sewer connectivity. This framework provides the basis for the hydrologic and hydraulic assessment of existing system capacity.



Channel Flooding Analysis Process

The ultimate receiving watercourse for the community of Ailsa Craig is the Ausauble River. It bounds the town by the northwest, west, and southwest. To the northeast is the Thirwell Award Drain and to the southeast is the Cameron-Thirwell Drain. The flooding within these watercourses is outside of the control of North Middlesex, and therefore flood mitigation strategies for these features has not been considered.



Hydraulic Assessment

The hydraulic assessment of the Ailsa Craig storm sewer network was completed using a standardized design sheet to evaluate the capacity and performance of existing infrastructure. Flow rates, velocities, and hydraulic gradients were calculated using Manning's equation, and results were compared against municipal design standards. The analysis highlighted that several pipe segments are undersized under current conditions. Many segments also demonstrated adequate capacity, but overall, the assessment identified widespread limitations that will require targeted upgrades to support future growth and mitigate flood risk.

North Middlesex

exp.

Hydraulic Assessment

The hydraulic assessment of the Ailsa Craig storm sewer system was carried out using standardized design methods to evaluate performance. Flow rates, velocities, and pipe capacities were calculated and compared to municipal design standards. The results indicate that while some pipes provide sufficient conveyance, a significant portion of the network is undersized, with capacity ratios above acceptable limits. This highlights system deficiencies that may contribute to localized flooding risks and points to priority areas for future upgrades and coordinated infrastructure renewal.

Catchment	Capacity Ratio	Pipes Over Capacity (%)
Catchment A	0.28-0.33	0
Catchment B	1.45-6.99	100
Catchment C	0.08-3.63	24
Catchment D/E	0.07-4.07	18
Catchment F/G	0.03-5.51	19
Catchment H	0.36-4.33	67

Adjacent Infrastructure

A review of installation years for storm sewers, sanitary sewers, and watermains across the five catchments shows that most of the underground infrastructure is considered middle-aged (25-50 years). Storm sewers were generally installed between 1950 and 1994, with newer segments concentrated in Catchment A and Catchment F/G.

Sanitary sewers were typically introduced circa 1980, meaning the entire sanitary system is likely in need of repair.

Watermains are also generally considered old, with most dating from the 1960s and the 1970s, with a Main Street Watermain Replacement completed in 2010 and a Queen Street Watermain Rehabilitation completed in 2024.

This overall distribution indicates that much of the network is at or beyond its expected service life, highlighting the importance of coordinated renewal strategies.

Adjacent Infrastructure

Pipes	Catchment	Installation Year	Aging Condition		
			% Old	% Mid	% New
Storm Sewer	Catchment A	1990	0	100	0
	Catchment B	1977	0	100	0
	Catchment C	1977	0	100	0
	Catchment D/E	1950-1977	35	65	0
	Catchment F/G	1977-1994	0	100	0
	Catchment H	1977	0	100	0
Sanitary	Catchment A	1980	0	100	0
	Catchment B	1980	0	100	0
	Catchment C	1980	0	100	0
	Catchment D/E	1980	0	100	0
	Catchment F/G	1980	0	100	0
	Catchment H	1980	0	100	0
Watermain	Catchment A	1974	100	0	0
	Catchment B	1974-2024	40	0	60
	Catchment C	1974-2010	14	0	86
	Catchment D/E	1960-1974	100	0	0
	Catchment F/G	1974-1977	90	10	0
	Catchment H	1974-2010	80	0	20

Prioritization Schedule

A prioritization schedule for replacing stormwater infrastructure focuses on capacity corrections to alleviate flooding but should also consider age and remaining service life of adjacent infrastructure.

Older systems are more vulnerable to failure, leading to higher maintenance costs and service disruptions. By identifying corridors where multiple systems have reached the end of their life, the Municipality can coordinate replacements to reduce emergency repairs and avoid repeated excavation.

This approach supports proactive renewal, bundled project delivery, and long-term system reliability.

