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PLANNERS & ENGINEERS

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Tullamore Secondary Plan Area, Town of Caledon

Master Environmental Servicing Plan Update

November 2025

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Part of Lot 1, Concession 1, Geographic Township of Albion,
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1. Executive Summary

A Master Environmental Servicing Plan (MESP) was prepared for the Tullamore Secondary Plan Area for the Town of Caledon by AGRA Earth & Environmental Limited in 2000. The MESP provided an inventory of the planning, environmental and stormwater servicing constraints and opportunities for the area and made a series of recommendations with respect to the management of the area as development occurs.

This Master Environmental Servicing Plan Update (MESPU) has been prepared by The Jones Consulting Group to provide an update to the MESP with an overview of current natural environmental and stormwater management issues, and a summary of the development status for the properties within the Tullamore Secondary Plan Area. The MESPU summarizes the changes that have occurred in the vicinity in the intervening 25 years and provides recommendations with respect to the development of the remaining undeveloped lands on the east side of Mayfield Road ("Study Area") as the properties outside of this limit are generally developed, under construction or have an active planning file with the municipality.

The entire TSPA encompasses an area of approximately 118 hectares (292 acres) located on the north side of the Airport Road (Regional Road 7) and Mayfield Road (Regional Road 14) intersection in the southern portion of the Town of Caledon, neighbouring the City of Brampton. The Study Area and is generally rectangular in shape and includes thirteen property owners, spanning across approximately 57 hectares (141 acres), bordered on the west by Airport Road, to the south by Mayfield Road, Salt Creek (a tributary of the East Humber River sub-watershed) to the east and an existing commercial-industrial development to the north.

The TSPA limits are illustrated on the Town's online Address Search Map and is provided in **Figure 1** with the Study Area boundary identified in red.

Figure 1: Tullamore Secondary Plan Area Map

The Study Area landowners have prepared a Draft Plan of Subdivision and completed the supporting background studies that determined the preferred alternative for water and wastewater servicing, stormwater management, street lighting, traffic signals, utilities, and the road layout for the subdivision through consultation with the owners and the approval agencies.

This Master Environmental Servicing Plan Update has been prepared in support of the Draft Plan of Subdivision to confirm that the municipal infrastructure is available to support the build-out of the lands and to identify the environmental constraints and mitigation measures to ensure that the lands can be developed in accordance with the latest approval agency policies.

2. Introduction

The entire Tullamore Secondary Plan Area (TSPA) covers approximately 118 hectares (292 acres) of land primarily located in the northeast quadrant of Airport Road and Mayfield Road, in the south part of the Town of Caledon (Town), adjacent to the City of Brampton's Vales of Castlemore North Secondary Plan. The Tullamore Secondary Plan Area is the largest of the three Caledon Industrial / Commercial Centres, established by Official Plan Amendment (OPA) 114. The main objective of the Tullamore Industrial/Commercial Secondary Plan is to provide high quality development while respecting policies, land use, municipal servicing, transportation, environment and community design.

Various commercial and industrial developments have proceeded throughout the Secondary Plan independently. The lands west of Airport Road are municipally serviced and developed, under construction or have an active planning file (DCP) with the municipality, with access from Airport Road, Mayfield Road, and Perdue Court. The land in this area were sub-divided by a Plan of Subdivision 43M-1670; Town of Caledon File 21T-00001C. The north-eastern limits of the Secondary Plan have also been built-out, housing two large warehouse facilities with stormwater management (SWM) ponds and municipal services from Airport Road.

Based on this built-out status, the lands along the west side of Airport Road, and the existing developments on the east side of Airport Road, environmental constraints, stormwater management facilities and municipal servicing strategies have been established through consultation with the Town and approval authorities. This MESPU's current natural environmental review and summary of the stormwater management issues therefore focuses on the undeveloped lands on the east side of Airport Road and south of Davis Lane, referred to as the "Study Area". The Study Area encompasses the south-eastern corner of the Planning Area, is rectangular in shape, and covers an area of approximately 57 hectares. The Study Area includes thirteen property owners, bordered on the west by Airport Road, to the south by Mayfield Road, Salt Creek (a tributary of the East Humber River sub-watershed) to the east and an existing commercial-industrial development to the north

The Study Area and limits of the Secondary Plan Boundary with the Town's previous conceptual road pattern are illustrated in **Figure 2**.

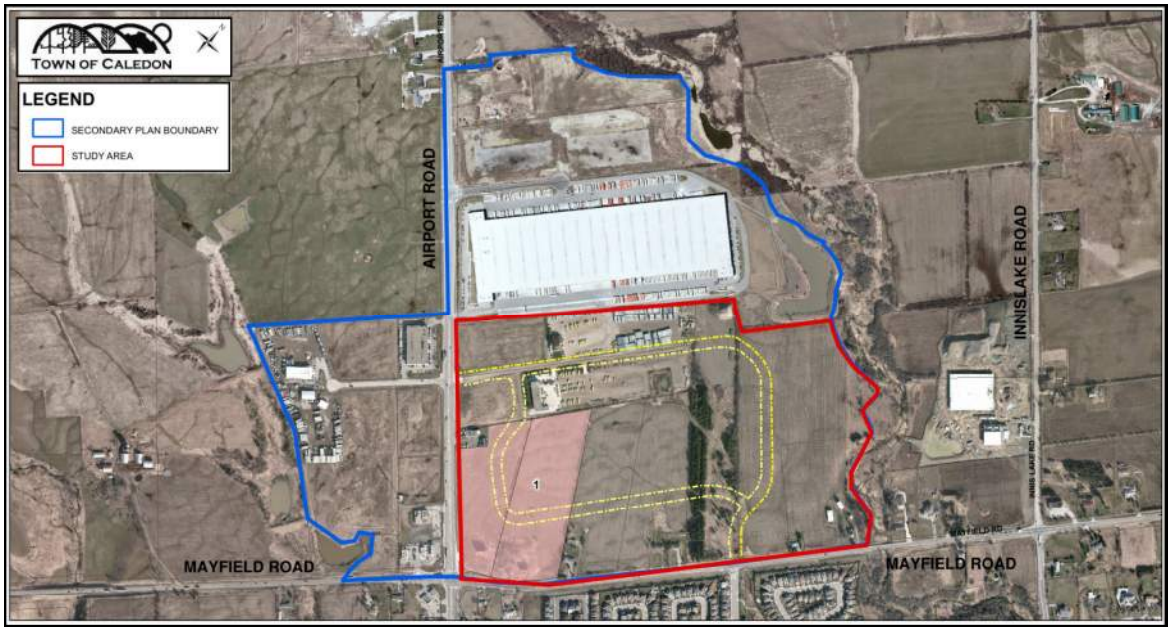

Figure 2: Tullamore Secondary Plan and Study Area Map

2.1. Appointment

The Jones Consulting Group Ltd. (TJCGL) has been retained by the Tullamore Secondary Plan Area landowner group to update the Tullamore Secondary Plan Area (TSPA) MESP and provide civil-municipal engineering services in support of the Study Area's Draft Plan of Subdivision.

The purpose of this MESPU is to summarize the previous studies and investigations completed for the TSPA and Study Area and adjacent lands and identify a servicing design and strategy that is consistent with the original MESP. The MESPU will ultimately establish the Study Area's Site Plan Application (SPA) development requirements for the future development blocks.

The following sections summarize the original MESP requirements, the current development status for the TSPA lands, and the existing environmental, stormwater and servicing constraints for the Study Area. Based on the MESP and current constraints the preferred municipal infrastructure (watermains, wastewater (sanitary) collection system, storm sewers, stormwater management facilities, stormwater conveyance for minor and major flows), roadways and access, grading, lot-level Low Impact Development (LID) controls, street lighting, traffic signals and utilities have been established.

2.2. Report Outline

This MESPU has been organized to provide a report summary in Section 1 followed by a brief overview of the general project information in Section 2. Sections 3 and 4 provide an up-to-date summary of the Tullamore Secondary Plan Area's development conditions for each property within the planning area. Section 5 identifies the existing municipal infrastructure surrounding the Study Area. Section 6 compiles the Study Area's available soil and geotechnical information. The Study Area's current environmental conditions, assessments, and recommendations are included in Section 7 and 8.

Based on background information, existing conditions, and environmental assessment recommendations, Section 9 includes the proposed Study Area conceptual development plan with the location of the future road network, environmentally protected channel, and stormwater management facilities. Section 9 provides an overview of the Study Area's development criteria and approval agency requirements. Section 10 provides the required stormwater controls for the Study Area concept plan based on the MESP Environmental Management Plan and recommendations.

The Study Area conceptual wastewater (sanitary) and water servicing requirements are provided in Sections 11 and 12, respectively. The Study Area internal right-of-way and Regional Road intersection connections requirements are discussed in Sections 14 and 15. Section 16 provides an overview of the Study Area utilities, street lighting, and traffic signals. Conclusions are provided in Section 17.

3. Tullamore Secondary Plan Area Description

The Tullamore Secondary Plan Area (TSPA) covers approximately 118 hectares (292 acres) of land located along Airport Road, north of Mayfield Road, in the south part of the Town of Caledon, adjacent to the City of Brampton's Vales of Castlemore North Secondary Plan. The Tullamore Secondary Plan Area is the largest of the three Caledon Industrial / Commercial Centres, established by Official Plan Amendment (OPA) 114. The Tullamore Secondary Plan Area is the largest of the three Caledon Industrial / Commercial Centres, established by Official Plan Amendment (OPA) 114. The main objective of the Tullamore Industrial/Commercial Secondary Plan is to provide high quality development while respecting policies, land use, municipal servicing, transportation, environment and community design.

Various commercial and industrial developments have proceeded throughout the Secondary Plan independently. The lands west of Airport Road are municipally serviced and developed, under construction or have an active planning file (DCP) with the municipality, with access from Airport Road, Mayfield Road, and Perdue Court. The land in this area were sub-divided by a Plan of Subdivision 43M-1670; Town of Caledon File 21T-00001C. The north-eastern limits of the Secondary Plan have also been built-out, housing two large warehouse facilities with stormwater management (SWM) ponds and municipal services from Airport Road.

Figure 3 illustrates each property's location and orientation, taken from the Town's online Address Search Map. **Table 1** summarizes the property information and statistics for the developments on the west side of Airport Road. **Table 2** summarizes the property information and statistics for the developments on the east side of Airport Road, outside of the Study Area limits.

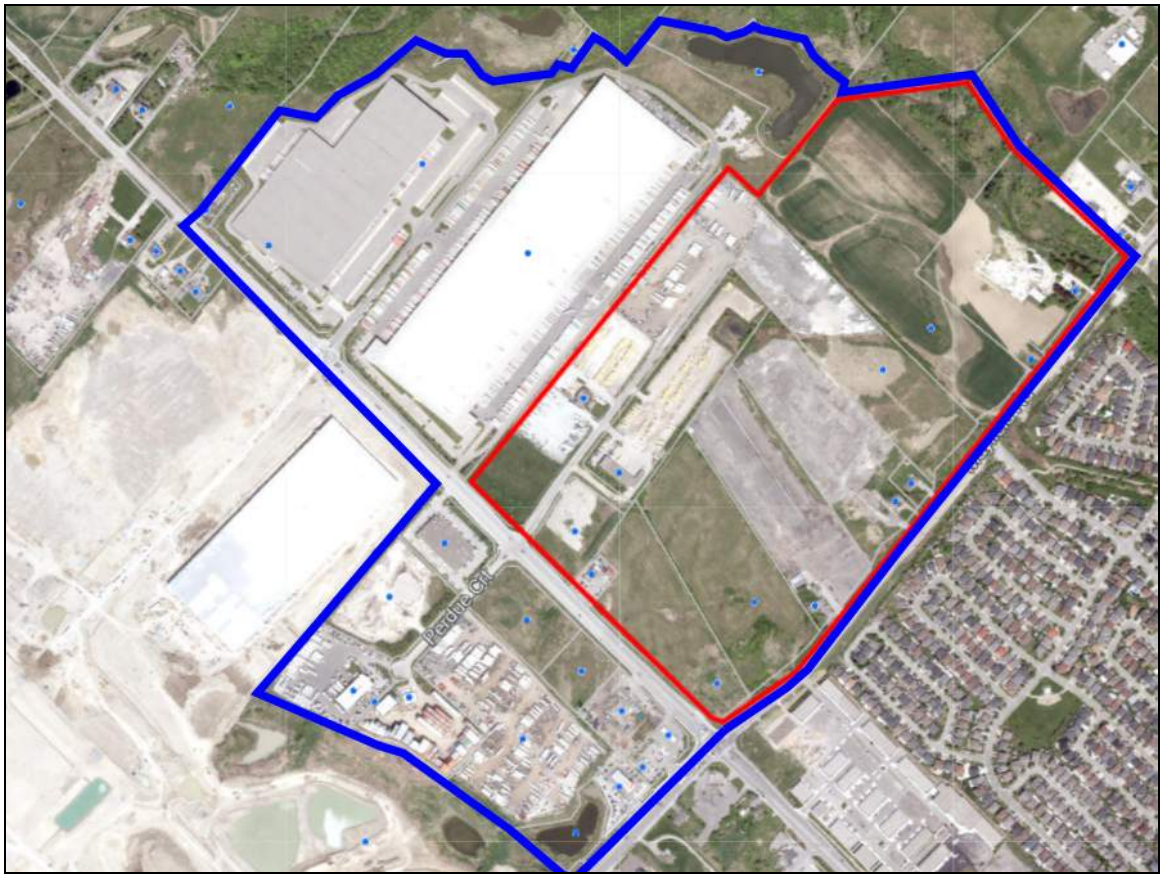

Figure 3: Tullamore Secondary Plan Area Properties

Table 1: TSPA Property Information and Statistics – West Side of Airport Road

Municipal Address	Existing / Proposed Development Name / Owner	Area (hectares)	Town File No.	Development Status
43 Perdue Court	ATS Container Services	2.02	SPA 2020-0043	Developed
34 Perdue Court	HCG the Harmon Group	2.24	SPA 07-20	Developed
33 Perdue Court	Black Hawk Transport	5.31	SPA 2024-0074	Developed/Active SPA application
22 Perdue Court	Strada Aggregates-Caledon Depot	2.47	SPA 2014-0070	Developed/Active minor variance application
11 Perdue Court/0 Airport Road	Harper Dell (TBC)	1.63	SPA 2024-0074	Active SPA application
10 Perdue Court	City Electric Supply Corporation	1.52	SPA 06-18	Developed
12016 Airport Road	Shell	0.29	N/A	Developed

12050 Airport	Caledon Sabi Farm	1.15	N/A	Developed
5866 Mayfield Road	Khalsa Business Centre Inc	0.60	SPA 2019-0061	Under construction
5998 Mayfield Road	Tim Horton's	0.28	N/A	Developed
		17.51		

Table 2: TSPA Property Information and Statistics – East Side of Airport Road Outside of Study Area

Municipal Address	Existing Development Name	Area (hectares)	Town File No.	Development Status
12203 Airport Road	Vitrans Logistics Warehouse (Tullamore Business Park)	22.81	SPA-05-64	Developed
12333 Airport Road	Airport Road Distribution Facility (Mayport Distribution Facility)	12.79	SPA 2015-0061	Developed
		35.60		

The above tables illustrate that all the properties outside of the Study Area limits are developed, under construction or have an active planning file with the municipality. The environmental constraints and stormwater management opportunities for these lands have been addressed through there respective planning and building permit applications.

3.1. Study Area Description

The Study Area is generally rectangular in shape, with a total area of approximately 57.6 hectares. The site is located at the northeast corner of the intersection of Mayfield Road and Airport Road. The Study Area is bounded to the north by an existing distribution warehouse development, to the east by Salt Creek, to the west by 600 m of municipal right-of-way frontage on Airport Road, and to the south by 1,200 m of frontage on Mayfield Road. The Study Area consists of thirteen separate properties with varying sizes and shapes. **Figure 4** illustrates each property's location and orientation, and **Table 3** summarizes the property information and statistics.

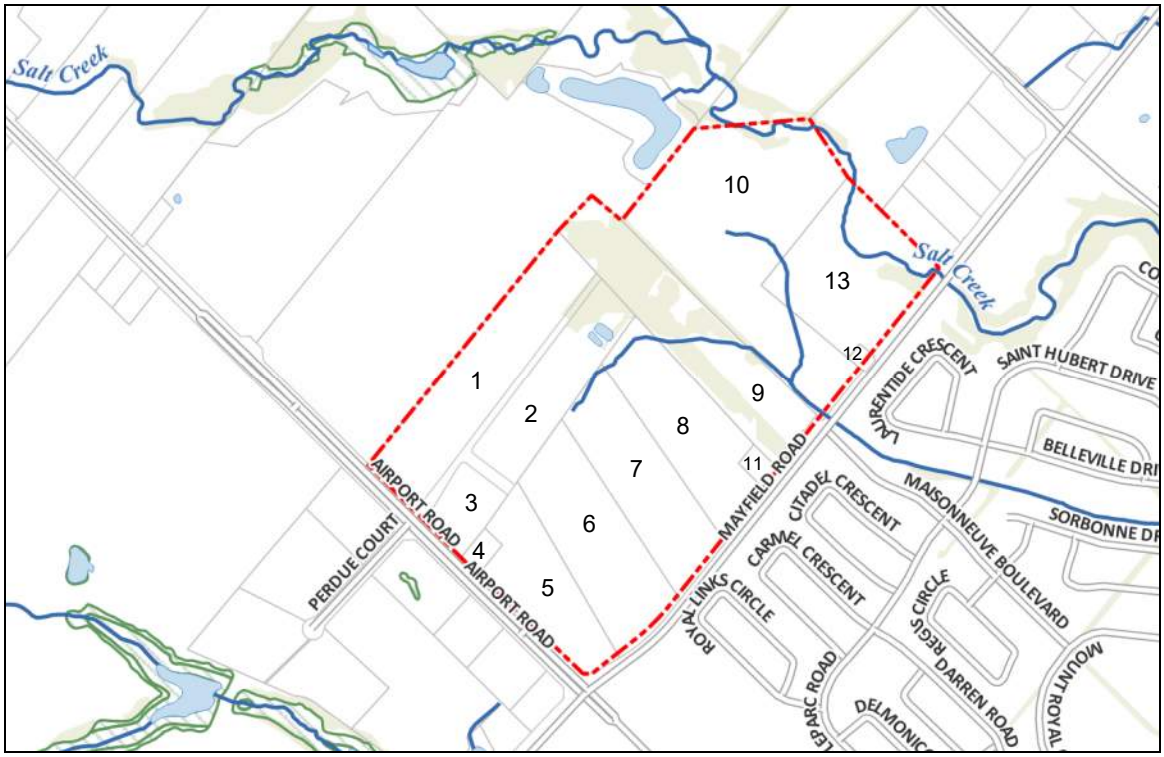

Figure 4: Study Area Properties

Table 3: Study Area Property Information and Statistics

Property Ref. No.	Municipal Address / Legal Description	Existing / Proposed Development Name / Owner	Area (hectares)	Town File No.	Development Status
1	12151 Airport Road	Millennium Tire Airport 12151 Inc.	6.38	21T-25006C	No formal SPA yet – pre-consultation only
2	12117 Airport Road	Fateh Transport Formerly Laidlaw Transit	4.47	SPA 2002-0012	Approved SPA
3	Part 3 Plan 43R-36141	Preet Transport Carrier Inc.	1.82	N/A	Pre-consultations Only
4	12101 Airport Road	Motorway Sales and Service / Infinity Indian Cuisine	0.31	N/A	Pre-consultations Only
5	0 Airport Road Part 1 Plan 43R-34197	SmartCentres	3.81	RZ 2021-0014 POPA 2021-0008	Rezoning and official plan amendment have been approved
6	6034 Mayfield Road	SmartCentres	5.63	RZ 2021-0014 POPA 2021-0008	Rezoning and official plan amendment have been approved

7	6086 Mayfield Road	Falcon Express Group Inc. 6086 Mayfield Inc.	5.11	21T-25006C	No formal SPA yet – pre-consultation only
8	6186 Mayfield Road	2652876 Ontario Ltd. M&M Carriers	4.92	21T-25006C	No formal SPA yet – pre-consultation only
9	6230 Mayfield Road Part 1 Plan 43R11401	Millenium Tire 6230 Mayfield Inc.	6.66	21T-25006C	No formal SPA yet – pre-consultation only
10	PT LT 1 CON 1 Albion	Tullamore Industrial Park	12.02	N/A	
11	6206 Mayfield Road	Residential Dwelling	0.33	N/A	
12	6296 Mayfield Road	Residential Dwelling	0.14	N/A	
13	6340 Mayfield Road	Residential Dwelling / Farm	6.01	N/A	
Total			**57.60**		

3.2. Summary of Study Area Current Site Conditions

Currently, the Study Area is partly developed (some non-permitted developments) and being utilized for industrial usages (i.e. trucking operations) at 12151 Airport Road, 12117 Airport Road, 6086 Mayfield Road, 6186 Mayfield Road and 6230 Mayfield Road. The non-permitted developments are not in the ultimate conditions, and the current state of the sites have no bearing on the future ultimate development of the subdivision. Lands not in compliance with the Draft Plan of Subdivision will be required to go through the formal site plan process once the final draft plan conditions are approved. There are also four residential/farmhouse dwellings fronting on Mayfield Road and a commercial plaza (car lot, convenience store) fronting on Airport Road.

The trucking operation sites at 12151 and 12117 Airport Road are accessed from Davis Lane and generally consist of an office building surrounded by gravel parking lots. The 6086, 6186, and 6230 Mayfield Road sites are similar with access from Mayfield Road and the residential dwellings converted to office buildings. The remainder of the site is undeveloped, consisting of highly disturbed meadows communities that were formerly agricultural and/or treed lands.

Davis Lane is a gravel laneway owned by the Town with ditches that provides access to three private properties know as Fateh Transport (formerly Laidlaw Transit Ltd.) at 12117 Airport Road, Millenium Tire at 12151 Airport Road, and Preet Transport Carriers at Part 3 Plan 43R-36141 (Property No. 3). The Fateh Transport property has sanitary and water services from Airport Road and a stormwater management

pond at the south-eastern limit of the development that was constructed through the site plan approval process with the Town.

There are several small drainage courses within the Study Area that collect local stormwater runoff and ultimately drain to a tributary of Salt Creek south of the site, adjacent to Maisonneuve Boulevard. As the downstream limits of the tributary is known to contain habitat for Redside Dace, the existing on-site watercourse will be partially preserved and extended with a proposed environmentally protected (EP) channel, dividing the Study Area into west and east portions. Previous on-site reviews with staff from the consultant team, MNRF, TRCA and Town confirmed that the portion of the tributary within the Study Area does not contain Redside Dace. Additional details for the EP channel have been provided in the subsequent sections of this report.

A detailed *Natural Hazards Assessment* has been completed by the TRCA for Salt Creek, and as such, the development setback limits have been established at the east side of the site adjacent to the creek. Further reference to the Study Area within this Report shall mean the developable area outside of the Salt Creek setback limits. The relevant TRCA flood mapping information is provided in **Appendix A.4**. Further descriptions of the existing servicing infrastructure, drainage conditions and soils information are described in a subsequent section of this report. The Study Area's existing conditions are shown in **Figure 5**.

Figure 5: Existing Study Area Site Conditions

3.3. Study Area TRCA Violation

As the Toronto and Region Conservation Authority (TRCA) is aware, fill was placed within TRCA regulated lands along a HDF on the property. In addition, twin CSP culverts were installed within the unnamed drainage feature to Salt Creek. These works were completed without a TRCA work permit and are therefore project activities in violation of the former Ontario Regulation 166/06 (now Ontario Regulation 41/24). The following does not specifically comment on the TRCA violation or provide specific remediation works. It is understood that TRCA provided two options for resolving this violation and that TRCA requested either a full or partial removal of the fill material along with restoration requirements to resolve the violation. However, it is our understanding that the preferred option is to address the TRCA violation though a condition of site plan approval and will be resolved as part of the construction of servicing and subsequent landscaping to be undertaken as part of the development.

4. Background Information

The following summarizes the previous reports and background studies completed for the Tullamore Secondary Plan Area and adjacent lands.

4.1. Town of Caledon Official Plan

The Tullamore Secondary Plan Area industrial/commercial centre was established by Official Plan Amendment (OPA) 114. The Town's commercial development's policies primary focus is to provide commercial services to the travelling public and local residences. The OP further specifies that the directive of the industrial areas is to *concentrate industrial activities and employment opportunities within the Town; maximize use of available sanitary, water, and transportation infrastructure; and provide locations for industrial growth proximate to larger markets to the south and east*.

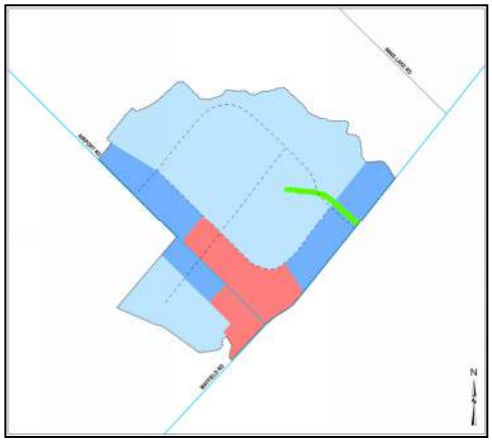

Figure 6: OP Schedule N Tullamore Land Use Area (2008)

The entire Tullamore Secondary Plan Area covers approximately 118 hectares (292 acres) of land primarily located in the northeast quadrant of Airport Road and Mayfield Road, in the south part of the Town of Caledon, adjacent to the City of Brampton's Vales of Castlemore North Secondary Plan. The Secondary Plan Area is bounded on the east and west sides by Salt Creek and a western branch of the West Branch of the Humber River reach, respectively.

The Town's Official Plan (OP) Schedule N - Tullamore Land Use Area shows the site is designated a mix of prestige industrial, general industrial, highway commercial, with an environmental policy area over the existing ditch that outlets to Mayfield Road. The OP specifies that Tullamore has a historical established population of 50. The 2008 OP Schedule N showed the eastern portion of the area with an internal network of three roadways looping through the subdivision connecting to Mayfield Road at Maisonneuve Boulevard and two connections to Airport Road; refer to **Figure 6**.

Since the initial OP was established two (2) large commercial warehouses, Vitrans Logistics (12203 Airport Road) and the Mayport Distribution Facility (12333 Airport Road), have been developed in the north-east

quadrant of the Secondary Plan, eliminating the possibility of a northern loop road. As a result, the Town updated the OP Schedule N in March 2024 to eliminate the northern road loop; refer to **Figure 7**. **Table 4** generally summarizes the Study Area's OP land use areas and designations.

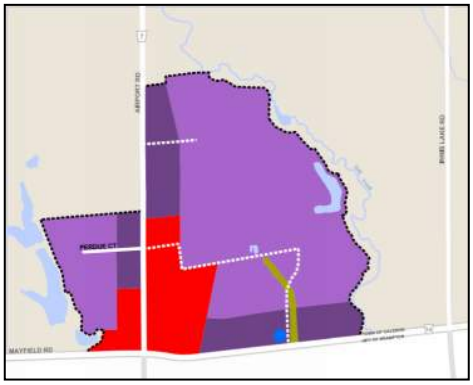

Figure 7: OP Schedule N
Tullamore Land Use Area (2024)

Table 4: Study Area Official Plan (2024) Land Use Areas and Designations

Land Use	Area (hectares)
Highway Commercial	13.5
Prestige Industrial	9.5
General Industrial	27.6
Roads (26 m ROW)	0
Environmental Policy Area	1.2
Salt Creek Flood Plain	4.8
Total	57.6

The Town's Zone Map 4 (By-Law 2006-05) illustrates the Study Area's individual zoning designations and current hold restrictions. A copy has been attached in **Appendix A.2** for reference with an excerpt provided in **Figure 8**.

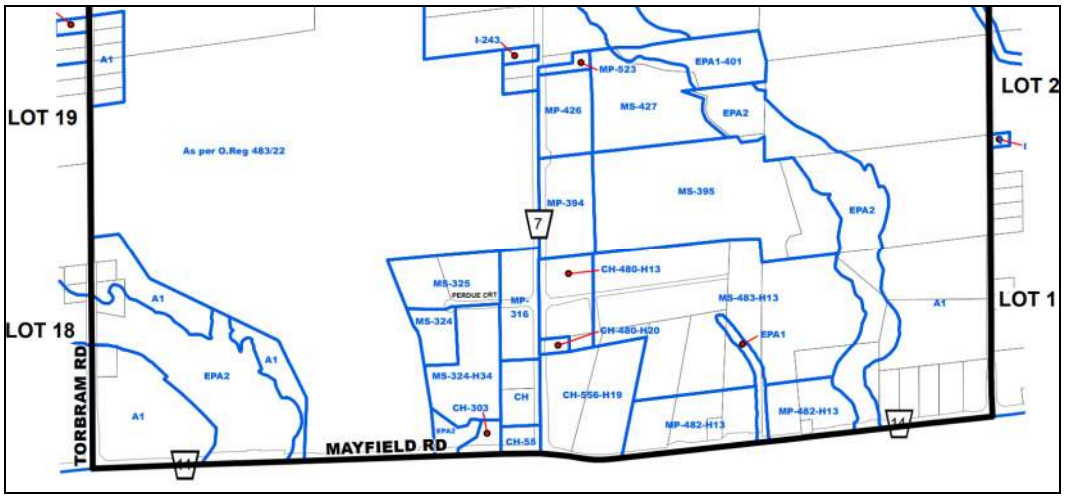

Figure 8: Town of Caledon Zone Map 4

The Town's commercial and industrial zoning by-law standards have also been included in **Appendix A.1**.

4.2. Tullamore Secondary Plan Area Master Environmental Servicing Plan

The Town retained AGRA Earth & Environmental Ltd. and Giffels Associates Ltd. to complete a Master Environmental Servicing Plan (MESP), dated June 2000, for the entire Tullamore Secondary Plan Area. The MESP provides an overview of natural environmental and stormwater management issues for the entire 118 hectare secondary plan. The document includes baseline information on the natural environment, including terrestrial, wildlife and aquatic resources, as well as surface water drainage and stormwater management options. Subsequent developments refer to this document to form the basis of their designs.

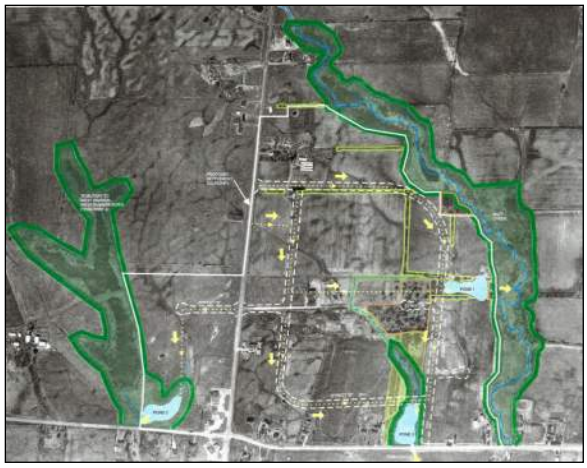

Figure 9: MESP Figure 5.2 - Environmental Management Plan

The MESP conceptual road pattern and SWM facilities are illustrated in the MESP Figure 5.2 – Environmental Management Plan. A copy of the full MESP has been attached in **Appendix A.2** with an excerpt of Figure 5.2 provided in **Figure 9**. The MESP Figure 3.1 – Existing Conditions Drainage Area Plan illustrates that the TSPA drainage areas are divided into four main tributaries with the Study Area split between Tributary 2 and 3. A copy of the Figure 3.1 has been attached in **Appendix A.2** with an excerpt provided in **Figure 10**.

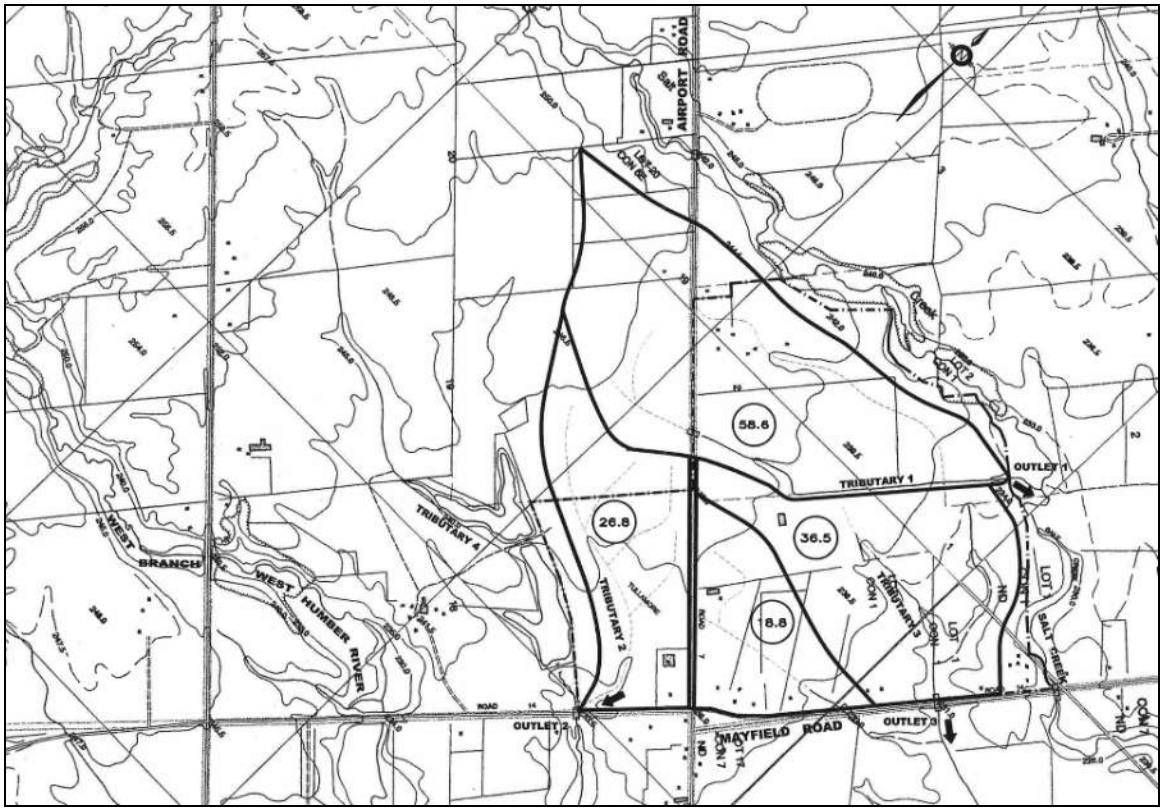

Figure 10: MESP Figure 3.1 – Existing Conditions Drainage Area Plan

The MESP concludes with a set of strategies, the key elements of which are:

- Provide definition of the valley top of banks and establish appropriate vegetative buffers to effectively isolate the development from the EPAs identified in the Salt Creek, Tributary 3 and Tributary 4 valley lands.

- Implement 3 quality and quantity stormwater management facilities that provide Level 1 protection to the receiving waters of Salt Creek, Tributary 3 and Tributary 4.

- Apply Distributed Runoff Control.

- Establish an integrated restoration area/stormwater pond in Tributary 3 to promote the linkage to Salt Creek through the Vales of Castlemore (North) development.

- Integrate restoration and stormwater management designs for the Tributary 1 and 2 watercourses, to maintain the ecological form and function of the adjacent valleys of Salt Creek and Tributary 4.

4.2.1. Official Plan Context

Since 2000 several planning changes have occurred. The most important to the TSPA is the evolution of the road pattern that is substantially different from the original MESP Environmental Management Plan. The area to the south of Mayfield has been urbanized and Maisonneuve Boulevard has been constructed. For traffic reasons, this determines the location of the future TSPA Study Area north-south road connection to Mayfield.

The evolution of the road pattern also impacts the Environmentally Protected Area. The MESP Tributary 3 outlet and Environmentally Protected channel extension into the City of Brampton is located on the east side of Maisonneuve Blvd. As a result, the Tributary 3 outlet and channel must continue along the east side of the new north-south road. The previous Environmental Management Plan illustrates the reverse, with the channel located west of the north south road. The proposed draft plan indicates that Tributary 3 would continue on the east side of the road extension. A storm pond is located on the west side of the road in the general location shown on the MESP. A second storm pond would need to be located on the east side of the road to service the future development of those lands.

4.3. Tullamore Community Design Guidelines

The Town retained Paul Cosburn and Associates Ltd. to prepare the *Tullamore Community Design Guidelines*, dated May 2000, which outlines the streetscape design components to be incorporated into the Study Area's detailed design. The report specifies that the subdivision shall have a primary entrance feature located at the intersection of the Airport Road and Mayfield Road and the Davis Lane and Airport Road and Mayfield Road and Maisonneuve Boulevard intersections/entrances are both to have secondary entrance features. These landscape design components and features will be coordinated with the parks and planning departments during the detailed design.

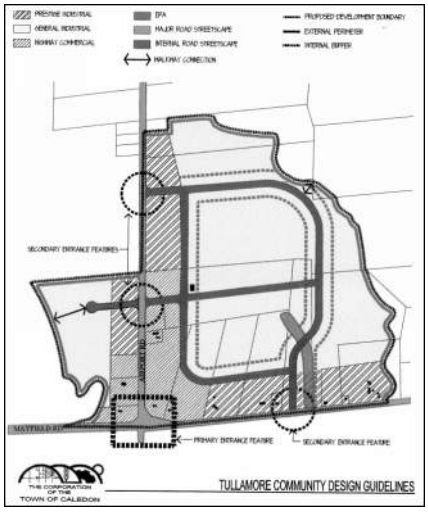

Figure 11: Tullamore Community Design Guidelines Plan

4.4. Castlemore North Secondary Plan – City of Brampton

The City of Brampton's Vales of Castlemore North Secondary Plan (Area 49) is located along the Study Area's southern boundary. Area 49 is an established subdivision housing a mix of residential, institutional and commercial developments, generally spanning from Mayfield Road to Country Side Drive and Airport Road to Goreway Drive.

The detailed engineering plans prepared by Candevcon Ltd. shows an existing wastewater (sanitary) sewer for future extension into the Study Area. There is also an existing 35 meter wide Open Space block along the east side of the Mayfield Road and Maisonneuve Boulevard intersection that will be extended into the Study Area. A copy of the subdivisions sanitary drainage area plans, and sewer design sheets have been attached in **Appendix A.5**.

Figure 12: Castlemore North Secondary Plan

4.5. Mayfield Road Improvements Class Environmental Assessment Study Report

The Region retained Stantec Consulting Ltd. To complete a *Municipal Class Environmental Assessment* (MCEA) *Environmental Study Report* (ESR) for *Mayfield Road Improvements*, from Airport Road to Coleraine Drive. The ESR, dated April 2013, provides the interim and ultimate framework for the Mayfield Road configuration and identifies a recommended alternative design concept for equal road widenings to minimize property impacts.