Prioritization Schedule

1 — Highest Priority

- Storm sewer capacity significantly deficient
- All 3 systems “Old”
- Flagged sanitary issues (CCTV)
- Stormwater condition rating: 4–5

2 — Second Priority

- Storm sewer capacity moderately deficient
- 2 systems “Old”
- No major flags
- Stormwater rating: 3–4

3 — Third Priority

- 1 system “Old”, Other systems mid-life or newer
- No major flags
- Stormwater rating: 2–3

4 — Fourth Priority

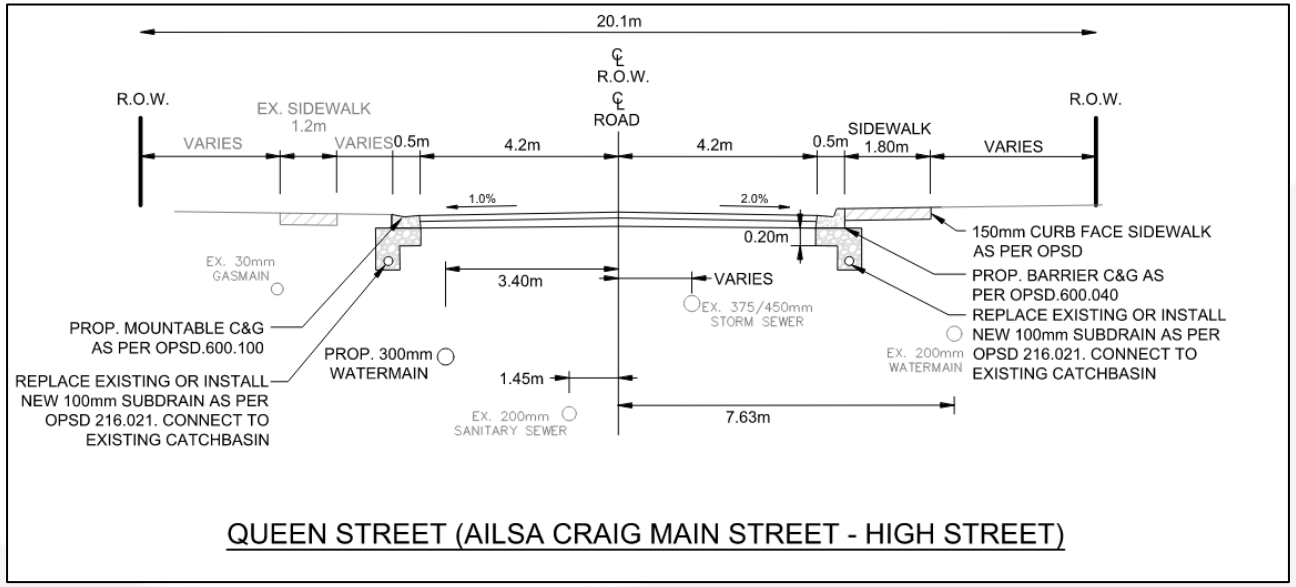
- Systems generally newer
- Stormwater rating: 1–2
- No major flags

Street Replacement Priorities

1 (Highest Priority)
2 (Medium Priority)
3 (Lowest Priority)

Conclusion

- Assessment of existing system performance completed using municipal guidelines.
- Undersized infrastructure was identified for each catchment.
- Proposed pipe sizing completed following the same approach.
- Adjacent infrastructure age was cross-referenced to determine most might-risk areas.