Figure 13: Mayfield Road EA Study Area

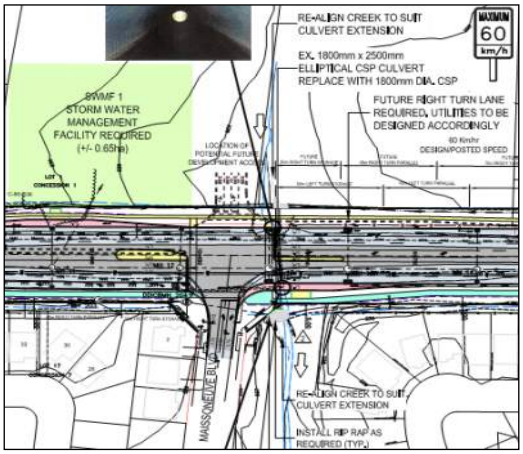

Figure 14: Mayfield Rd EA SWMF-1 Location

With regards to the Study Area limits, the ESR provides recommendations for replacing two of the existing road crossing culverts along the southern limit of the site, a conceptual road connection at the existing Mayfield

Road and Maisonneuve Boulevard intersection, and the construction of a stormwater management facility (SWMF 1) to control the right-of-way runoff adjacent to the future road connection. The ESR also recommends re-aligning the existing creek to suit the culvert extension.

A copy of the preferred alternative road alignment drawings across the Study Area have been attached in **Appendix A.2**.

4.6. Mayfield Road Improvements Detailed Design

The Region retained the IBI Group Inc. to complete the detailed design for the Mayfield Road improvements project, from Airport Road to Coleraine Drive. The design was completed in accordance with the Region's Mayfield Road EA Study Report recommendations with adjustments based on actual field measurements.

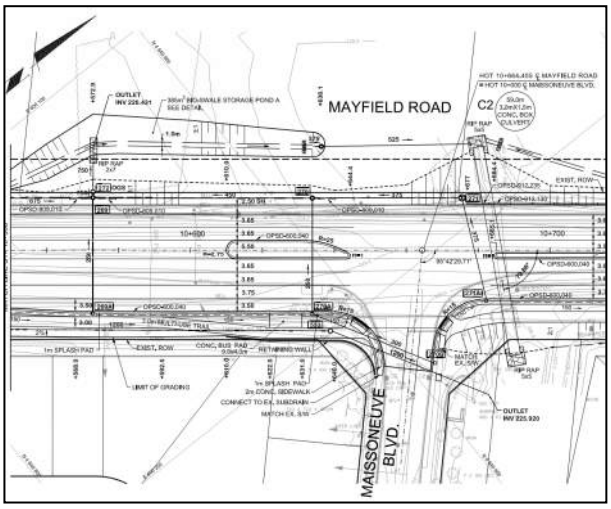

Figure 15: Mayfield Road Improvements - 60%-90% Design Drawing

The Region reviewed various stormwater control options within the future right-of-way limits, including underground storage and infiltration, to eliminate the need for any external stormwater management facilities (ponds), as shown in the Mayfield Road EA Study Report. The intention would be to reduce cost and scheduling delays for land acquisition and to allow the project to move forward independently of the Tullamore Study Area project.

The Region's design drawings illustrate a storm sewer system that collects most of the roadways hard surface area runoff and outlets to an oil-grit-separator and a bio-swale storage pond at the Study Area's proposed west pond location. The ROW's northern ditch and catchment area west of the road crossing culvert at 6186 Mayfield Road will by-pass the system, draining across the road to a sewer system that outlets to the Maisonneuve Boulevard EP channel. This catchment includes the SmartCentres lands at 0 Airport Road and 6034 Mayfield Road.

The Region's website notes that the Mayfield Road works are planned to start in early 2026 with utility relocation scheduled for 2025. A request was made to the Region for a copy of the latest submission drawings. The Region provided copies of the 60-90% plan and profile progress submission drawings. A review of the design confirmed that the sewers can convey the stormwater to the proposed Tullamore

SWM facility with some adjustments to the proposed design. The Mayfield Road storm system outlet invert will need to be raised by either insulating the pipe, adjusting the pipe type to elliptical pipes, raising the future Mayfield Road crossing culvert inverts or adjusting the Mayfield Road culvert dimensions. Additional requirements will be confirmed during the detailed design. A copy of the progress drawings are attached in **Appendix A.1**. Copies of the plan and profiles for the roadways existing conditions have also been attached.

4.7. Toronto Region Conservation Authority Watershed Mapping

The TRCA watershed map illustrates that the Study Area is in the Humber River Watershed, part of the Main Humber tributary. Salt Creek borders the area, running along the eastern boundary. The TRACA Flood Plain Mapping Program identifies this section of Salt Creek as HUM. 132. The TRCA Map Output does not show the EP designation over the existing ditch draining to the road crossing culvert at Maisonneuve Boulevard. Further, *Mayfield Road Improvements Class Environmental Study* drawing labels the ditch to be "*Re-align Creek to Suit Culvert Extension*"; refer to **Figure 14**. Through consultation with the TRCA we have obtained copies of the Salt Creek HUM watershed mapping data to establish the Study Area eastern development limits.

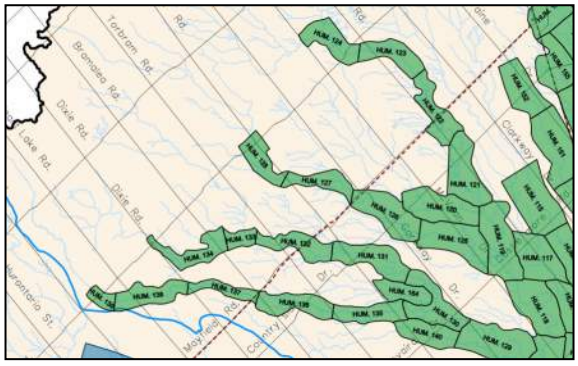

Figure 16: TRCA Humber River Watershed Map

4.8. West Side of Airport Road

4.8.1. Tullamore Industrial Subdivision – 43M-1670

The Tullamore Industrial Subdivision is located on the west side of Airport Road north of Mayfield Road in the southern portion of the Town of Caledon. The subdivision includes six industrial site plan blocks with access from Perdue Court via Airport Road. The AECOM engineering drawing set, dated 2003, illustrates that the subdivision is serviced with 300mm diameter watermains, hydrants, valves and a 250mm diameter sanitary sewer system. The subdivision municipal

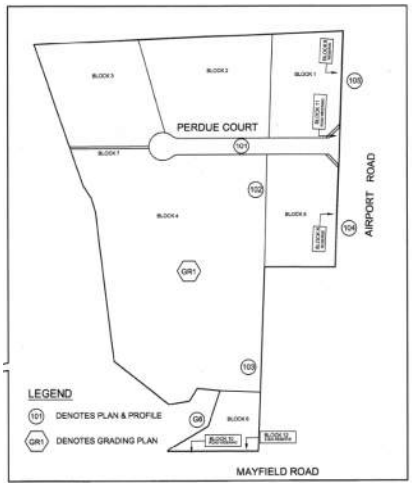

Figure 17: Tullamore Industrial

services are connected to the Airport Road infrastructure. Stormwater management is controlled and treated on site with a series of ditches, drainage channels, storm sewers and catch basins that collects and conveys runoff to the stormwater management facility located in the southwest corner next to Block 6. A copy of the AECOM engineering plans (43M-1670, Town File 21T-00001C) are provided in **Appendix A.2.**

4.8.2. 10 Perdue Court (Block 1) - Torbram Electric Supply

Torbram Electric Supply retained Schad Engineering to complete site servicing and grading design for a one storey warehouse development located at 10 Perdue Court in April 2006. The property, referred to as Block 1 in the Tullamore Industrial Subdivision, directs storm runoff to the internal storm sewers and conveys it to the Perdue Court storm system constructed as part of the Tullamore Industrial Subdivision. The site is also provided with municipal water and a sanitary service connected to the municipal infrastructure. A copy of the Schad Engineering plans (Town File SPA-06-18) are provided in **Appendix A.2.**

Figure 18: 10 Perdue Court

4.8.3. 22 Perdue Court (Block 2) - Strada Aggregates

Candevcon Limited were retained by Strada Aggregates in 2015 to provide engineering services for the aggregate site plan development located at 22 Perdue Court. The engineering services included site grading and servicing plans and a stormwater management report. The internal design of the site includes an onsite stormwater management pond. The site has been graded to direct storm runoff to an onsite stormwater management pond before being released to the subdivision's pond in Block 6 constructed as part of the Tullamore Industrial Subdivision works. A copy of the Candevcon Limited engineering plans (Town File SPA-2014-0070) are provided in **Appendix A.2.**

Figure 19: 22 Perdue Court

4.8.1. 34 Perdue Court (Block 3) - Harmon Transport

Harmon Transport retained A.M. Candaras Associates Inc. in 2007 to complete a stormwater management report and the site grading and servicing designs for the Harman Transport building located at 34 Perdue Court. The report identifies the quantity and quality controls required for the site based on the Tullamore Industrial Subdivision. The report also identifies the lot level quantity controls required for the site servicing design. A copy of the A.M. Candaras Associates Inc. engineering plans (Town n File SPA-07-20) are provided in **Appendix A.2.**

Figure 20: 34 Perdue Court

4.8.2. 43 Perdue Court (Part of Block 4) - ATS Containers Inc.

Urban Watershed Group Ltd. was retained by ATS Container Services Inc. to provide engineering services for the 43 Perdue Court development that included the site grading and servicing design and stormwater management report. Runoff from the northeast portion of the site is conveyed to the internal storm sewers located on the east side of the access road driveway before discharging to the Perdue Court storm sewer network. The runoff from the remainder of the site is directed towards the perimeter enhanced swale and towards the storm easement located at the southern portion of the site. The site is serviced by municipal water and a sanitary service from Perdue Court. A copy of the Urban Watershed Group engineering plans (Town File SPA-2020-0043) are provided in **Appendix A.2.**

Figure 21: 43 Perdue Court

4.8.3. 11 and 33 Perdue Court (Part of Block 4 and Block 5)

Luban Limited completed the engineering design and stormwater management report for the development located at 11 & 33 Perdue Court in 2024. Currently, 11 Perdue Court sits vacant, and 33 Perdue Court is being used as a tractor trailer parking lot. The design proposes a 2-storey office and cold storage warehouse building at 11 Perdue Court and a parking lot at 33

Figure 22: 11 and 33 Perdue Court

Perdue Court complete with onsite stormwater management controls including 100-year surface ponding areas, underground storage tanks, and an internal storm sewer network with subdrain leads for infiltration. Storm runoff subsequently drains to the Tullamore Industrial Subdivision Pond via the storm maintenance hole located at southern portion of the site. Water and sanitary services will be provided from Perdue Court. A copy of the Luban Limited engineering plans (Town File SPA-2024-0074) are provided in **Appendix A.2.**

4.8.1. 5866 Mayfield Road (Block 6) - Khalsa Business Centre Inc.

The Khalsa Business Centre Inc. retained Candevcon Limited to complete the site grading and servicing design and stormwater management report for the commercial site plan. The development consists of a motor vehicle repair facility equipped with an internal storm sewer system that collects and conveys the sites runoff to the neighboring stormwater management facility. The site is serviced by municipal water for fire protection and potable water demand. The sanitary effluent from the building is conveyed by a 200mm diameter PVC sanitary sewer connected to the maintenance hole within the Mayfield Road right-of-way. A copy of the Candevcon Limited engineering plans (Town File SPA-2019-0061) are provided in **Appendix A.2.**

Figure 23: 5866 Mayfield Road

4.9. East Side of Airport Road

4.9.1. 12203 Airport Road - Tullamore Business Park (Vitrans Logistics)

The Urbacon Buildings Group retained Counterpoint Engineering Inc. to complete the stormwater management plan, dated November 2005, to address the SWM design for part of the Tullamore Secondary Plan Area located immediately north of the Study Area at 12203 Airport Road. The industrial warehouse development (formerly Vitrans Logistics, now Loblaws)

Figure 24: 12203 Airport Road

consists of approximately 27.0 hectares and includes rooftop storage and an extended detention wet pond for SWM quantity and quality control at the properties south-east corner. The area represents part of the 58.6 hectare drainage area defined in the MESP draining to pond 1. The southern site entrance is a right-in only entrance from Airport Road. The facility's road network continues eastward around the building and then back to Airport Road where it also services the Mayport Distribution Facility development. The development is services with water and wastewater connections directly from Airport Road. The approval and construction of this development split the east side of the Tullamore Secondary Plan Areas north and south limits and necessitated the re-alignment of the future Study Area roads. A copy of the Counterpoint Engineering plans (Town File SPA-05-64) are provided in **Appendix A.2.**

4.9.2. 12333 Airport Road - Airport Road Distribution Facility (Mayport Distribution Facility)

Hopewell Development Corp. retained JSW+ Associates to complete a Functional Servicing Report and Stormwater Management Report in August 2013 for the Airport Road Distribution Facility located at 12333 Airport Road. The report references the MESP as well as the SWMR by Counterpoint Engineering, as the lands were included in the design of the existing SWM pond north of the Study Area (pond 1). The site is services with water and wastewater connections directly from Airport Road. A copy of the JSW+ Associates engineering plans (Town File SPA-2015-0061) are provided in **Appendix A.2.**

Figure 25: 12333 Airport Road

4.9.1. 6230 – 6340 Mayfield Road - Tullamore Industrial Park Functional Servicing Report (Study Area Property No. 9 and 10)

The former Tullamore South Landowners group retained IBI Group Inc. to complete a Functional Servicing Report in February 2009, to address the preliminary design for the municipal roads and services for the development of a large portion of the Study Area's eastern lands. The report outlines preliminary servicing recommendations given that

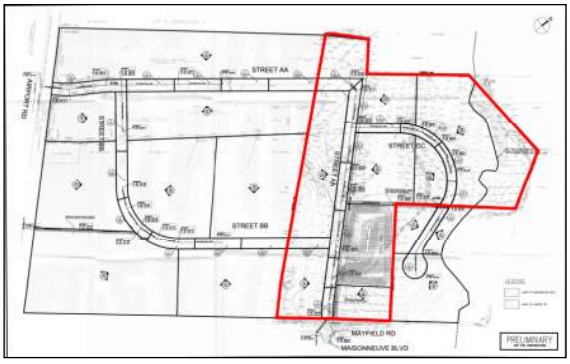

Figure 26: Tullamore Industrial Park Lands

no specific draft plan of subdivision existed at the time. With regards to SWM, the report references the MESP for the proposed SWM pond location, minor/major storm runoff, controls for roof areas, and allowable parking lot ponding. The report also provides preliminary estimates for the developments sanitary (wastewater) flows and water demands. Region correspondence, dated November 20, 2006, confirms that (at the time of the review) there is available capacity in the Zone 6 water distribution system and in the Maisonneuve Boulevard (Vales of Castlemore North Secondary Plan) wastewater sewer. A copy of the Region's correspondence has been included in **Appendix A.2.**

4.9.2. Existing Study Area Commercial / Industrial Developments

There are six existing commercial / industrial developments within the Study Area located at 12151, 12117, and 12101 Airport Road, and 6086, 6186 and 6230 Mayfield Road. 12101 Airport Road is a commercial plaza, while the other sites are generally used for trucking operations. The trucking operation sites at 12151 and 12117 Airport Road (and the norther portion of 6230 Mayfield Road) are accessed from Davis Lane and consist of an office building surrounded by gravel parking lots. The 6086, 6186, and 6230 Mayfield Road sites are similar with access from Mayfield Road and the residential dwellings converted to office buildings.

Figure 27: Study Area Existing Developments

The 12117 Airport Road development currently has Site Plan Approval and the Laidlaw Transit site servicing and grading plan prepared by EMC Group Ltd., dated February 2003, illustrates that the operations building is serviced with sanitary and water connections from Airport Road. There is also a stormwater management pond located at the properties south-east corner. A copy of the EMC Group engineering plan (Town File SPA-2002-0012) is provided in **Appendix A.2.**

4.9.3. 0 Airport Road and 6034 Mayfield Road (Study Area Property No. 5 and 6)

Based on the Town's April 21, 2022, Notice of Public Meeting SmartCentres submitted Official Plan Amendment and Zoning By-law Amendment applications in support of a site plan development at 6034 Airport Road and 0 Airport Road. The Site Plan proposes two industrial buildings, parking, and private entrances to Airport Road and Mayfield Road. A copy of the *Site Plan* (Drawing A1.0, prepared by Ware Malcomb, dated July 26, 2021), Notice, and Submission Cover Letter has been attached in **Appendix A.2**.

The development will be serviced internally by watermains and sanitary and storm sewers. The sanitary sewers will outlet to Airport Road. The on-site stormwater system (underground sewers and tanks, rooftop storage) will outlet at the existing Mayfield Road northern ditch. This ditch drains eastwards and crosses Mayfield Road at a road crossing culvert and eventually outlets at Salt Creek. The proposed servicing and grading information is illustrated on the *Preliminary Site Servicing Figure* and *Preliminary Grading Figure* (Sheet Number 4 and 5 respectively, prepared by WSP, dated July 22, 2021) attached in **Appendix A.2**. To ensure that the MESPU and accompanying details are based on the latest information, SmartCentres was contacted to confirm if an updated development plan was available but no additional information was provided.

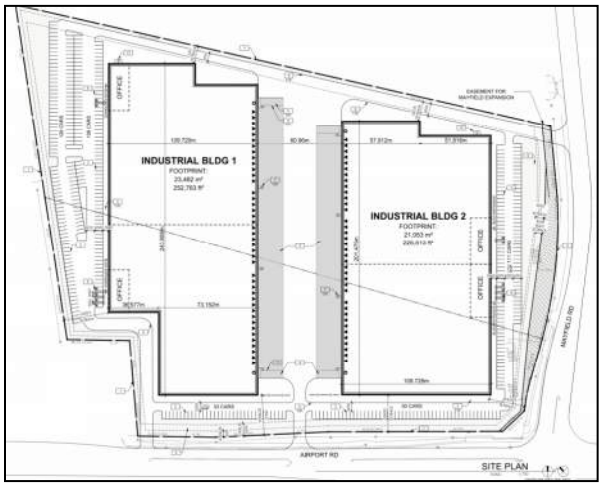

Figure 28: Proposed SmartCentres Site Plan

5. Overview of Study Area Existing Municipal Infrastructure

5.1. Stormwater Servicing

The TRCA watershed map illustrates that the Secondary Plan Area and surround lands are in the Humber River Watershed, part of the Main Humber tributary. Salt Creek borders the area, running along the eastern boundary.

Internal System

The Study Area's topography contains average slopes ranging from 1-2%, generally draining in a southeast direction towards the tributary of Salt Creek adjacent to Maisonneuve Blvd. There are two main intermittent drainage courses which convey the internal site drainage to two existing culverts on Mayfield Road.

There is an existing stormwater management pond servicing the parking lot area central to the site. This pond was designed only to be temporary and is to be removed once the stormwater management pond for the Study Area is constructed. The existing pond discharges to one of the intermittent drainage courses and eventually drains to the culvert in the vicinity of Maisonneuve Boulevard.

External Systems

Two existing culverts within Mayfield Road currently convey the majority of the Study Area's stormwater runoff to the south. A 1,200mm diameter CSP culvert and a 1800x2500mm elliptical culvert. There are also a few smaller pockets of land which drain directly to Airport Road or to Salt Creek. The culvert in the vicinity of Maisonneuve Boulevard will serve as the main stormwater outlet for the site in the post-development condition.

Figure 29: Existing Elliptical Culvert at Mayfield Rd and Maisonneuve Blvd

The Airport Road storm sewer system collects runoff from the right-of-way and conveys it south and then west at Mayfield Road intersection. This system outlets to the Humber River West Branch tributary.

External Drainage

There is only a small external area that drains through the site from the 12203 Airport Road warehouse development. A small ditch was created along the Study Area's northern boundary when the warehouse was constructed to convey runoff from a landscaped area to the Study Area's eastern limits.

5.2. Wastewater Servicing

The Region's *Wastewater Master Plan* (2014) illustrates that the Study Area is in the northern limits of the East Trunk Sewer drainage catchment area that outlets to the G. E. Booth Wastewater Pollution Control Plant. The nearest trunk sewer servicing the Study Area and surrounding lands is located within west side of Airport Road. This 750 mm diameter concrete sewer slopes from the north to the south and is at an approximate depth of 6 meters to 7 meters along the Study Area limits. A copy of the Region's existing wastewater infrastructure has been included in **Appendix D**.

The Study Area's wastewater will discharge to the municipal system at two (2) locations, Airport Road and Davis Lane, and the proposed Davis Lane (Street A) and Maisonneuve Boulevard.

5.3. Water Servicing

The Region's *Water Master Plan* (2014) illustrates that the Study Area is in the East Trunk System's Pressure Zone 6. This zone is serviced from the interconnected Lakeview and Lorne Park Water Treatment Plants. The Tullamore Reservoir and Pumping Station facility is located adjacent to the Study Area, across Salt Creek, on Innis Lake Road. A copy of the Region's existing water infrastructure map has been included in **Appendix D**.

The Study Area's internal watermains will connect to the existing system at the two (2) locations, Airport Road and Davis Lane, and proposed Davis Lane (Street A) and Maisonneuve Boulevard.

6. Study Area Soil Information

6.1. Soil Map of Peel County, Ontario - Report No. 18

The Study Area consists mainly of Chinguacousy Clay Loam (SCS Group C) with pockets of Peel Clay (SCS Group D) and Oneida Clay Loam (SCS Group D), as shown on the *Soil Map of Peel County, Ontario - Report No. 18*. An excerpt from the soils maps is provided in **Appendix A.3**.

These soils typically are assigned to the Soil Group of CD for assigning Curve Numbers (CN) and Runoff Coefficients (RC).

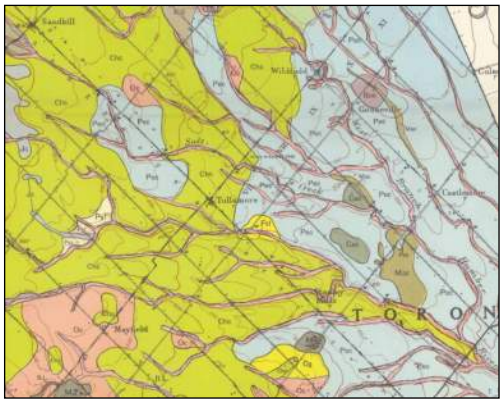

Figure 30: Soils Map Key Plan

6.2. Physiography of Southern Ontario Map

The Ontario Geological Survey map of the Physiography of Southern Ontario indicates that the study area is situated within the South Slope physiographic region which extends from the Niagara Escarpment to the Trent River. Conditions in the region vary greatly. The location in which the Study Area lies is described as a ground moraine with irregular knolls and hollows. The South Slope lies across the limestones of the Verulam and Lindsay Formations, the grey shales of the Georgian Bay Formation and the reddish shales of the Queenston Formation. A till consisting nearly of red and grey shale is reached west of the Credit River. The soil is only slightly acidic, ranging from sandy in the east to clayey in the west. A copy of the map has been attached in **Appendix A.3** for reference.

6.3. SmartCentres Geotechnical Investigation (Property No. 5 and 6)

As part of the SmartCentres initial submission package a *Preliminary Geotechnical Investigation Report* was completed by Golder Associates in February 2012 and a *Phase 1 Environmental Site Assessment* by Barenco Inc. in December 2010. The geotech investigation determined the general subsurface soil and groundwater conditions at the site by advancing eight boreholes to depths between 6.5 and 9.6 meters. Two piezometers (standpipes) were installed in *EX. BH 5* and *EX. BH 7* and during a site visit on July 7,

2011 (about one week after the boreholes were drilled) water was observed in the boreholes at depths of 4.5 meters and 7.0 meters below the existing grounds surface elevations, respectively.

The report generally summarized the site as having a 250 mm to 480 mm thick topsoil layer over native silty clay. Shallow deposits of clayey silt were found in all boreholes below the topsoil and discontinuous deposits of glacial till were encountered interbedded in the silty clay in a few boreholes. A copy of the geotechnical report's borehole data has been provided in **Appendix A.3**.

6.4. Tullamore Industrial Park Soil Survey and Agricultural Report (Property No. 9 and 10)

In March 1989 Ecoplans Limited completed a *Soil Survey and Agricultural Report* for the Tullamore Industrial Park lands. The report determined that the soil material generally consists of calcareous clay tills containing few stones. Surface soils consist of loam with 20% clay content. The three underlying soils mapped on the property consist of Oneida, Chinguacousy and Jeddo. Oneida soils are well drained and vary in slope from 4% to 20%. The Chinguacousy soils are imperfectly drained with very gentle slope of 1% to 2%. Jeddo soils occupy the drainage channels dissecting the properties. These soils are level and saturated most of the year. Poor drainage on the Jeddo is due to the slow runoff rates. A copy of the reports *Soil Survey Map* has been provided in **Appendix A.3.**

6.5. 6086, 6186, 6230 Mayfield Road and 12151 Airport Road Geotechnical Investigation (Property 1, 7, 8, and 9)

A *Geotechnical Investigation* and groundwater assessment for 6086, 6186, 6230 Mayfield Road and 12151 Airport Road property's future roads, stormwater management ponds (SWMPs) and EP channel was completed by Soil Engineers Ltd., dated September 2023. The investigation completed 24 boreholes between August 3 and 9, 2023. The report summarized that beneath the granular fill, a topsoil veneer and a layer of earth fill in places, the site is underlain by strata of silt, silty clay, silty clay till and sandy silt till. Shale bedrock is contacted near the termination depth of Borehole 20. A detailed summary of the existing conditions is provided below.

- A layer of topsoil, approximately 30 cm to 35 cm in thickness, was encountered at the ground surface of Boreholes 1, 2, 19 and 20.

- Boreholes 6, 16, 18, 22, 24 were carried out on the asphalt pavement, which consists of a layer of asphalt, approximately 30 mm to 100 mm in thickness, and a layer of granular fill, approximately 280 to 450 mm in thickness. Other boreholes were carried out on unpaved gravel surface, having a layer of granular fill with thickness ranging from 150 mm to 600 mm.
- Beneath the surface cover, a layer of earth fill was contacted in Boreholes 1, 4, 5, 8, 9, 11, 13, 15, 16, 18, 22, 23, and 24, extending to a depth of 0.8 to 2.0 m below the ground surface. The fill consists of a mixture of silty clay and sandy silt with gravel, organics, and topsoil inclusions. Shale fragments were occasionally found within the earth fill.
- A layer of sandy silt till deposit was contacted at various depth of Boreholes 14, 18 and 19. The till consists of a mixture of clay and gravel, with silt and sand being the dominant fraction.
- The silty clay till deposit was contacted within the investigated depths of all boreholes except Borehole 15. Localized silt and sand layers were occasionally contacted in the lower stratigraphy of the till deposit. The silty clay till consists of a random mixture of particle sizes with clay or silt being the dominant fraction.
- Similar to the silty clay till, the native silty clay stratum was contacted at various depths in most of the boreholes.
- A layer of silt deposit was contacted beneath the silty clay till in Borehole 4 extending to a depth from 2.6 m to 4.1 m below the ground surface.
- Weathered shale was observed at the lower stratigraphy within the investigated depth of Borehole 20.
- The report noted that upon the completion of drilling the groundwater ranged from 3.1 m to 4.9 m below ground surface in Boreholes 4, 11, 17 and 24.
- On August 18, 2023, approximately 2 weeks after well installation, groundwater level was measured from the monitoring wells at the depths ranging from 0.5 to 6.1 m below the prevailing ground surface, or between El. 222.4 m and El. 236.3 m, which is subject to seasonal fluctuations.

A copy of the report has been included in **Appendix A.3**.

7. Study Area Environmental Impact Study

7.1. Overview

Azimuth Environmental Consulting, Inc. was retained to complete an Environmental Impact Study (March 2025) for five (5) of the Tullamore Secondary Plan Area undeveloped "Study Area" properties listed below and the adjacent lands (within approximately 120 m of the properties).

1. 12151 Airport Road
2. 6186 Mayfield Road
3. 6230 Mayfield Road
4. 6206 Mayfield Road
5. 6086 Mayfield Road

The purpose of the Environmental Impact Study (EIS) is to provide the TRCA and other review agencies with an understanding of the potential impact of development on the natural heritage features (NHF), Species at Risk (SAR) and functions identified within the Study Area and to develop strategies to mitigate potential impacts to the identified NHF. The EIS serves as an update to the previously completed Natural Heritage Existing Conditions report prepared by Azimuth in March 2024 and the Interim ESC Plan and Preliminary Natural Heritage Impact Assessment prepared by Azimuth in October 2023.

The EIS *Figure No. 2 – Environmental Features* illustrates the existing Study Area watercourses and vegetation and wetland communities. A copy of the plan with the full EIS Report has been attached in **Appendix B** and provided in **Figure 31**.

Figure 31: EIS Figure No. 2 – Environmental Features

The EIS *Figure No. 3 – TRCA Regulated Features* illustrates the existing watercourses regulated setbacks, Salt Creek meander belt, and wetland communities. A copy of the plan has been attached in **Appendix B** and provided in **Figure 32**.

Figure 32: EIS Figure No. 3 – TRCA Regulated Features

The results of the natural heritage reports remain consistent in that no candidate significant woodland, significant valley land, or significant wildlife habitat features were identified within the Study Area. No terrestrial SAR are anticipated to be impacted from the proposed works, and no wetlands within the study area were identified as provincially or locally significant. While the drainage features on the property do not function as direct fish habitat, they are identified as contributing Redside Dace (Endangered) habitat. This means that site drainage is expected to contribute base flow and nutrients to direct fish habitat supporting SAR aquatic species downstream in Salt Creek.

A planting plan composed of a variety of native species should be prepared for the Environmental Protection corridor with consideration for including TRCA rare species, Pointed Broom Sedge and White Spruce. Riparian plantings in the Environmental Protection corridor along the drainage feature should be selected to provide shade and bank stability within the channel to help regulate water temperatures and limit scouring/erosion during periods of elevated flow. Consideration could be given to the creation of

riparian/wetland conditions to compensate for the loss of on-site wetland. A fluvial geomorphologist would be required to prepare design drawings for the channel using natural channel design principles.

The EIS *Figure No. 4 – Proposed Development* illustrates the existing environmental features overlaid with the proposed draft plan of subdivision. A copy of the plan has been provided in **Figure 32**.

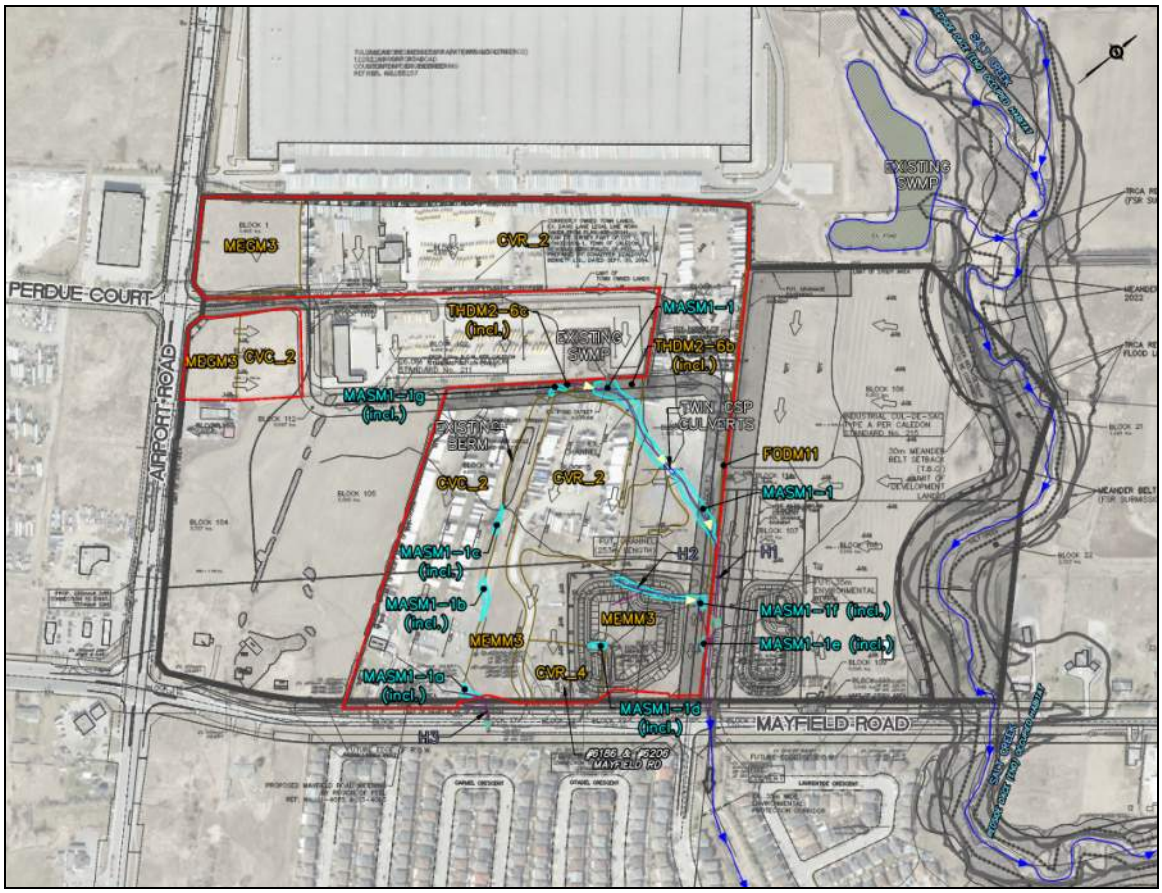

Figure 33: EIS Figure No. 4 – Proposed Development

7.2. Recommendations

It should be noted that the absence of a protected species within the study area does not indicate that they will never occur within the area. Given the dynamic character of the natural environment, there is a constant variation in habitat use. Care should be taken in the interpretation of presence of species of concern including those listed under the ESA. Changes to policy, or the natural environment, could result in shifts, removal, or addition of new areas to the list of areas currently considered candidate KNHFs. This report is intended as a point in time assessment of the potential to impact SAR; not to provide long term

"clearance" for SAR. While there is no expectation that the assessment should change significantly, it is the responsibility of the proponent to ensure that they are not in contravention of the ESA at the time that site works are undertaken.

7.2.1. Species at Risk – Redside Dace

Altering or removing the drainage features on site requires work within contributing Redside Dace habitat, which is protected under the ESA. At this time, it is anticipated that an Overall Benefit Permit would be required to complete these works as per Clause 17(2)(c) of the ESA. An Overall Benefit Permit is for projects where the main purpose is not protection or recovery of the species. ESA permit requirements would need to be confirmed once design plans have advanced in subsequent detail design stages. It would be our recommendation to contact MECP to begin the permit process once the draft plan of subdivision has been approved.

7.2.2. Environmental Protection Corridor (adjacent lands)

A planting plan composed of a variety of native species should be prepared for the Environmental Protection corridor with consideration for including TRCA rare species, Pointed Broom Sedge and White Spruce. Riparian plantings in the Environmental Protection corridor along the drainage feature should be selected to provide shade and bank stability within the channel to help regulate water temperatures and limit scouring/erosion during periods of elevated flow. Consideration could be given to the creation of riparian/wetland conditions to compensate for the loss of on-site wetland. A fluvial geomorphologist would be required to prepare design drawings for the channel using natural channel design principles.

7.2.3. Migratory Breeding Birds and Bats

Activities involving the removal of vegetation should be restricted from occurring during the breeding season. Migratory birds, nests, and eggs are protected by the Migratory Birds Convention Act, 1994 (MBCA) and the Fish and Wildlife Conservation Act, 1997 (FWCA). Environment Canada outlines dates when activities in any region have potential to impact nests at the Environment Canada Website (http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#_03). In Zones C1 and C2 vegetation clearing should be avoided between April 1 through August 31 of any given year. If work requires that vegetation clearing is required between these dates screening by an ecologist with

knowledge of bird species present in the area could be undertaken to ensure that the vegetation has been confirmed to be free of nests prior to clearing.

Activities involving individual tree removal, particularly any trees greater than 25cm Diameter Breast Height, should be avoided between April 1 through September 30 of any given year, during the active period for bat species that may utilities trees for day roosting purposes. It is anticipated that adherence to this timing restriction will avoid impacts to individual SAR bats, therefore remaining in compliance with Section 9 of the ESA affording individual protection to Endangered species.

7.2.4. Sediment and Erosion Controls

Diligent application of Erosion & Sediment Controls (ESCs) is recommended for all future construction activities to minimize the extent of accidental or unavoidable impacts to adjacent vegetation communities and wildlife habitat. Prior to the commencement of site works, silt fencing should be applied along the length of directly adjacent natural or naturalized features, and routine inspection/maintenance of the silt fencing should occur throughout construction. It is recommended that erosion and sediment controls be maintained until vegetation is re-established post-construction.

7.2.5. Operations

All material storage and maintenance activities required during future construction should be conducted at least 30m away from identified natural heritage features to prevent accidental spillage of deleterious substances that may harm natural environments.

Snow fencing or equivalent should be installed at the limit of the work area to prevent the accidental intrusion of machinery operations into adjacent undisturbed natural areas.

7.2.6. Fish and Fish Habitat

The following recommendations are intended to protect both indirect fish habitat in the Study Area and direct fish habitat downstream:

- All in-water work should be completed during the applicable in-water timing window for warm water systems (i.e., no in-water work is permitted from March 15 through July 15 of any given year.

- Diligent application and maintenance of ESC measures should be completed as noted above. The site-wide Erosion and Sediment Control Plan as prepared by the engineer shall be site-specific and adaptive to account for changes in site conditions and weather patterns/seasons. The Erosion and Sediment Control Plan shall also include different phases of the project to ensure that flows are being maintained in both quantity and quality to downstream receiving system during construction.
- The SWM ponds shall be designed and constructed to include the thermal mitigation measures outlined above in accordance with MECP requirements.
- If dewatering is required, outlet hoses should be directed to a filter bag placed on well vegetated soils a minimum of 30m from any watercourse or drainage feature.
- The extent of site disturbance and the duration of in-water work should be minimized to the extent possible to mitigate impacts to fish habitat;
- All machinery maintenance/refueling is to be completed at a minimum distance of 30m from the drainage features to prevent accidental spillage of deleterious substances.
- The contractor shall have a fully stocked spill kit on site at all times and is required to have a contaminant and spill management plan in place prior to the initiation of works. In the event of a spill, the contractor must report it immediately to the Spills Action Centre (SAC) at 1-800-268-6060.

7.2.7. DFO Permitting

All drainage features on the property are considered indirect fish habitat and are directly connected to fish bearing watercourses downstream. Therefore, they are afforded protection under the Federal Fisheries Act. Should works be proposed that could result in the "harmful alteration, disruption or destruction of fish habitat", (Section 35(1)), the proposed works would need to be submitted to DFO for a request for review to their Fish and Fish Habitat Protection Program regional office to determine approval requirements.

A request for review is completed at the detail design stage where minimum 90% completion design drawings are typically required to accompany the DFO request for review submission package. At this stage, Azimuth has had no formal consultation with DFO.

7.3. Conclusions

Based upon the analysis, it is concluded that several natural heritage features exist within the study area including Species at Risk (Redside Dace – contributing habitat), wetland and watercourses/fish habitat (indirect warmwater). Wetland compensation considerations will be required which may include the creation of wetland within the EP block. The Concept Plan and SWM report as prepared by Jones Consulting has considered the aquatic natural heritage features into their SWM designs through the incorporation of an EP Block and the thermal mitigation measures for the SWM ponds as recommended by MECP for Redside Dace. Additional permitting through MECP and DFO will still be required at the detail design stage due to the removal and realignment of the drainage features on site. At this time, it is our recommendation that the draft plan of subdivision be advanced under the assumption that the recommendations outlined above are followed during subsequent design phases and that further environmental permitting from DFO and MECP be obtained.