References

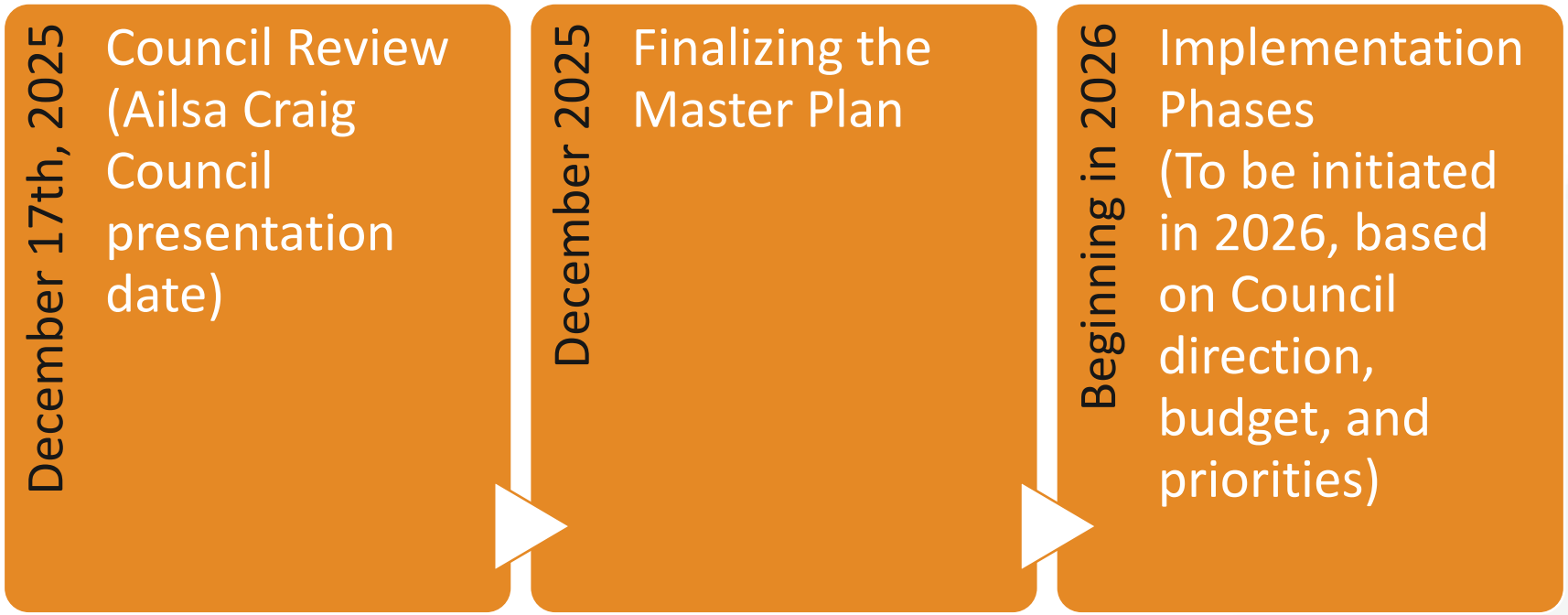
- Municipality of North Middlesex. Infrastructure Design Guidelines and Construction Standards (2025)
- Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA, 2022)
- Ontario Ministry of Transportation Highway Drainage Design Standards (HDDS, 2008)
- Ministry of the Environment Stormwater Management Planning and Design Manual (SWMPDM, 2003)

Next Steps

Following the Public Information Centre, we will:

- Review public feedback to better understand the priorities of Ailsa Craig residents and stakeholders.
- Refine the identified stormwater system needs, issues, and opportunities based on input received.
- Finalize recommended solutions for each servicing area within the Ailsa Craig urban boundary.
- Present the Master Plan Report and recommendations to North Middlesex Council.

Next Steps


December 17th, 2025
Council Review (Ailsa Craig Council presentation date)
December 2025
Finalizing the Master Plan
Beginning in 2026
Implementation Phases (To be initiated in 2026, based on Council direction, budget, and priorities)

Next Steps

Please visit the community website (www.northmiddlesex.on.ca) for study updates and more information.

Please forward any comments prior to November 24, 2025, to either of the contacts below.

Faishal Diwan, B. Eng
Manager of Infrastructure
Municipality of North Middlesex
T 519-294-6244 ext 3218
Email: faishald@northmiddlesex.on.ca

Cameron Rickert
Stormwater Engineer
EXP Services Inc.
Phone: 519-963-3000
Email: cameron.rickert@exp.com

PIC Sign-in Sheet

PUBLIC INFORMATION CENTRE
AILSA CRAIG STORMWATER MANAGEMENT MASTERPLAN
MONDAY, NOVEMBER 10TH, 2025, 5:00 P.M. TO 7:00 P.M.