8. Study Area Headwater Drainage Feature Assessment

8.1. Overview

Azimuth Environmental Consulting, Inc. was retained to complete a Headwater Drainage Feature (HDF) assessment for the Tullamore Secondary Plan Area "Study Area" in March 2024 to identify the function and value of drainage features within the larger context of the watershed and assist with approvals for a draft plan of subdivision. A total of 10 HDFs were assessed during field investigations. Five HDFs were observed to have water present during all three field investigations. Based on the CVC/TRCA HDF Guidelines (2014), these five HDFs are considered to have 'Important' hydrological functions and are to have a management recommendation of 'Protection'. The remaining five drainage features were all assigned a management recommendation of 'Mitigation' as these features had either 'Valued' or 'Contributing' hydrology, but none had fish habitat, terrestrial habitat, or riparian vegetation that would characterize them as 'Conservation' or 'Protection'. The HDF *Figure No. 2 – Headwater Drainage Feature Assessment* illustrates the existing Study Area watercourses with the feature mitigation and protection limits. A copy of the plan with the full HDF Report has been attached in **Appendix B** and provided in **Figure 33**.

Figure 34: HDF Figure No. 2 – Headwater Drainage Feature Assessment

A summary of the findings for each individual classification section is presented below.

8.1.1. Hydrogeological Classification

During the early spring field survey, water was present at all 10 drainage features, with surface flow noted in all the HDFs assessed. During the mid/late spring visit, a mix of flow conditions were observed, ranging from HDFs that were dry (SC-H2-Seg 2) to HDFs that still had substantial surface flow (SC-H1-Seg 1). During the mid/late summer visit, all 10 drainage features were either dry or had standing water present. No visible flow was observed in any drainage feature during the mid/late summer visit, but standing water was present in multiple features (SC-H1-Seg 1, SC-H1-Seg 3, SC-H3-Seg 1, and SC-H3-Seg 2). Due to the recent development upslope of SC-H3-Seg 1 and SC-H3-Seg 2, the standing water in these features was assumed to be a result of the land/drainage alterations (parking lot drainage), and that water being present was not anticipated to be a result of natural hydrological conditions. The standing water observed

during the late summer site visit was shallow, had no flow, and was contained within isolated scoured segments of the drainage channel.

8.1.2. Riparian Classification

The riparian classifications remained the same during the three site visits. Riparian vegetation was marginal/poor throughout a majority of the drainage features. The actively cropped farm field to the east of SC-H1-Seg 1, SC-H1-Seg 2, and SC-H1-Seg 3 limited the overall function/width of riparian and feature vegetation. Development activities on the property also altered/minimized the extent of riparian vegetation along most of the other features.

8.1.3. Fish and Fish Habitat Classification

No evidence of direct fish habitat was observed throughout the assessed property and associated drainage features. The Mayfield Road culvert at the downstream (south) end of the assessed property (south of SC-H1-Seg 1) may function as seasonal direct fish habitat, as the culvert may serve as a refuge pool for small bodied fish, but no direct fish habitat functions were noted on the property. All the features were dry or had shallow (<5cm) standing water present during the late spring field visit. No refuge pools were noted in any of the assessed HDFs that could host fish year-round, and no fish were observed during any of the site visits. Therefore, most of the drainage features were characterized as indirect fish habitat. Two drainage features (SC-H1-Seg 6 and SC-H2-Seg2) were characterized as 'not fish habitat' as defined features were not observed at these HDFs, and any overland/contributing flows would be expected to be minimal/non-existent for a majority of the year.

8.1.4. Terrestrial Habitat Classification

All terrestrial habitats in proximity to the drainage features were classified as having a limited or contributing function. Overall, terrestrial habitat on the property was limited to a few small hedgerows and narrow treed corridors, with limited function as movement corridors. Development on the property and nearby agricultural activity has limited the extent of natural terrestrial habitat along most of the drainage features. In addition, the presence of existing urban development, commercial development, and agricultural fields surrounding the assessed property limits the overall function in regard to terrestrial habitat and movement corridors.

8.2. Management Recommendations

HDF management recommendations are summarized in the below table based on the field surveys completed. All drainage features in the study area are shown on *Figure 2* with their management recommendations. The HDF management recommendations are based on the CVC/TRCA HDF Guidelines (2014) and the CVC/TRCA flow chart which provides direction on management options (flow chart).

Table 5: Tullamore Headwater Drainage Feature Assessment Summary

HDF Segment Code	Step 1		Step 2	Step 3	Step 4	Management Recommendation
	Hydrology	Modifiers	Riparian	Fish and Fish Habitat	Terrestrial Habitat	
SC-H1-Seg 1	Important	-	Important	Valued	Contributing	Protection
SC-H1-Seg 2	Valued	Agricultural	Important	Contributing	Contributing	Protection
SC-H1-Seg 3	Important	Agricultural	Important	Contributing	Contributing	Protection
SC-H1-Seg 4	Valued	Developed	Limited	Contributing	Limited	Mitigation
SC-H1-Seg 5	Valued	Developed	Limited	Contributing	Limited	Mitigation
SC-H1-Seg 6	Contributing	Developed	Limited	Contributing	Contributing	Mitigation
SC-H2-Seg 1	Contributing	-	Limited	N/A	Limited	Mitigation
SC-H2-Seg 2	Contributing	Developed	Limited	N/A	Limited	Mitigation
SC-H3-Seg 1	Important	Developed	Valued	Contributing	Limited	Protection
SC-H3-Seg 2	Important	Developed	Valued	Contributing	Limited	Protection

The hydrology of SC-H3-Seg 1 and SC-H3-Seg 2 has been altered from recent development in the area, which appears to have infilled a portion of the drainage feature to the west of the assessed area where a parking lot is located. Drainage from the parking lot area appears to flow into both drainage features, although a direct source of the upstream flows could not be found. Regardless, both features were wet and/or had flowing water during all three field investigations, most notably during the late summer visit. Therefore, based on the CVC/TRCA HDF Guidelines (2014), they are considered to have 'Important' hydrological functions and are to have a management recommendation of 'Protection'.

Similarly, SC-H1-Seg 3 also had water present during all three field investigations and is therefore considered to have 'Important' hydrological functions and a management recommendation of 'Protection'. Downstream of SC-H1-Seg 3, SC-H1-Seg 2 was dry during the late summer site visit and was originally given a management recommendation of 'Conservation'. However, based on the CVC/TRCA HDF Guidelines (2014), in the event that a lower level of protection is identified for a segment downstream of

a segment with a higher level of protection, the more conservative approach shall be adopted for both segments, and the downstream segment should be reclassified to match the upstream segment. Therefore, the management recommendation for SC-H1-Seg 2 was changed to 'Protection' as well, similar o SC-H1-Seg 3.

For the remaining five drainage features, they were all assigned a management recommendation of 'Mitigation'. All these features had either 'Valued' or 'Contributing' hydrology, but had no fish habitat, terrestrial habitat, or riparian vegetation that would be characterize them as 'Conservation' or 'Protection'.

8.3. Conclusions

Of the 10 HDFs that were assessed during the field investigations, five were assigned a management recommendation of 'Protection' as per the CVC/TRCA HDF Guidelines (2014). The remaining five drainage features were all assigned a management recommendation of 'Mitigation' as these features had either 'Valued' or 'Contributing' hydrology, but none had fish habitat, terrestrial habitat, or riparian vegetation that would be characterize them as 'Conservation' or 'Protection'.

Overall, it should be noted that previous development activities on the property have altered the form and function of many HDFs assessed in this report. The CVC/TRCA HDF Guidelines (2014) states that "an HDF has been altered and/or eliminated without a permit under a conservation authority's Section 28 Regulation, a "No Management Required" category will not be assigned, and restoration of the HDF may be required."

The HDF assessment assessed the drainage features based on their current state during the field investigations. The timing and extent of the previous development activities on the property are unknown, and any further development in proximity to these HDFs may alter site characteristics presented in this report.

9. Study Area Conceptual Land Use Plan

The latest Concept Plan (Drawing No. CP-1 attached in **Appendix H**) for the Study Area has been created using the landowners Draft Plan of Subdivision with the Town's 26 meter Local Industrial Standard (Standard No. 211). The plan's internal road layout has gone through various iterations to accommodate the future municipal services, EP channel and road connection locations through consultation with the landowners, Town, MNRF, and TRCA. The most notable change from previous layouts is the EP channel extension and alignment along the future Davis Lane (Street A) to match the Town's latest Schedule N.

The Concept Plan illustrates the internal road providing access to several subdivided blocks, an EP channel dividing the site into west and east portions, and two stormwater management blocks for the proposed extended detention wet ponds. Davis Lane (Street A) will extend through the Study Area, connecting Airport Road to Mayfield Road at Maisonneuve Boulevard. The roadway will extend east from Airport Road then run south to the Smart Centre lands north limits, head eastwards again and then finally south to Mayfield Road. A second right-of-way (Street B) running east-west will connect to the eastern side of Street A and end at a cul-de-sac.

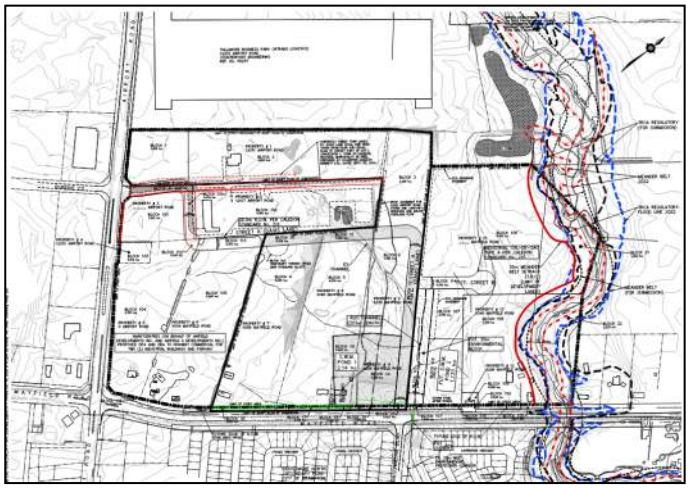

Figure 35: Study Area Concept Plan

The latest Draft Plan of Subdivision and Concept Plan have separated the current phase of work (Phase 1) from the future external phases based on the participating landowners. The current 23.1 ha phase areas are numbered as Block 1 through 20 and the future external areas are labeled as Block 101 through 120. The plans include a temporary turning circle on the east side of SmartCentre lands within Block 4. The temporary turning circle will be utilized until the future road connection between Davis Lane (Street A) is extended through SmartCentres. The existing Davis Lane roadway connection will continue to serve as the access point for the northern properties.

Block 1 will be developed as a commercial block whereas blocks 2 through 7 will be developed as industrial blocks. Blocks 8 through 12 will be developed into internal subdivision roadways. Lots 13

through 15 will be used to develop SWMF1. Blocks 16 through 20 will be dedicated to the future Mayfield Road widening.

Based on the site topography, the proposed end-of-pipe stormwater management ponds will be located at the southeast corner of the site. The site's stormwater management design incorporates a "3rd pipe system" to collect rooftop drainage within the future phases of development and discharge this flow directly to the proposed EP channel. The roof drainage will be controlled, as established in the MESP, and would be considered "clean" storm runoff that could bypass the proposed SWM ponds. Options for implementing this type of system will be explored in the detailed design phase.

Table 3 summarizes the latest Concept Plan's land use areas and designations.

Table 6: Concept Plan Land Use Areas and Designations

Land Use	**Area (hectares)**
Highway Commercial	12.0
Prestige Industrial	5.2
General Industrial	27.6
Roads (26 m ROW)	3.4
Environmentally Protected Channel	0.9
Stormwater Management Pond 1	2.1
Stormwater Management Pond 2	1.1
Mayfield Road Widening	0.9
Salt Creek Flood Plain	4.4
Total	**57.6**

The Concept Plan does not currently show any developments; however, the future Site Plan Applications will consist of commercial and industrial lots mainly covered by buildings, parking lots and landscaped areas. Once the subdivision is approved and constructed these applications must conform to the Town's latest commercial and industrial planning standards. Each lot will be serviced by gas, hydro, watermains, sanitary sewers, and storm sewers located within the proposed road right-of-ways.

10. Approval Agencies and Design Criteria

The Study Area is subject to the policies and requirements of the Town, Region, TRCA, the MNRF, and the Ministry of the Environment, Conservation and Parks (MOECP) with respect to municipal servicing (water, wastewater, roads, street lighting and traffic signals), stormwater management (quantity, quality, erosion control and water balance) and utility servicing (gas, hydro, phone, cable and internet).

10.1. Town of Caledon

The municipal services, roads, utilities, grading and stormwater drainage design must conform to the Town's *Development Standards Manual* (Version 5 - 2019). The Town's document is intended as a guideline for new land development and provides technical requirements specific to sewers, site grading, street lighting, erosion and sediment control, and stormwater quantity and quality control techniques, among other topics.

The Town has been granted a *Consolidated Linear Infrastructure Environmental Compliance Approval 324-S701* (CLI ECA) authorizing the Town to approve alterations to the municipal wastewater (sanitary) and storm sewers and stormwater management facilities (ponds). The subject lands will be required to meet all the conditions of the Town's CLI ECA along with the associated design criteria. Once the detailed design for the development has been completed, the FSR and the SWMR will be submitted to the Town in support of an application for an CLI/ECA.

10.2. Region of Peel

The Region reviews all water and wastewater (sanitary) works for new developments. The water and wastewater works must conform to the Region's *Linear Wastewater Standards* (2023) (previously the *Public Works Design, Specifications & Procedures Manual – Linear Infrastructure, Sanitary Sewer Design Criteria* and *Watermain Design Criteria* (revised 2009 and 2011, respectively). Since the Study Area's build-out will have major impacts on Airport Road and Mayfield Road (Regional Road No. 14), the Region is also the review and approval authority for the traffic study's recommendations for intersection improvements and traffic signals.

Further, the stormwater management plan may involve the inclusion of drainage from the future widening works on Mayfield Road. The Region will therefore be involved in the design and review of the proposed stormwater management facilities and storm sewers conveying drainage from this road. As a general rule, the Region will require that *Post-Development flows must be equal to or less than Pre-Development levels* for all lands that drain to a Regional road storm system. Where necessary, the design of the subject site with respect to stormwater drainage will conform to the *Region of Peel's Public Works Stormwater Design Criteria and Procedural Manual* (June 2019), *Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA) Stormwater Management Criteria* (September 2022), and *Region of Peel Stormwater Management Report* (December 2022).

10.3. Toronto and Region Conservation Authority

The Study Area is located within the Humber River Watershed within the TRCA's jurisdiction. It is expected that the TRCA will require the EIS recommendations and corresponding stormwater management plan to adhere to the TRCA's *Stormwater Management Criteria* (Version 1.0, August 2012). The TRCA criteria provides guidance in the planning and design of stormwater management infrastructure to address flooding, water quality, erosion, water balance, and natural heritage.

10.4. Master Environmental Servicing Plan

Master Environmental Servicing Plans (MESP) are required by municipalities to support new developments and re-developments within a secondary plan area. The TRCA is responsible for the technical clearance of the MESP's as the governing conservation authority (CA). Under the Planning Act and Environmental Assessment Act the CA represents the Provincial interest for Natural Hazards of the Provincial Policy Statement.

The TRCA will review the technical aspects of the water management, natural hazards and natural heritage investigations and confirm that they have been addressed through the MESP update. Under Phase 1 of the Characterization of the Natural System the TRCA will require a review of the following:

1. Existing studies and projects
2. Surface Water which would include Watershed Hydrology and Flood Plain Mapping/Hydraulics
3. Erosion including Fluvial Geomorphology and Geotechnical

4. Groundwater assessment
5. Natural Heritage
6. Water Balance

Phase 2 generally includes the following:

1. Outlines the impact of the proposed development in regard to stormwater management and low impact strategies, above and below ground servicing
2. Identifies applicable valley and stream crossings and trails
3. Provide preliminary grading plans identifying existing and proposed grades and demonstrating the proposed design will adhere to municipal and regional standards and respecting the limits of the Natural System.

10.5. Ministry of Natural Resources and Forestry

The Study Area is located adjacent to Salt Creek, which has been identified as an ecologically important watercourse due to the presence of Redside Dace Habitat. The watercourse adjacent to Maisonneuve Boulevard, which will serve as the outlet for stormwater runoff from the site, drains into Salt Creek. Through previous consultation with the MNRF, the stormwater management pond design must incorporate thermal mitigation measures to reduce the threat to Redside Dace. Specifically, these measures include the following:

- Average permanent pool depth, of the open water component of the SWM facility, excluding the forebay area and other shallow water features, is to be minimum 3.0 meters deep.
- Bottom draw outlet are to be located a minimum of 2.5 meters below the permanent pool elevation.
- The perimeter of the pond at the permanent pool elevation is to include a minimum 3.0 meter wide flat shelf, 0.3 meter deep, as a wetland planting area. The shelf will include a 30 cm layer of topsoil and planted with native emergent species (cattail and bulrushes) suited for fluctuating water levels.
- Side slopes below the normal water level of the permanent pool are to be 4:1 (max).

- The volume of water in the permanent pool between the depths of 1.5 meters to 3.0 meters is to be at least equivalent to the volume of runoff generated by a 10 mm storm event. The calculated volume below the 1.5 meter depth is to be discharged over a minimum 24 hour period.

10.6. Ministry of the Environment, Conservation and Parks

An Environmental Compliance Approval (ECA) will be required from the MOECP for the proposed wastewater (sanitary) and storm sewers and stormwater management facilities (ponds). Once the detailed design for the site has been completed, the FSR and the SWMR will be submitted to the Town for the MOECP ECA. Stormwater drainage proposals are to be consistent with the guidelines of the MOECP's *Stormwater Management Planning and Design Manual* (March 2003).

11. Conceptual Stormwater Management Plan and Servicing

A *Preliminary Stormwater Management Report* (PSWMR) has been completed as part of the TJCGL appointment and scope of work for the Study Area. A full copy of the PSWMR has been attached in **Appendix C**.

The PSWMR outlines a design for the Study Area's future stormwater management system to meet the compulsory post-development quantity and quality requirements imposed by the Town, Region, TRCA, MNRF and MOECP. During the Study Area's detailed design stage, a (detailed) Stormwater Management Report will be completed in support of the storm system and facilities Town/MOECP ECA Certificates and TRCA Application for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Pursuant to Ontario Regulation 166/06) permit.

11.1. Existing Drainage Conditions

The Study Area consists of approximately 57 hectares of land that is partially developed mainly for trucking uses while the remaining area is highly disturbed meadows communities that were formerly agricultural and/or treed lands.

The site's topography contains average slopes ranging from 1-2%, generally draining in a southeast direction towards the tributary of Salt Creek adjacent to Maisonneuve Boulevard. There are intermittent drainage courses which convey the local site drainage to two (2) existing culverts on Mayfield Road. One of these culverts, a 1200mm diameter CSP, drains an area of approximately 9.49 hectares to the south side of Mayfield Road, which is conveyed via a roadside ditch to the tributary adjacent to Maisonneuve Boulevard. The second culvert is an 1800x2500mm elliptical culvert, located immediately upstream of the tributary and drains most of the site (approximately 41.67 hectares) directly to the tributary. There are also smaller pockets of land which drain directly to Airport Road or to Salt Creek. The culvert in the vicinity of Maisonneuve Boulevard will serve as the main stormwater outlet for the site in the post-development condition.

There is an existing SWMP servicing the Laidlaw parking lot area central to the site. This pond was designed only to be temporary and is to be removed once the stormwater management ponds for the overall Study Area are constructed. The existing pond discharges to one of the intermittent drainage courses described above and eventually drains to the culvert in the vicinity of Maisonneuve Boulevard.

The preliminary design confirms that the existing ponds outlet elevations can be accommodated by the proposed storm sewer system until the block is re-developed.

There is an external drainage area approximately 1.30 ha in size to the north of the development that is captured by the property boundary drainage ditch. In the existing condition, flows generated in this area are conveyed in an eastwards direction along the property boundary to an existing intermittent drainage course located within the future development phase. The stormwater generated in this area is ultimately conveyed to the existing Maisonneuve Boulevard & Mayfield Road Intersection Culvert. The proposed condition will collect and convey stormwater from the northern boundary ditch directly to the Environmentally Protected Channel via underground culverts located within Phase 2 developments.

12101 Airport Road is developed and consists of a commercial plaza with a detached vehicle repair shop and parking lot. This commercial plaza is accessed exclusively from Airport Road.

12151 Airport Road is a non-permitted development that currently consists of gravel areas used to store vehicles. This property will be required to be reinstated to previous site conditions.

The pre-development storm drainage plan is provided as drawing STM-1 in **Appendix H**. It is worth noting that the development belonging to 6034 Mayfield Road and 0 Airport Road (future SmartCentres), will provide mitigation of their own stormwater in the post-development scenario.

11.2. Stormwater Management Plan

The stormwater management plan is intended to provide an environmentally sound approach to stormwater issues. The issues can be divided into four main categories: stormwater quality control, stormwater quantity control, water balance, and erosion and sediment control.

To provide the required stormwater quality and quantity control for the site two extended detention wet ponds and Low Impact Development (LID) devices are proposed. The ponds, referred herein as the west and east ponds, are divided by a proposed 35 meter wide EP channel extending from the tributary of Salt Creek along the east side of Mayfield Road. The channel is the discharge location for the pond outlets and for all other stormwater runoff from the site. The proposed ponds are located generally at the southeast corner of the Study Area.

The Study Area development blocks are required to implement at-source LID's within their future Site Plans to provide best efforts in achieving the 5mm retention erosion control target and water balance requirements in accordance with the Town's Consolidated Linear Infrastructure Environmental

Compliance Approval (CLI-ECA) and Appendix A Table A1 performance criteria. Implementation of LIDs will also assist in achieving established quality and quantity control targets and site-specific water balance. Conceptual LID sizing calculations have been provided for the Subdivisions right of way, additional calculations and supporting information will be provided in the detailed design stage. A summary of the general targets for the site is provided below in **Table 7**:

Table 7: Stormwater Management Design Criteria

Category	Sub-Category	Target
Quantity Control	Peak Flow Control	Control post-development flows to appropriate Watershed Unitary Discharge rates limits for the 2 through 100-Year storm events *(ToC, TRCA, & MESP)* Reduce rooftop controls to 40L/s/ha and lot level controls to 180L/s/ha with a 0.30m maximum ponding within parking areas. (*MESP*)
	Minor-Major System Conveyance	Minor System to convey 10-Yr event, Major System to convey the larger of 100-Yr event or Regional Event *(ToC, TRCA)*
	Regulatory Storm Conveyance	Convey the greater of the uncontrolled 100-year or Regional Event to a *sufficient outlet (ToC, TRCA)*
Quality Control	Total Suspended Soils	Control the 90th percental storm event and provide Level 1 (Enhanced) Protection, 80% Long Term Removal per latest MOE SWMPD Manual *(ToC, MECP, TRCA)*
	Thermal Mitigation	Where applicable, mitigate potential thermal and bacteriological impacts. *(TRCA)*
Erosion Control	SWMF Drawdown Time	Detain and release the runoff produced from the 25mm storm over a minimum 24 hours, preferred 48 hours *(MECP, TRCA, ToC)*
	Erosion Discharge	Control post-development peak flows to the allowable Erosion Control Discharge rate per MESP requirements. *(MESP, ToC)*
	Runoff Volume Control Target	Best efforts in retaining 5mm of rainfall onsite using LID features. (*TRCA*)
Water Balance		Best efforts to maintain water recharge for Low Volume Groundwater Recharge Areas. For natural features (woodlands, wetlands, watercourses) maintain hydrologic regimes and hydroperiods. (*TRCA*) Control the runoff from the 90th percentile storm event on an annual average basis from all surfaces on the entire site. Control is in the following hierarchal order, retention, LID filtration, conventional stormwater management. (*ToC CLI ECA*) The development is required to retain at a minimum 5mm of runoff.

11.3. Drainage System

Development of the Study Area will consist of several commercial lots, an internal looped roadway to be built to the Town's 26.0 meter Local Industrial Road (Standard No. 211), an EP drainage channel, and two (2) stormwater management extended detention wet ponds. Each individual lot will be developed with buildings, driveways, parking lots, and landscaped areas. The lots future coverage areas must conform to the Town's commercial and industrial planning policies (attached in **Appendix A.2**). The lot grading will direct the stormwater runoff to the internal road network and the Mayfield Road northern boulevard (for the 6086 and 6186 Mayfield Rd property drainage), which will contain a proposed storm sewer system to convey minor flow to the proposed ponds. The roads and boulevard will also convey the major overland flow within the right-of-way. The proposed end-of-pipe SWM facilities are extended detention wet ponds, providing stormwater quantity and quality control. All proposed buildings will require rooftop controls, as per the recommendations of the MESP. The stormwater runoff from the future development lands building's rooftops on the east side of the proposed Street A extension (Future Phase) are proposed to drain to a 3rd pipe system and conveyed and discharged directly to the EP channel. This channel will drain into the tributary of the Salt Creek within the Vales of Castlemore Secondary Plan, bypassing the proposed ponds. The 3rd pipe system is sized to convey the 100-year storm event peak flow controlled to a rate of 40 L/s/ha of building area. The location of the 3rd pipe within the future external ROW will be determined during the detailed design.

The proposed site grading and drainage design will maintain the culvert drainage at the southwest portion of the Study Area. This drainage, according to the Region's latest design drawings, will continue to be conveyed across the road. The planned future roadworks will pipe the flows to the Maisonneuve Boulevard intersection, and to the creek.

In general, the PSWMR results demonstrate that the proposed stormwater management ponds will provide the required quantity control to reduce the Study Area's built-out post-development peak flows to the allowable release rates identified in the MESP which references TRCA's Unit Flow Relationships for the Humber River Watershed.

The Post-Development Storm Drainage Plan (Drawing No. STM-2) with the accompanying SWMP figures (Drawing No. PND-1, 2, and 3) illustrates the proposed drainage scenario and are attached in **Appendix H**.

11.4. Lot Level and Rooftop Controls

In accordance with the *MESP*, rooftop areas are to be controlled to a maximum release rate of 40 L/s/ha for the governing 100 year event. Lot level controls will be controlled to 180 L/s/ha for the governing 100 year event. The rooftop area was estimated for the developable area based on the maximum allowable lot coverage per the Town's Zoning By-Law. According to the By-law the maximum permitted building area and minimum landscaping area for General Industrial and Prestige Industrial are 50% & 10% lot coverage, respectively. The Town's Zoning Bylaw also stipulates the required minimum landscaping area for corner lots shall be 12.5%. Lands zoned with the Highway Commercial designation permit a maximum building area and minimum landscaping area of 30% and 20% lot coverage respectively. The following outlines the target rooftop and lot level controls for each block under the governing 100 year event per MESP requirements.

Table 8: Target Rooftop and Lot Level Controls by Block Number

Block Number	Max. Rooftop Area (ha)	Rooftop Controls (40L/s/ha)	Max. Lot Level Area (ha)	Lot Level Control (180L/s/ha)
1	0.44	0.0176 m^3/s	1.03	0.1848 m^3/s
2	2.33	0.0932 m^3/s	2.47	0.4441 m^3/s
3	1.05	0.0421 m^3/s	1.05	0.1894 m^3/s
4	2.33	0.0930 m^3/s	2.33	0.4187 m^3/s
5&7	2.07	0.0826 m^3/s	2.07	0.3719 m^3/s
6	0.89	0.0356 m^3/s	0.89	0.1605 m^3/s
101	0.41	0.0163 m^3/s	0.95	0.1717 m^3/s
102	2.20	0.0881 m^3/s	2.22	0.3988 m^3/s
103	0.09	0.0037 m^3/s	0.22	0.0392 m^3/s
106	3.45	0.1380 m^3/s	3.45	0.6212 m^3/s
107	0.39	0.0154 m^3/s	0.39	0.0697 m^3/s
108 & 109	1.60	0.0639 m^3/s	1.60	0.2879 m^3/s
Total Private Lands	**17.25 ha**	**0.6901 m^3/s**	**18.66 ha**	**3.3585 m^3/s**

The maximum rooftop areas draining to SWMF1 & SWMF2 are approximately 11.60 ha and 5.06 ha, respectively. To achieve the required release rates, the rooftops will require approximately 10 cm of ponding depth to provide the required storage volume during the 100-year storm event. Any additional storage volume will be discharged directly from the rooftops to paved or landscaped areas.

11.5. Low Impact Development

Low impact development (LID) is a stormwater management strategy that seeks to mitigate the impacts of increased runoff and stormwater pollution by managing runoff as close to its source as possible. LID comprises a set of site design strategies that minimize runoff and distributed, small scale structural practices that mimic natural or predevelopment hydrology through the processes of infiltration, evapotranspiration, harvesting, filtration and detention of stormwater. These practices can effectively remove nutrients, pathogens and metals from runoff, and they reduce the volume and intensity of stormwater flows.

LIDs are to be implemented within the road right-of-way (ROW) in an effort to meet infiltration targets and filtration targets. The most effective LID within the ROW may consist of a bioretention swale along one or both sides of the street with a subsurface infiltration/filtration trench complete with an overflow pipe connected to the storm sewer system. Given the poor infiltration characteristics of the native soils, a perforated pipe underdrain has been incorporated in the LID.

To determine the cross sectional area and filtration capacity for the site's ROW LID measures, the *Town of Caledon 26.0m Industrial Collector 14.5m Roadway (13.9m Pavement) Standard Drawing No. 211* was referenced in combination with the developments preliminary storm sewer design.

A total of 20 plausible locations were determined within the Right of Way for LIDs of which 8 have the potential to infiltrate the full runoff volume from the 90th Percentile water quality event (27mm 4-hour Chicago). Site Specific constraints such as poor soils, depth to the groundwater table, and site servicing requirements, have limited the availability of LIDs. A minimum 1.0m separation distance has been provided from the bottom of infiltration-based LIDs to the seasonal high groundwater table elevation. Soil Engineers Ltd has conducted a geotechnical investigation for the proposed subdivision. In Soil Engineer Ltd.'s *Geotechnical Investigation*, site soils are described as being underlain by strata of silt, silty clay, silty clay till and sandy silt till and groundwater was recorded at depth ranging from 0.5m to 6.1m below the prevailing ground surface subject to seasonal fluctuations. According to the *Soil Survey of Peel County*, the existing site soil consists of Chinguacousy Clay Loam belonging to Hydraulic Soil Group C and Alluvial Bottom Land corresponding with low lying land along stream courses. In the absence of hydrogeological testing an assumed saturated native infiltration rate of 5mm/hour has been selected for Hydraulic Soil Group C soils. A 2.5 times factor of safety has been applied to determine the factored infiltration rate of 2mm/hour used in LID design. This assumed factored infiltration rate is consistent with Typical values within the *Design Chart 1.13: Infiltration Parameters, MTO Drainage Management Manual, 1997* for Soils

belonging to SCS Hydraulic Soil Group C. Additional Guelph permeameter testing will be conducted prior to the detailed design stage.

LIDs will generally be 3.0m wide and range between 1.65m and 1.70m deep. The LIDs will consist of a trench comprised of Engineered Soil Blend 'A' (void ratio of 0.40) wrapped in filter cloth on all sides. The length of the LIDs vary from 8.5m to 41m.

It is required that individual future site plans will provide LID measures to achieve best-efforts in retention of 5mm of rainfall onsite, best efforts in maintain water recharge, and control the runoff from the 90th percentile storm event on an annual average basis from all surfaces. Control is in the following hierarchal order, retention, LID filtration, and conventional stormwater management. The site's proposed LID cross-sectional details are summarized in the following **Table 19**.

Table 9: LID Summary and Cross Section Details

LID Name	Drainage Area ID	Catchment Area (ha)	Percent Impervious	Length (m)	Width (m)	Depth (m)	Volume of LID (m^3)	% of MOE Required Volume Captured	% of 27mm Volume Captured
LID-1	101	0.06	69%	41.00	3.00	1.65	92.25	3,903%	595%
LID-2	102	0.05	69%	35.00	3.00	1.65	78.75	4,119%	628%
LID-3	103	0.08	71%	41.00	3.00	1.70	94.71	3,309%	503%
LID-4	104	0.08	71%	41.00	3.00	1.70	94.71	3,309%	503%
LID-5	105	0.05	72%	30.00	3.00	1.70	69.30	3,617%	550%
LID-6	106	0.08	69%	41.00	3.00	1.70	94.71	3,347%	510%
LID-7	107	0.08	71%	41.00	3.00	1.70	94.71	3,309%	503%
LID-8	108	0.08	71%	41.00	3.00	1.70	94.71	3,309%	503%
LID-9*	109	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-10*	110	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-11*	111	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-12*	112	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-13*	113	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-14*	114	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-15*	115	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-16*	116	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-17*	117	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-18*	118	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-19*	119	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
LID-20*	120	0.08	75%	8.50	3.00	1.70	19.64	686%	104%
	Total:	1.49	75%				949.47		

* Asterix denotes Filtration only LIDs. These LIDs could not be designed as infiltration based facilities due to local depth to seasonal high groundwater elevations, and proximity of supporting stormwater infrastructure.

Based on the proposed configuration of the LIDs it is anticipated that upstream ROW drainage will be conveyed to the LIDs. The corresponding total LID drainage area is 1.49 ha of which approximately 0.56 ha will receive full infiltration of the 90th percentile water quality event and 0.94 ha will receive filtration. The rainfall volume over these areas is approximately 362m^3 including volume reductions from both impervious and pervious initial abstraction. Approximately 135m^3 and 227 m^3 of stormwater, is directed towards infiltration-based and filtration-based facilities respectively.

LIDs have been proposed to achieve the minimum 5mm volume retention. Based on a total catchment area of 43.45 ha the target run-off volume control is determined to be 2,172 m^3 (43.45 ha x 5mm). The following **Table 20** outlines the target runoff volume controls for both private and public lands.

Table 10: Target Runoff Volume Control by Block Number

Block Number	Area (ha)	Target Runoff Volume Control (m^3)
1	1.46	73
2	4.80	240
3	2.11	105
4	4.65	233
5&7	4.13	207
6	1.78	89
101	1.36	68
102	4.42	221
103	0.31	16
106	6.90	345
107	0.78	39
108 & 109	3.20	160
Sub- Total Private Lands	**35.91**	**1,796**
8, 9, 10, 11, 12, 111, 112 & 113	2.87	143.5
13, 14 & 15	2.13	106.4
110	0.89	44.3
114	0.52	26.0
115	1.13	56.6
Sub-Total Public lands	**7.54**	**377**
Total	**43.45**	**2,173**

It can be shown that the infiltration target is achieved by calculating the provided capture volume available in the proposed infiltration-based LID facilities. The storage volumes provided in the ROW Bioretention Swales total 713.85 m^3. The volume control provided by the respective LIDs are capped at 27mm over the contributing imperviousness area. Summing up the LID volume provided results in a total of **134.5 m^3**, translating to approximately **4.62 mm** over the total public areas total impervious area (7.54 ha at 38.6%).

It is anticipated that individual site plans associated with the Tullamore Secondary Plan area will provide additional measures during the future Site Plan Application stage to achieve best-efforts in retention of 5mm rainfall onsite.

11.6. Extended Detention Wet Ponds

In accordance with the *MESP*, wet ponds will be utilized as end-of-pipe stormwater management facilities, which are sized to provide the required quantity control for all storms up to the 100-year event for the site. The SWMFs have been designed to accommodate all generated flows exclusive of upstream rooftop controls to account for the interim non-site plan approved scenario with the site's temporarily covered in gravel and used for trucking storage yards. The pond's outlet structure and overflow weir has been sized to safely convey the Regional storm event, ensuring a 0.3 m freeboard between the top of pond and the Hazel storm event's ponding elevation.

The preliminary design of SWMF1 & SWMF2 are similar in geometry, having a bottom elevation of the main cell at 224.00 m and permanent pool elevation at 227.00 m. The bottom of SWMF1 forebays are 225.50 m whereas SWMF2s forebay is 226.00 m. This provides permanent pool depths of 3.0 m in the main cell for SWMF1 & SWMF2 whereas a 1.5m & 1.0m deep permanent pool for SWMF1 and SWMF2 forebays. The top of pond elevations for SWMF1 & SWMF2 are 229.30m and 229.00 m, respectively. A safety shelf using 10H:1V and 5H:1V sideslopes has been provided 0.3m and 0.6m above and below the permanent pool elevations, whereas 4H:1V sidesloping has been used everywhere else in the proposed SWMFs. An allowance for a 5 meter wide access road is provided around the entire perimeter of the ponds and is sloped at 2% slope.

11.6.1. SWMF-1

SWMF1 will discharge through a reverse-sloped 450 mm diameter storm pipe to a control manhole complete with a 185 mm diameter orifice plate bolted to the upstream side of the internal weir wall with an invert elevation of 227.00 m. The primary outlet pipe will be secured to a Gabion basket at the bottom of the pond, ensuring that the water is drawn from the bottom 0.5 m of the pond. A secondary outlet pipe, 525 mm in diameter, will discharge to the control manhole at an invert of 227.60 m. This secondary outlet will also have a 500mm orifice plate bolted to the upstream side of the internal weir wall with an invert elevation of 227.60 m. The control manhole will discharge to the channel via a 700 mm diameter storm pipe at a slope of 0.5%. A 12.0 m wide emergency overflow spill weir is incorporated at an elevation of 228.70 m to ensure safe conveyance of peak flows during the Regional (Hazel) storm event.

An abbreviated version of the SWMF1 stage-storage-discharge table is presented below. The full table is provided in **Appendix C**. The values for storage and pond outflow result from the proposed design height and dimensions for the orifices and overflow weir.

Table 11: SWMF1 Stage-Storage-Discharge Table

Elevation (m)	Total Storage (m^3)	Active Storage (m^3)	Water Depth (m)	Discharge (m^3/s)	Comments
224.00	0	0	0.00	0.000	Bottom of Main Cell
225.50	5,911	0	1.50	0.000	Bottom of Forebay
227.00	15,686	0	3.00	0.000	Permanent Pool & Primary Orifice Inv. Elev.
227.50	20,971	5,285	3.50	0.047	90^{th} Percentile - 27mm 4Hr CHI 227.50m
227.60	22,163	6,478	3.60	0.053	Secondary Orifice Inv. Elev.
227.75	23,892	8,206	3.75	0.090	2-Year 12Hr AES 227.75m
227.93	26,149	10,463	3.93	0.219	5-Year 12Hr AES 227.93m
228.04	27,490	11,804	4.04	0.308	10-Year 12Hr AES 228.04m
228.19	29,348	13,662	4.19	0.394	25-Year 12Hr AES 228.19m
228.30	30,836	15,150	4.30	0.446	50-Year 12Hr AES 228.30m
228.43	32,432	16,746	4.43	0.501	100-Year 6Hr AES 228.43m
228.70	36,119	20,434	4.70	0.615	Overflow Weir Sill Elev.
228.97	39,876	24,190	4.97	4.080	Regional (Hazel) 228.97m
229.30	44,712	29,027	5.30	13.637	Top of SWMF

11.6.1. SWMF-2

SWMF2 will discharge through a reverse-sloped 450 mm diameter storm pipe to a control manhole complete with a 120 mm diameter orifice plate bolted to the upstream side of the internal weir wall with an invert elevation of 227.00 m. The primary outlet pipe will be secured to a Gabion basket at the bottom of the pond, ensuring that the water is drawn from the bottom 0.5m of the pond. A secondary outlet pipe, 525 mm in diameter, will discharge to the control manhole at an invert of 227.50 m. A secondary orifice plate will be bolted to the upstream side of the internal weir wall with an invert elevation of 227.50 m. The control manhole will discharge to the environmentally protected channel via a 525 mm diameter storm pipe at a slope of 0.5%. A 6.0 m wide emergency overflow spill weir is incorporated at an elevation of 228.40 m to ensure safe conveyance of peak flows during the Regional (Hazel) storm event.