Sign-in Sheet

Name	Address	Contact Number	Email
[redacted]			

Information will be collected in accordance with the *Freedom of Information and Privacy Act*. With the exception of personal contact details, all information will become part of the public record.

Comments Received

PUBLIC INFORMATION CENTRE
AILSA CRAIG STORMWATER MANAGEMENT MASTERPLAN
MONDAY, NOVEMBER 10TH, 2025 5:00 P.M. TO 7:00 P.M.

COMMENT SHEET

You are invited to provide comments on the materials presented today (November 10th, 2025).

Please complete this comment sheet and leave it with us today or send it prior to Monday, December 1st, 2025, to either of the contacts below:

Faishal Diwan, B.Eng.
Manager of Infrastructure
Municipality of North Middlesex
229 Parkhill Main Street
Parkhill, ON N0M 2K0
Phone: 519-294-6244 ext. 3218
Email: faishald@northmiddlesex.on.ca

Cameron Rickert, P.Eng.
Stormwater Engineer
EXP Services Inc.
15701 Robin's Hill Road
London, ON N5V 0A5
Phone: 519-963-3000
Email: cameron.rickert@exp.com

COMMENTS:

Good Display with info

Staff + local Reps very willing to share info and listen to comments

Looking forward to seeing posting of info on line & studying info in more detail

NAME:	[redacted]
ADDRESS:	[redacted]
TELEPHONE:	[redacted]
EMAIL:	[redacted]

Information will be collected in accordance with the *Freedom of Information and Privacy Act*. With the exception of personal information, all comments will become part of the public record.

North Middlesex

PUBLIC INFORMATION CENTRE
AILSA CRAIG STORMWATER MANAGEMENT MASTERPLAN
MONDAY, NOVEMBER 10TH, 2025 5:00 TO 7:00 P.M.

COMMENT SHEET

You are invited to provide comments on the materials presented today (November 10th, 2025).

Please complete this comment sheet and leave it with us today or send it prior to Monday, December 1st, 2025, to either of the contacts below:

Faishal Diwan, B.Eng. **Manager of Infrastructure** **Municipality of North Middlesex** 229 Parkhill Main Street Parkhill, ON N0M 2K0 Phone: 519-294-6244 ext. 3218 Email: faishald@northmiddlesex.on.ca	**Cameron Rickert, P.Eng.** **Stormwater Engineer** **EXP Services Inc.** 15701 Robin's Hill Road London, ON N5V 0A5 Phone: 519-963-3000 Email: cameron.rickert@exp.com

COMMENTS: should be curb put on east side of Queen St north of Church St. and put culverts in road ditch between lanes and fill in ditch. It will just be a maintenance problem as gravel from shoulder washes in to ditch and will plug culverts in lane if not maintained often. The is very little shoulder on that road so with ditch filled in it would be better. Car & truck just stop on road and traffic drives like the Indy 500 and would look better
Note: There is a 24" plastic storm sewer on east side of ~~Church~~ Queen St from gulley to maybe Church St

Shoul[d] wash out in fron[t] of 86 Queen Ro[ad]!

NAME: [redacted]

ADDRESS: [redacted]

TELEPHONE: [redacted]

EMAIL: [redacted]

From: Alyssa Speiran
Sent: Wednesday, November 26, 2025 2:46 PM
To: Alyssa Speiran
Subject: FW: Storm Management Master Plan Ailsa Craig

From: [redacted]
Sent: 24 November 2025 13:12
To: Carolyn Tripp <carolynt@northmiddlesex.on.ca>; Brian Ropp <mayor@northmiddlesex.on.ca>; Bill Irwin <billi@northmiddlesex.on.ca>; Faisal Diwan <faisald@northmiddlesex.on.ca>; Nick Wolfs <nickw@northmiddlesex.on.ca>; Cameron Rickert <Cameron.Rickert@exp.com>
Subject: Storm Management Master Plan Ailsa Craig

[You don't often get email from [redacted]. Learn why this is important at https://aka.ms/LearnAboutSenderIdentification]

[CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe]

Dear Sirs and Madam,
Unfortunately, I did not receive notification of the Nov 10, 2025 meeting regarding the above. I am the property owner at [redacted]Rabbitwood Court, Ailsa Craig. However, I have reviewed the materials presented via power point at said meeting and have the following concerns:

1. Rabbitwood cul de sac is significantly below the grade of Church and Ness Street. My house is particularly vulnerable because there is drainage to my property from two above neighbours, the [redacted] properties.

2 . With respect to anticipated increased rainfall due to climate change, there has already been a washout (spring 2025) due to extremely heavy rainfall over a short period of time of the retaining blocks from the municipal storm drain which runs along my north property line into the Ausable-Bayfield watercourse, a tributary to the Ausable River. Nick Wolfs came to inspect and I have been advised that the drain retaining blocks are to be repaired by the municipality and are in the repair queue. To my knowledge, no repairs have taken place.

4. There has been at least one major flood on our street that was beyond the capacity of the current drainage system. Water was pooled for many hours. The 2 storm drain manhole covers are located at the end of my driveway adjacent to the curb and directly across the street at the curb.

With the above concerns in mind, I feel that Rabbitwood as part of Drainage zone A requires higher prioritization than your presentation suggests.

Please notify me of further public meetings regarding drainage plans so that I may attend.

Thankyou for your attention to these matters,

Sincerely,

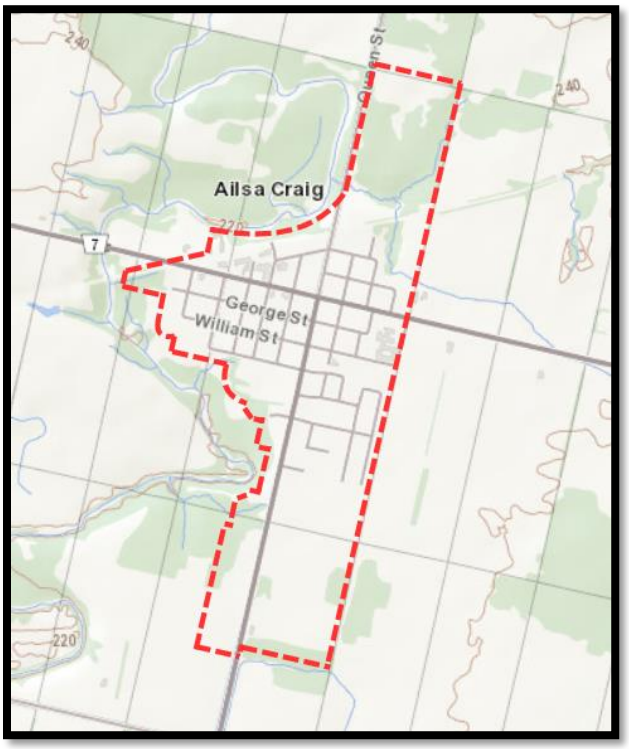
Request for Information Letters

Darren Ungar, Management Biologist
MNRF Aylmer
darren.ungar@ontario.ca

September 9, 2025

SUBJECT: Request for Information – Stormwater Upgrade Implementation Strategy for the area of Ailsa Craig (Municipality of North Middlesex)

EXP Services Inc. has conducted an initial background search for aquatic and terrestrial ecosystem information within the project limits (red dashed line in map below). **At this time, we are requesting that your staff review our assembled background information and provide any supplemental information that they may have**. Our intent is to ensure that all natural heritage values are captured within the project limits.



We greatly appreciate your attention to this timely matter. Please contact me if you would like to discuss the project further.

Thank you very much,

Alastair Ross, Senior Environmental Manager
EXP Services Inc.