An abbreviated version of the SWMF2 stage-storage-discharge table is presented in **Table 17** below. The full table is provided in **Appendix A**. The values for storage and pond outflow result from the proposed design height and dimensions for the orifices and overflow weir.

Table 12: SWMF2 Stage-Storage-Discharge Table

Elevation (m)	Total Storage (m^3)	Active Storage (m^3)	Water Depth (m)	Discharge (m^3/s)	Comments
224.00	0	0	0.00	0.000	Bottom of Main Cell
226.00	2,344	0	2.00	0.000	Bottom of Forebay
227.00	5,485	0	3.00	0.000	Permanent Pool
227.44	7,854	2,369	3.44	0.020	90th Percentile - 27mm 4Hr CHI 227.41m
227.50	8,239	2,754	3.50	0.021	Secondary Orifice
227.63	9,057	3,572	3.63	0.038	2-Year 12Hr AES 227.65m
227.77	9,944	4,459	3.77	0.086	5-Year 12Hr AES 227.80m
227.87	10,594	5,109	3.87	0.107	10-Year 12Hr AES 227.91m
228.00	11,466	5,981	4.00	0.129	25-Year 12Hr AES 228.06m
228.09	12,138	6,653	4.09	0.143	50-Year 12Hr AES 228.17m
228.19	12,826	7,341	4.19	0.157	100-Year 12Hr AES 228.28m
228.40	14,336	8,851	4.40	0.181	Overflow Weir
228.63	16,077	10,592	4.63	1.693	Regional (Hazel) 228.66m
229.00	19,089	13,604	5.00	8.338	Top of Pond

11.7. Water Balance

The primary objective of the TRCA's water balance target is to capture and manage annual rainfall on the development site to preserve the pre-development hydrology (water balance) through a combination of infiltration, evapotranspiration, landscaping, rainwater reuse and/or other low impact development practices. TRCA has completed modeling and mapping outlining the important groundwater recharge areas. According to TRCA mapping, the subject site falls under a Low Volume Groundwater Recharge Area (LGRA) however it does discharge to a sensitive ecological feature. As such, a site-specific water balance is required, and best efforts will be made via the SWM plan to maintain the quantity of surface and groundwater contributions.

Various site-specific characteristics contribute to the ability to achieve water balance. They include, but are not limited to: soil permeability, the ability to collect and direct drainage into the ground, groundwater table elevations and seasonal fluctuations. Best Efforts will be made via the SWM plan to maintain groundwater recharge while considering site specific characteristics.

To assess the impact development will have on the subject site's water budget, a pre to post development water balance has been completed. Water Balance Calculations have been provided in the PSWMR

Appendix A for reference. The preliminary Water Balance Assessment for the development has been broken up between public and private lands and is summarized in the following table.

Table 13: Preliminary Water Balance Assessment

Land Use	Approximate Land Area (m^2)	Estimated Impervious Area	Impervious Area Runoff (m^3/yr)	Pervious Area Runoff (m^3/yr)	Total Runoff Volume (m^3/a)	Total Infiltration Volume (m^3/yr)
Pre-Development Scenario						
Agricultural - Public	75,375	0.0%	0	15,105	15,105	10,070
Agricultural - Private	359,121	0.0%	0	71,968	71,968	47,979
Total Pre-Development	**434,496**	**0.0%**	**0**	**87,073**	**87,073**	**58,049**
Post-Development Scenario						
Roads	33,894	75.0%	22,141	1,981	24,122	849
SWM Facilities	32,618	11.2%	3,182	6,772	9,954	2,902
Open Space	8,863	0.0%	0	2,072	2,072	888
Sub-Total Public	**75,375**	**38.6%**	**25,323**	**10,825**	**36,148**	**4,639**
Block 1	14,670	80.0%	10,222	686	10,908	294
Block 2	48,004	89.3%	37,338	1,201	38,539	515
Block 3	21,053	90.0%	16,503	492	16,996	211
Block 4	46,527	90.0%	36,473	1,088	37,560	466
Block 5 & 7	41,331	90.0%	32,399	966	33,366	414
Block 6	17,834	90.0%	13,980	417	14,397	179
Block 101	13,633	80.0%	9,499	637	10,137	273
Block 102	44,191	90.0%	34,641	1,033	35,675	443
Block 103	3,112	80.0%	2,168	146	2,314	62
Block 106	69,023	90.0%	54,107	1,614	55,721	692
Block 107	7,751	90.0%	6,076	181	6,257	78
Block 108 & 109	31,992	84.0%	23,407	1,197	24,603	513
Sub-Total Private	**359,120**	**88.5%**	**276,814**	**9,658**	**286,472**	**4,139**
Total Post-Development	**434,496**	**79.8%**	**302,137**	**20,483**	**322,621**	**8,779**

The results summarized above indicate that there is an increase in total runoff volume and a deficit in infiltration volume from pre to post-development without accounting for LIDs in both the public and private areas. The SWM Plan provided herein is intended to mitigate or reduce the water balance deficit as outlined above. Runoff generated from upstream development is directed to the proposed Low Impact Development (LID) measures. The LIDs and their contributing drainage areas are illustrated on **Drawing STM-4** in **Appendix H**.

The proposed LID measures have been designed to capture and treat the full volume from the 90th Percentile Water quality event. As the naming suggests, the 90th percentile event corresponds to 90% of the total annual rainfall experienced. The theoretical total annual runoff capture for the LIDs equates to 90% of the Impervious and Pervious Area Average Annual Runoff resulting in an additional 783.9 mm/year and 210.4 mm/year retention for the LIDs upstream catchment areas respectively. The proposed LIDs are exclusively located within future public owned lands and as such will only be used to reduce the public lands water balance deficit. Without consideration for the proposed LIDs the public portion of the development has a water balance deficit of 5,431 m^3/year between pre and post development scenarios. The addition of infiltration-based LIDs has reduced this deficit to 1,999 m^3/year by capturing and infiltrating an additional 3,432 m^3/year. All available right-of-way infiltration-based LID locations have been exhausted.

Private lands are required to implement LIDs within their site plans to mitigate the pre to post-development private land water balance deficit. As a general requirement the future site plans will be required to mitigate a unit water balance deficit of 1,218 m^3/ha.yr. To mitigate the private land water balance deficit an additional 56m^3/ha.yr will be required increasing the Future Site Plan unit water balance target to **1,274m^3/ha.yr.** The following table outlines target water balance requirements per block.

Table 14: Target Water Balance Requirement by Block Number

Block Number	Block Area (ha)	Target Water Balance Requirements (1,274 m^3/ha.yr)
1	1.47	1,869
2	4.80	6,218
3	2.11	2,682
4	4.65	5,928
5&7	4.13	5,266
6	1.78	2,272
101	1.36	1,737
102	4.42	5,630
103	0.31	396
106	6.90	8,794
107	0.78	987
108 & 109	3.20	4,076
Total Private Lands	**35.91 ha**	**45,855 m^3/yr**

The private lands unit water balance target will increase the total infiltration volume by an additional **45,855 m^3/year** resulting in a total private lands infiltration volume of **49,994 m^3/year.** This is larger than the pre-development total infiltration volume of **47,979 m^3/year** resulting in a surplus **of 2,015 m^3/year**.

The private lands surplus water balance of **2,015 m^3/year** can be used to reduce the public lands water balance deficit of **1,999 m^3/year** resulting in a net surplus water balance of **16 m^3/year**.

In summary, the proposed stormwater management plan has undertaken a best-efforts approach to mitigate the established pre- to post-development water balance targets.

11.8. Temporary Erosion and Sediment Control

During construction, the majority of the Study Area's natural features will be removed and the topsoil stripped within the development area. The exposed surface will be susceptible to erosion, increasing the potential for sediment runoff. To minimize local and downstream impacts from erosion and sedimentation during construction, the following measures have been recommended:

- Excess earth and topsoil is to be stockpiled away from established drainage areas and/or removed from site. Stockpiles shall be seeded or covered with erosion control if left for periods of greater than 30 days.
- Temporary sediment control fencing should be erected around the perimeter of all grading activities.
- Temporary sediment fabric and stone filters should be installed on catch basins until surface cover has been stabilized.
- Temporary rock flow check dams should be installed within drainage cut-off swales.
- A temporary construction access mud mat should be installed at the construction accesses to reduce the amount of materials that may be transported off site.
- Temporary erosion and sediment control basins are to be constructed (during the site plan development stage), complete with a Hickenbottom outlet control structure and overflow weir. The basins' purpose is to detain runoff long enough to allow most soil particles to settle out of suspension.
- Construction during drier months should be monitored for wind-borne transport of sediments. At the direction of the engineer, the contractor may be directed to water down exposed earth areas with an aqueous solution of calcium chloride.
- All disturbed areas not under immediate construction for 30 days, or not intended for building activities within a 3-month time period, should be stabilized with seeding.

A Conceptual Erosion and Sediment Control Plan (Drawing No. ESC-1) has been attached in **Appendix H** illustrating the location of the above features.

11.9. Conclusions

The Preliminary Stormwater Management Report identifies the recommended stormwater management design for the Study Area's concept plan based on the MESP and latest TRCA, MECP and Town requirements. The report's conclusions and recommendations are as follows:

- Enhanced (Level 1) SWM Quality Control will be provided by the proposed extended detention wet ponds.
- SWM Quantity Control will be provided by both the active storage component of the proposed wet ponds as well as rooftop and on-site storage measures on all proposed development blocks per the MESP requirements. The post-development peak flows will be controlled to the allowable flow rates as determined by the MESP and the TRCA's Unit Flow Relationships for the Humber River Watershed.
- The design of the proposed wet ponds will incorporate thermal mitigation measures defined by the Ministry of Natural Resources in order to diminish the impacts of development on the habitat of Redside Dace found in the receiving watercourse.
- A 3rd pipe system is proposed to collect stormwater runoff from rooftop areas and discharge directly to the tributary of Salt Creek. This system will assist with maintaining flow contributions to this watercourse, which has been identified as an ecologically important feature.
- Water Balance for the site will be examined in further detail after additional geotechnical investigations have been completed to confirm soil types on site.
-

12. Conceptual Wastewater Servicing

12.1. External Wastewater Servicing Framework

The Study Area is part of the Region's East Trunk Sewer drainage catchment area that outlets to the G. E. Booth Wastewater Pollution Control Plant located on the shore of Lake Ontario. The closest trunk sewer servicing the Study Area and surrounding lands is located within west side of Airport Road. The *Airport Road, New Construction,* Plan No. 38362-D and No. 38363-D (dated January 2010) plan and profile's (P&P) illustrates that there is an existing 750 mm diameter sanitary sewer within the roadway's western boulevard at an approximate depth of 6mto 7.5m along the Study Area limits. The Region's Wastewater DC Map (2014) shows this sewer draining south along Airport Road until it eventually outlets to the McVean Pump Station at Queen Street in the City of Brampton.

The *Highlands of Castlemore*, *Maisonneuve Boulevard, Plan and Profile* No. 34313-D (dated July 2002) illustrates an existing 250 mm diameter sanitary sewer that terminates at the intersection of Mayfield Road at an approximate depth of 4.75m. This local sewer drains south through the Castlemore Secondary Plan and eventually outlets to the east trunk system. All the existing municipal services directly surrounding the Study Area are shown on the Existing Servicing Plan (Drawing No. GEN-1) attached in **Appendix H**.

12.2. Allocated and Projected Populations

The Region's *Linear Wastewater Standards* (2023) (formerly the *Public Works Design, Specifications & Procedures Manual – Linear Infrastructure, Sanitary Sewer Design Criteria* (July 2009)) provides theoretical design criteria for future developments and their projected sanitary loading demands. Specifically, the guidelines provide design criteria for commercial and industrial developments based on land use population equivalents. The population equivalents for the Study Area are:

- Industrial (light): 70 persons per hectare (70 PPH)
- Commercial: 50 persons per hectare (50 PPH)

A copy of the Region's sanitary sewer design criteria has been attached in **Appendix D**.

12.2.1. Allocated Population

Correspondence with the Region determined that the wastewater servicing and the allocation in the existing Airport Road servicing framework would be determined based on the Study Area's topography, the Region's sanitary servicing standards, and the depth of the Airport Road sewer. Prior to the commencement of the Study Area's design works it was noted that the land was not specifically accommodated in the Airport Road sewers catchment area. A copy of the Region's correspondence has been attached in **Appendix D**. However, the Region's Trunk Catchment System Maps (Sheet 3, 14, 18 and 21) dated March 2014, shows that the Study Area is located within catchment ER_Sub1.

Portion of the Study Area's eastern limits have been accommodated in the Highlands of Castlemore subdivisions design located south of the Study Area. The extension of the sanitary sewer within Maisonneuve Boulevard to the southern limit of Mayfield Road was coordinate by the Tullamore Industrial Park development (Property Owners No. 9 and 10). The *Sanitary Drainage Area Plan,* Sheet No. D.2 (dated July 2002) and accompanying *Sanitary Sewer Design Sheet 3* (dated January 2003) shows an external drainage area of 20.71 hectares (20.23 from Area ID EXT plus an additional 0.48 hectares), a population density of 50 PPH and a total equivalent population of **1,035.5 people**, or flow of 0.018142 cu.m/s, draining to the Maisonneuve Boulevard sewer system from the Study Area (20.71 ha x 50 PPH = 1,035.5 people). However, *Sanitary Sewer Design Sheet 12's* bottom row indicates that "*flow based on population equivalent of 70 for Future areas west of Country Brook and North of Mayfield Rd = 20.23+15.5=38.8".* For the EXT area of 20.23 hectares this equates to a total equivalent population of **1,416.1 people**. Since this note does not reflect the *Sheet 3* data the initial allocation of 50 PPH (conservative allocation scenario) has been used as the governing allocated population.

12.2.2. Projected Design Population

The Study Area Concept Plan has a total land area of 53.2 hectares excluding the Salt Creek floodplain lands (refer to Table 3). For wastewater flow estimates the total developable land (commercial and industrial blocks) is 44.8 hectares, with 8.4 hectares used for the future roadways, EP channel and SWM pond blocks.

Based on the Study Area topography and Region's sanitary sewer design criteria for commercial/industrial areas (sewer obvert shall be located 3.5 meters below the centre line of the road allowance where possible) the lands have been broken down into two (2) main catchments referred to as the west catchment and the east catchment. The west catchment will gravity drain to the Airport Road sewer

system and the east catchment will gravity drain to the Maisonneuve Boulevard sewer. The catchment areas are shown on the Sanitary Drainage Area Plan (Drawing No. SAN-1) attached in **Appendix H**. The west and east catchment area and statistics and projected population based on land uses have been summarized in the following table.

Table 15: Wastewater Catchment Areas and Population Statistics

	Area (hectares)		Population	
Land Use	**West Catchment**	**East Catchment**	**West Catchment**	**East Catchment**
Highway Commercial (50 PPH)	12.0	0.0	598.8	0.0
Prestige Industrial (70 PPH)	0.0	5.2	0.0	364.2
General Industrial (70 PPH)	5.8	21.8	402.5	1,527.5
Roads (26 m ROW)	1.0	2.3		
Environmentally Protected Channel	0.0	0.9		
Stormwater Management Pond 1	0.0	2.1		
Stormwater Management Pond 2	0.0	1.1		
Mayfield Road Widening	0.2	0.7		
Salt Creek Flood Plain	0.0	4.4		
Sub-Totals	19.0	38.6	1,001.3	1,891.7
Total	57.6		2893.0	

Note: The above areas are based on the Study Area land uses with SmartCentres re-zoning designations. Refer to Drawing No. LU-1 attached in Appendix B for the land uses.

Excluding the non-developable lands (roads, EP channel, SWM ponds, road widenings, Salt Creek flood plain lands) the total developable area for the west and east catchments are 19.0 hectares and 28.6 hectares, respectively. Based on these areas and the Region's population equivalent for commercial and industrial developments the west and east catchments will have a total equivalent population of **1,001.03 persons** and **1,891.7 persons**, respectively.

The east catchment area's developable land of 28.6 hectares is greater than the Highlands of Castlemore's sanitary sewer design sheet estimate of 20.7 hectares and the catchments developable lands are all industrial resulting in projected population of 1,891.7 people which is 856.2 people greater than the originally EXT area population of 1,035.5 people if based on the allowable commercial areas projected population density (50 PPH), and is 475.6 people higher than the EXT area population of 1,416.1 people if based on the allowable industrial areas project population density (70 PPH). If the east catchments actual

developable area was restricted to the Highlands of Castlemore's sanitary sewer design sheet population this corresponds to an allowable PPH density of approximately 36.2 (1,035.5/28.6).

To confirm that the east catchments additional population and resulting sanitary flow rate can be accommodated in the downstream sewer network the projected wastewater flows have been estimated to compare against the sewer networks excess flow capacity.

12.3. Allocated and Projected Wastewater Flows

12.3.1. Allocated Wastewater Flows

As previously mentioned, portion of the Study Area's eastern limits have been accommodated in the Highlands of Castlemore subdivisions design. The *Sanitary Drainage Area Plan,* Sheet No. D.2 (dated July 2002) and accompanying *Sanitary Sewer Design Sheet 3* (dated January 2003) show an external drainage area of 20.71 hectares that equates to a sewage flow of 0.014 cubic meters per second (m^3/sec) and infiltration flows of 0.00414 m^3/sec for a total flow rate of 0.01814 m^3/sec.

Design Criteria

For detailed design the Region's *Sanitary Sewer Design Criteria* Standard Drawing 2-5-5 *Sewage Flows (Excluding Infiltration)* uses an average daily domestic sewage flow rate (q) of 302.8 liters per capita per day (lpcd) for estimating projected sanitary loading demands. The Region's Linear Wastewater Standards Section 2.3 notes that the daily per capita sanitary flow rate shall be 270 L/employee/per day for non-residential and 290 lpcd for residential. Since the number of employees for the development lands is unknown the more stringent flow of 302.8 lpcd has been utilized.

The infiltration (extraneous) sewage flow rate of 0.00026 cubic meter per second per hectare (0.0026 m^3/sec/ha or 0.26 L/sec/ha) is used for all types of lands (developable and non-developable) within the sanitary catchment boundary. An additional allowance for maintenance hole inflow of 0.00028 m^3/sec/maintenance hole or 0.000028 m^3/sec/meter of sewer length is also used for detailed design calculations.

To confirm that the existing outfall sewers have the capacity to convey the Study Area's future wastewater the peak projected sanitary flows have been calculated using the site's design population with the *Peak Domestic Sewage Flow* equation and the *Harmon Formula* provided below.