Attachment: Initial Natural Heritage Background Search

Initial Natural Heritage Background Search: Request for Confirmation and Supplementation

An initial natural heritage background search for this assignment has been completed using the following sources:

- NHIC data from 'Make a Map: Natural Heritage Areas'
- e-Bird
- Ontario Reptile and Amphibian Atlas
- Natural Heritage Information Centre (NHIC) database – 1 km squares
- Land Information Ontario (LIO) Shapefiles/Feature Classes including: Aquatic Resource Area Line Segment, Waterbodies, Wetlands, Wintering Areas, Conservation Reserves, Provincial Park Regulated, Crown Game Preserve, ANSI, Spawning Areas, Wintering Area, Nesting Site, Aquatic Feeding Area, Staging Area Wildlife
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Map
- Google Earth aerial images

This project is located within the Aylmer District MNRF jurisdiction, situated within the St. Thomas Ecodistrict 7E-2. The natural heritage features are listed below. Please confirm and supplement as appropriate.

Species at Risk

<u>Endangered</u>

- Northern Riffleshell (Endangered: SARO and COSEWIC)
- Kidneyshell (Endangered: SARO and COSEWIC)
- Lake Sturgeon (Great Lakes – Upper St. Lawrence River population) (Endangered: SARO)
- False Hop Sedge (Endangered: SARO and COSEWIC)

<u>Threatened</u>

- Wavy-rayed Lampmussel (Threatened: SARO)
- Eastern Sand Darter (Southwestern Ontario Population) (Threatened: SARO and COSEWIC)
- Lake Sturgeon (Great Lakes – Upper St. Lawrence River population) (Threatened: COSEWIC)
- Eastern Meadowlark (Threatened: SARO and COSEWIC)

Significant Wildlife Habitat

<u>Species of Special Concern</u>

- Wavy-rayed Lampmussel (Special Concern: COSEWIC)
- Riddell's Goldenrod (Special Concern: SARO and COSEWIC)

- Midland Painted Turtle: (Special Concern: COSEWIC)
- Grass Pickerel (Special Concern: SARO and COSEWIC)
- Snapping Turtle (Special Concern: SARO and COSEWIC)
- Northern Sunfish (Great Lakes – Upper St. Lawrence populations) (Special Concern: SARO and COSEWIC)
- Eastern Milksnake (Special Concern: COSEWIC)
- Northern Map Turtle (Special Concern: SARO and COSEWIC)
- Eastern Wood-pewee (Special Concern: SARO and COSEWIC)

Wildlife Concentration Areas

- None within the study area

Specialized Habitats for Wildlife

- None within the study area

Special Land Use Designations (i.e. ANSI, Provincial Park, Provincially Significant Wetlands etc.): None with the study area

Fisheries: The river valley of the Ausable River passes through the edge of the study area. The species within the watercourse includes: Baitfish, Blackside Darter, Bluegill, Bluntnose Minnow, Brook Stickleback, Brown Bullhead, Carps and Minnows, Central Mudminnow, Central Stoneroller, Common Carp, Common Shiner, Creek Chub, Emerald Shiner, Golden Redhorse, Green Sunfish, Greenside Darter, Hornyhead Chub, Johnny Darter, Johnny Darter x Tesselated Darter, Largemouth Bass, New World Silversides, Northern Hog Sucker, Northern Pike, Northern Sunfish, Pikes, Pumpkinseed, Rainbow Darter, Rainbow Trout, Redfin Shiner, River Chub, River Redhorse, Rock Bass, Rosyface Shiner, Silver Redhorse, Smallmouth Bass, Spotfin Shiner, Spottail Shiner, Sticklebacks, Stonecat, Striped Shiner, Suckers, Walleye, White Bass, White Sucker, and Yellow Bullhead. The permitted in-water work window based on the species present is July 1 to March 31.

No wetland systems are present in the study area.

Kari Jean, Aquatic Biologist
Ausable Bayfield Conservation Authority
kjean@abca.ca

September 9, 2025

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No wetland systems are present in the study area.

Request for Information Correspondence

Outlook

FW: Ailsa Craig - Ecology Information Request

From Kaitlyn Tse <kaitlyn.tse@exp.com>
Date Tue 9/23/2025 4:30 PM
To Alastair Ross <Alastair.Ross@exp.com>; Alyssa Speiran <Alyssa.Speiran@exp.com>

1 attachment (216 KB)
Request for Information Stormwater Management Masterplan for the area of Ailsa Craig (MNRF Aylmer).pdf;

FYI for the ecology information regarding Ailsa Craig.

Kaitlyn Tse
EXP | Environmental Planner
t : +1.905.695.3217, 63741 | e : kaitlyn.tse@exp.com
exp.com | *legal disclaimer*
keep it green, read from the screen

From: Ungar, Darren (MNR) <Darren.Ungar@ontario.ca>
Sent: Tuesday, September 23, 2025 4:16 PM
To: Kaitlyn Tse <kaitlyn.tse@exp.com>
Subject: FW: Ailsa Craig - Ecology Information Request

Good afternoon, Kaitlyn,

Thank you for contacting the ministry seeking any additional natural heritage information for the area of Ailsa Craig as described in the attached PDF. The Government of Ontario is committed to transparency, customer service, and making information more publicly accessible. Access to natural heritage information is critical to informing municipal planning processes, development activities, and other initiatives such as science and research.

Natural Heritage Data Information Request

MNR has developed a Geohub webpage to assist you with accessing all the natural heritage data and values the Ministry of Natural Resources has available. The new page can be accessed here - Natural Heritage Data Access Requests. The new webpage not only consolidates all MNR natural heritage data into one location, it also functions as a self serve tool, outlines how to make data requests for MNR restricted data and includes links to the Natural Heritage Make a Map tool and natural heritage policies and documentation to reference when conducting a natural heritage screening exercise.

The information available from MNR and the sources listed and linked on the Geohub webpage should **not be considered as a substitute for site visits and appropriate field surveys.** Generally,

information available from MNR can be regarded as a starting point from which to conduct further field studies, if needed. While this data represents MNR's best available current information, it is important to note that a lack of information for a site does not mean that additional features and values are not present. There are many areas where MNR does not currently have information. On-site assessments can better verify site conditions, identify natural heritage features and values, and determine any potential environmental impacts that may result from a proposed activity.

I've reviewed our records, and **you have all the pertinent natural heritage information for your project location**. Please note, The Ministry of Environment, Conservation & Parks (MECP) is now responsible for the Endangered Species Act and SAR in Ontario. Any inquires about SAR should be directed towards MECP staff at SAROntario@ontario.ca

I hope this information helps. Let me know if you need anything further.

Thank you.

Darren Ungar
Management Biologist | Aylmer/Guelph District
Ministry of Natural Resources & Forestry | Ontario Public Service
226-962-6870 | darren.ungar@ontario.ca

Ontario

Taking pride in strengthening Ontario, its places and its people

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From: Kaitlyn Tse <kaitlyn.tse@exp.com>
Sent: September 9, 2025 10:33 AM
To: Ungar, Darren (MNR) <Darren.Ungar@ontario.ca>
Cc: Alastair Ross <Alastair.Ross@exp.com>; Alyssa Speiran <Alyssa.Speiran@exp.com>
Subject: Ailsa Craig - Ecology Information Request

Hi Darren,

Please see the attached information request letter for the area of Ailsa Craig. If you have any questions, please let me know!

Best,

Kaitlyn

Kaitlyn Tse
EXP | Environmental Planner
t : +1.905.695.3217 | e : kaitlyn.tse@exp.com
220 Commerce Valley Drive West

Suite 110
Markham, ON L3T 0A8
CANADA

Outlook

Ailsa Craig - Ecology Information Request

From Kaitlyn Tse <kaitlyn.tse@exp.com>
Date Tue 9/9/2025 10:37 AM
To kjean@abca.ca <kjean@abca.ca>
Cc Alyssa Speiran <Alyssa.Speiran@exp.com>; Alastair Ross <Alastair.Ross@exp.com>

1 attachment (219 KB)

Request for Information Stormwater Management Masterplan for the area of Ailsa Craig (Municipality of North Middlesex - ABCA).pdf;

Hi Kari,

Please see the attached information request letter for the area of Ailsa Craig. If you have any questions, please let me know!

Best,

Kaitlyn

Kaitlyn Tse
EXP | Environmental Planner
t : +1.905.695.3217 | e : kaitlyn.tse@exp.com
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