Peak Domestic Sewage Flow $Q_p = P \times q \times M / 86.4 + I \times A$

Where: Q_p *= peak residential sanitary sewage flow, including extraneous flow (L/s), P = design population in thousands, q = average domestic flow per capita (litres/day/person), M = Peaking factor (no less than 2 and not greater than 4), I = Peak extraneous flow (litres/second/hectare), A = tributary area (hectares)*

Harmon Formula $M = 1 + 14/(4 + P^{1/2})$

Where: *M = ratio of peak flow to average flow, P = tributary population in thousands*

Projected Wastewater Flows

Using the above equations with the development areas and land use types, the Study Area's total peak wastewater flows have been summarized in the following table.

Table 16: Wastewater Flows Based on Projected Population

			Wastewater Flow (cu.m/s)		Sub-Totals
	West Catchment	East Catchment	West Catchment	East Catchment	(cu.m/s)
Total Population	1,001.3	1,891.7	0.01333	0.0239	0.03723
Total Area for Infiltration (ha)	19.0	34.2	0.00493	0.00890	0.01383
Sub-Totals			0.01826	0.03280	
Total Peak Wastewater Flows			0.05106		

Based on the above table, the total peak flow (including infiltration) for the west and east catchments is 0.03997 m^3/s and 0.0328 m^3/s, respectively. The peak flows are consistent with the Region's Standard Drawing 2-5-2 *(Sewage Flows - Excluding Infiltration)* for the development area populations. Drawing 2-5-2's applicable population and domestic flows have been summarized in the following table.

Table 17: Region's Standard Drawing 2-5-2 (Sewage Flows - Excluding Infiltration) Summary

Population	Peak Wastewater Flow (cu.m/s)
1,200	0.0157
1,300	0.0169
1,400	0.0181
2,600	0.0318
2,800	0.0340

The Region's Standard Drawing 2-5-2 (Sewage Flows - Excluding Infiltration) illustrates that the actual combined flows from both catchments will be less than when calculated separately due to the decreased peaking factor. The peaking factor for the west and east catchments when calculated separately are 3.8 and 3.6, respectively. The combined population's peaking factor decreases to 3.46, or a reduction of 9%.

A summary version of the Region's Standard Drawings No. 2-5-1 *(Sanitary Sewer Design Sheet)* has been prepared using the populations and areas identified in the above tables. A copy of the design sheet has been attached in **Appendix D** showing the detailed calculations. The design sheet will be updated during the detailed design.

Based on the above information, the Study Area's east catchment will generate an excess peak sanitary flow of **0.014658 m^3/s** (0.0328 - 0.018142; proposed - allowable) or 14.66 l/s.

These flows are conservatively based on the Region's peak light industrial population equivalents when actual industrial sewage flows vary greatly with the types of industries, the provision of in-plant treatment or regulation of flows.

The MOECC *Guidelines for the Design of Water Storage Facilities, Water Distribution Systems, Sanitary Sewage Systems and Storm Sewers,* (May 1979) and the *Design Guidelines for Drinking-Water Systems* (2008) both recommend using a light industrial average day demand wastewater/water flow allowance of 35 m^3/ha-day (excluding infiltration). A typical peaking factor of 2 to 4 is applied to this rate depending on the type of industry and production schedule. A copy of the design guidelines have been attached in **Appendix D**.

Based on the light industrial flow allowance of 35 m^3/ha-day and a peaking factor of 2 to 4 the east catchments peak wastewater flows have been estimated and summarized in the following table.

Table 18: East Catchment Wastewater Flows Based on Light Industrial Demands

	Average Wastewater Flow		Peak Wastewater Flow (cu.m/s)	
	(cu.m/d)	(cu.m/s)	PF=2	PF=4
Developable Area Flow based on 27.0 ha at 35 cu.m/da-ha	945.9	0.01095	0.02189	0.04379
Infiltration Flow based on 34.2 ha at 0.0026 cu.m/sec/ha	768.9	0.0089	0.0089	0.0089
Totals	1,714.78	0.01985	0.03079	0.05269

The above table confirms that the Region's standards for calculating sewage waste flows are consistent with the MOECP standards.

Excess Wastewater Flows

As noted above, the Study Area's east catchment will generate an excess peak sanitary flow of **0.014658 m^3/s**, which is 80.8% greater than the allowable discharge rate (0.014658/0.018142*100).

12.3.2. Sanitary Sewer Capacity Check

To confirm that the Study Area's east catchment's additional population and resulting sanitary flow rate can be accommodated in the downstream sewer network the excess **0.014658 m^3/s** flow rate was reviewed against the Highlands of Castlemore subdivisions *Sanitary Sewer Design Sheet's* 1 through 12 downstream sewers *Total Flow (Sewage Flow plus Infiltration Flow)* to confirm if the increased flow rate can be added to the system without surcharging the *Capacity* of each of the sewers.

The locations of the existing sewer systems minimum excess flow capacities from each of the Highlands of Castlemore subdivisions *Sanitary Sewer Design Sheet's* 2 through 12 have been summarized in the following table. **Note:** The sanitary discharges actual route from the Study Area's east catchment through the existing system to the pump station will need to be confirmed as all the sanitary drainage plans where not available at the time of this analysis.

Table 19: Existing Downstream Sanitary Sewer Flow Capacities

No.	Location	Pipe Diam. (mm)	Slope (%)	Sewer Flow (cu.m/s)	Sewer Capacity (cu.m/s)	Excess Capacity (cu.m/s)	East Catch. Flow (cu.m/s)	Surcharge Rate (cu.m/s)
1	Sheet 2 Street B - Easement MH6A to MH5A	250	0.40	0.019604	0.038	0.018396	0.014658	0
2	Sheet 2 Street B - Easement MH5A to MH4A	300	0.40	0.030144	0.061	0.030856	0.014658	0
3	Sheet 3 Street I MH34A to MH33A	250	0.50	0.019446	0.042	0.022554	0.014658	0
4	Sheet 4 Street D MH41A to MH40A	250	0.50	0.013774	0.042	0.028226	0.014658	0
5	Sheet 5 Street H MH25A to MH26A	250	0.50	0.014426	0.042	0.029488	0.014658	0
6	Sheet 6 Street D MH28A to MH111A	250	0.50	0.029166	0.042	0.012834	0.014658	**0.001824**
7	Sheet 7 Street L MH85A to MH86A	250	0.50	0.040984	0.042	**0.001016**	0.014658	**0.013642**
8	Sheet 8 Easement MH116A to MH8A	250	0.50	0.032316	0.042	0.009684	0.014658	**0.004974**
9	Sheet 9 Street C	250	0.50	0.014542	0.042	0.027458	0.014658	0

No.	Location	Pipe Diam. (mm)	Slope (%)	Sewer Flow (cu.m/s)	Sewer Capacity (cu.m/s)	Excess Capacity (cu.m/s)	East Catch. Flow (cu.m/s)	Surcharge Rate (cu.m/s)
	MH48A to MH20A							
10	Sheet 10 Street G MH5A to MH4A	250	0.50	0.019698	0.042	0.022302	0.014658	0
11	Sheet 11 Street D MH10A to MH9A	250	0.50	0.02326	0.042	0.01874	0.013858	0
12	Sheet 12 Street O MH85A to MH96A	300	0.50	0.063486	0.068	**0.004514**	0.013858	**0.010144**
13	Sheet 12 Last Row	300		0.0917	0.097	**0.0053**	0.013858	**0.009358**

Based on the above table the proposed Study Area's east catchment sanitary flows would create a potential capacity issue at five (5) locations; refer to row no. 6, 7, 8, 12 and 13. The greatest surcharge rate occurs in row 7 at a rate of **0.013642 cu.m/s** (13.6 l/s).

If the increased population is added to the Highlands of Castlemore subdivisions *Sanitary Sewer Design Sheets* the higher population would reduce the peaking factor and result in an even lower surcharge rate. If the Region requires the peak flows to be reduce to the allocated levels options such as flow equalizations restrictions and/or off-peak discharge facilities can be implemented during the detailed design. Further some of the actual site plans will likely consist of truck yards and storage which would reduce the actual sanitary flows from these projected rates. Due to the relatively small increase in flows to the Region's overall system, we anticipate that there will not be any issues, and the excess flow rate can be accommodated by the existing infrastructure.

12.4. Sanitary Servicing Scenario

The Study Area will construct an internal gravity sanitary sewer network that will discharge to the municipal system at two locations; Airport Road and Davis Lane (approx. 6 meter deep sewer connection)

and the proposed Davis Lane (Street A) and Maisonneuve Boulevard (approx. 4.75 meter deep sewer connection).

The future right-of-way sewers will be installed 3.5 meters below the centre line of the road allowance, where possible. However, to accommodate the restricted allowable sanitary discharge to the Maisonneuve Boulevard sewer system, sections of the sanitary sewers are set at a depth of 2.0 meters. Refer to the preliminary Plan and Profiles (Drawing No. PP-1 and PP-2) attached in **Appendix H** for the depth and location of the proposed sewers. The sewers will generally be located 1.5 meters north or east of the centerline of the roadways. The future property blocks will have individual services stubbed at the limit of the right-of-way. The exact service locations will be confirmed during the detailed design when the subdivisions draft plan has been created with consultation from the landowners.

The Study Area's sanitary sewers will be constructed in accordance with the Region and Town's engineering standards and the MOECP guidelines. The proposed sewer network will consist of PVC, DR35 pipe with a minimum diameter of 250mm. The design will ensure that the minimum and maximum velocities are maintained under full flow conditions.

Refer to the Sanitary Drainage Area Plan (Drawing No. SAN-1) attached in **Appendix H** for the future sanitary sewer locations and the Sanitary Sewer Design Sheet attached in **Appendix D** for the flows and velocities. All the existing external and proposed Study Area municipal services are shown on the General Servicing Plan (Drawing No. GEN-2).

13. Conceptual Water Servicing

13.1. External Water Servicing

The Study Area is in the Region's East Trunk System's Pressure Zone 6. This zone is serviced from the interconnected Lakeview and Lorne Park Water Treatment Plans, both of which are located on the shore of Lake Ontario. The zone has a serviceable elevation range of 227.3 meters to 259.1 meters with a top water level of 297.2 meters. The Tullamore Reservoir and Pumping Station facility is located adjacent to the Study Area, across Salt Creek, off Innis Lake Road.

The *Airport Road, New Construction,* Plan No. 38362-D and No. 38363-D (dated January 2010) P&P shows that there is an existing 300 mm diameter watermain within the roadway's eastern asphalt, at an approximate depth of 2 meters. This main connects to the existing 300 mm diameter main within Mayfield Road's northern boulevard and is shown on the *Mayfield Road, Tullamore Transmission Main, Contract No. 2,* Plan No. 48180-D. This contract drawing set also shows existing 1,050 mm diameter and a 750 mm diameter transmission watermains within Mayfield Road. Plan No. 48182-D shows the 300 mm diameter main reduced to a 200 mm main in front of the Maisonneuve Boulevard intersection before continuing to Innis Lake Road. The *Mayfield Road Prop. 300 mm Watermain Relocation,* Plan 68322-D to 68324, IFC, stamped date of July 26, 2019, illustrate that the 200 mm diameter reducer and main were removed and upgraded with a 300 mm diameter main. All the existing municipal services surrounding the Study Area are shown on the Existing Servicing Plan (Drawing No. GEN-1) in **Appendix H**. A copy of the Region's existing water infrastructure information has been included in **Appendix D**.

13.2. Watermain System

The Study Area's proposed 300 mm diameter watermains will connect to the existing system at two locations; Airport Road and Davis Lane, and at the proposed Davis Lane (Street A) extension to Maisonneuve Boulevard/Mayfield Road. The Airport Road connection will be fed from the existing 300 mm diameter main running along Airport Road's eastern boulevard. The Davis Lane and Maisonneuve Boulevard/Mayfield Road connection will connect to the exiting 300 mm diameter main.

The proposed internal watermain system will be looped and include potable and fire water services stubbed at the limit of the right-of-way for each individual property / block. The exact service locations will be confirmed during the detailed design. The mains will be installed at the minimum depth of cover

(1.7 meter within ROW boulevards, 1.4 meters beneath the centerline of ditch crossings) and fire hydrants will be spaced at 100 meter intervals in accordance with Town and Region's industrial standards.

Refer to the General Servicing Plan (Drawing No. GEN-2) attached in **Appendix H** for the location of the existing external watermains, future connection points and internal subdivision layout.

13.3. Water System Analysis

During the project's initial background data collection and review the Region indicated that they have completed preliminary modelling for the Study Area's future water system demands. However, if requested by the Region, a Water System Analysis (WSA) will be completed for the Study Area's proposed water distribution system during the detailed design stage. The WSA will demonstrate how the future development blocks can achieve the minimum standards in the MOECP, Town, Ontario Building Code (OBC) and Region guidelines for water distribution systems. The model will also examine the effect of the Study Area's demands on the adjacent municipal system.

Based on the location of the Study Area and proximity to the Region's pumping station there should not be any issues meeting minimum potable and fire system standards for flow and pressure.

14. Conceptual Grading and Landform

14.1. Existing Conditions

The existing site conditions and surrounding municipal infrastructure data was initially provided by the Region's GIS department. The overall Study area existing contour data was primarily obtained through the First Base Solutions On-Line Mapping Data Warehouse. Further, the Tullamore Industrial Park's (Property 10) topographical and legal survey plan (dated February 2007), the Davis Lane legal survey (dated February 2014), the SmartCentres (Property 5 and 6), and the 6086 and 6230 Mayfield Road (Property 7 and 8) topographical survey were obtained and overlaid into the Study Area's digital base plan. Using the initial base data, the internal and external elevations and infrastructure locations were confirmed through survey spot checking.

14.2. Grading Scenario

The proposed grading scenario is based on the latest Concept Plan's right-of-way, EP channel and SWMP locations and the Town's grading standards. The Concept Plan proposes a 26-meter industrial collector roadway network (Street A / Davis Lane) approximately 1,400 meter in length connecting Airport Road at Davis Lane to Mayfield Road at the Maisonneuve Boulevard intersection. Street B will be 170 m in length located on the east side of Street / Davis Lane terminating at a cul-de-sac.

Generally, the grading design has been completed in accordance with the Town's industrial development standards, including the minimum road grade of 0.75%, maximum road grade of 6%, minimum K values of 25 (sag and crest) (where achievable) and the minimum intersection crown slope of 2%.

Additionally, the future lot grades are currently proposed at a minimum of 0.5% (standard is 2% minimum) to meet the Town's engineering standards for individual lots to drain to a single outlet/ROW location for the minor and major overland flow routes. The road and subdivision blocks grading will match into the existing Study Area perimeter elevations. The perimeter of some blocks will require sloping (3:1 max used) to ensure the block's future stormwater is directed to the ROW's and ultimately to the SWM ponds.

14.3. Roadway Geometric Design Review

The Town's Standards Section 1.5.2. *Geometric Design*, Table 1.2 notes that a 26.0 m Industrial Collector with an Average Daily Traffic (ADT) of 1,000 to 3,000 and a posted speed of 70 km/h requires a minimum vertical curve (K) in a sag and crest of 25. Due to the development's existing elevation and proposed stormwater design constraints, the proposed Street A connection at Mayfield Road K values deviate from the Town's criteria by proposing a minimum vertical sag K of 8 and a minimum vertical crest K of 13. Refer to the Plan and Profile drawings (PP-1 and PP-2) attached in **Appendix H** for an illustration of the proposed roadway profile details. The following road vertical curve geometric design review has been completed to illustrate that the proposed road K values meet or exceed the Ministry of Transportation (MTO) Geometric Design Standards for Ontario Highways minimum design criteria.

14.3.1. Transportation Study

As part of the Draft Plan of Subdivision development requirements a Transportation Study was prepared by CGE Transportation Consulting (CGE), dated December 16, 2024. A copy of the Transportation Study has been attached in **Appendix F**. The study provides a high-level assessment of the proposed developments anticipated traffic impacts to the surrounding roadways. CGE's proposed site trip generation data identifies the total amount of traffic during weekday morning peak hour, and two-way trips during afternoon peak hour, and has been summarized below.

- 310 two-way trips (221 in and 89 out) – **Weekday morning peak hour**
- 445 two-way trips (174 in and 271 out) – **Afternoon peak hour**

A total of 755 trips is anticipated for the development. The proposed ADT of 755 is lower than the ADT for an Industrial Collector R.O.W. (1,000 to 3,000) and is more in line with a Local Industrial R.O.W. (<1,000). As such the development's design speed will presumably have a posted design speed of 50 km/h. The Town's Standards Section 1.5.2. *Geometric Design*, Table 1.2 notes that the posted design speed of 50km/h based on an ADT of <1,000 requires a minimum vertical curve K in a sag and crest of 18 and 15, respectively.

14.3.1. Vertical Curve Geometric Design Review

To direct the post-development major overland flow to the proposed SWM facility a high point is required at Street A, north of the Mayfield Road intersection. This high point ensures that the major storm event runoff spills to the SWM facility for quantity control before draining south to Mayfield Road. The roadway high point and matching into the Mayfield Road asphalt 3% cross-fall, imposes a deviation in the road K values from the Town's criteria by requiring a vertical sag of 8 and a vertical crest of 13.

The MTO Geometric Design Standards for Ontario Highways is the governing document from which most municipalities roadway design standards are based on. Chapter C – *Alignment*, Section C.4 provides vertical alignment component design requirements, including the minimum sag and crest curvature, and is summarized below in Table C4-5 *K - Standard Vertical Curve Values*, and Table C4-8 *Sag Curvature, Comfort*.

Table C4-5
K - STANDARD VERTICAL CURVE VALUES

4	5	8	10	12	15	18	20	25	30	35	40	45
50	60	70	80	90	100	120	150	180	200	230	250	300

Table C4-8
SAG CURVATURE, COMFORT

Design Speed km/h	40	50	60	70	80	90	100	110	120
Minimum sag vertical curvature K, comfort criterion	4	5	8	12	15	20	25	25	30

The above tables illustrate that the minimum curvature for a crest and sag with a design speed of 50 km/h is 4 and 5, respectively. The proposed Street A roadway profile minimum crest and sage K of 13 and 8, respectively, both exceed the MTO minimum geometric design requirements. Refer to the Grading Plan (Drawing No. LG-1) and preliminary Plan and Profiles (Drawing No.'s PP-1 through PP-6) attached in **Appendix H** for the proposed road and lot elevations and details.

15. Transportation

15.1. External Road Network

The Study Area borders onto two Regional roads: Airport Road (Regional Road 7) along the western boundary and Mayfield Road (Regional Road 14) along the southern boundary. Both are considered arterial collector roads. A copy of the Region's Road Map is attached in **Appendix F**.

Figure 36: Regional Road Map

15.2. Mayfield Road Widening

The Region's Mayfield Road improvements project, from Airport Road to Colerain Drive, is expected to commence in 2026. The design and construction works will accommodate the Study Area's entrance location at the Davis Lane extension to the Mayfield Road and Maisonneuve Boulevard intersection. This subdivision entrance will ultimately require traffic signals to accommodate Study Area's commercial and industrial transportation demands on the surrounding roadways.

15.3. Transportation Study

As part of the Study Area's preliminary design a *Transportation Study* (TS) has been completed by CGE Transportation Consulting, dated December 16, 2024, to provide a high level assessment for the impact of the future Study Area traffic on the adjacent roadways and to provide recommendations to accommodate the traffic in a safe and efficient manner. The TS reflects the early planning stages of the development and was prepared in advance of the site Traffic Impact Study (TIS) and the Functional Internal Traffic Study (FITS). Note that the TS and the SmartCentres TIS and Demand

Figure 37: Transportation Study Map

Management Plan are complementing each other to address the traffic impacts and site accesses to the various developments located within this quadrant.

In general, the TS has reviewed and addressed the proposed access locations and traffic scenarios with recommendations for the planned intersections. For a full description of the transportation requirements refer to the TS attached in **Appendix F**.

16. Utilities, Street Lighting and Traffic Signals

The Study Area will be serviced by secondary utilities including hydro, gas, phone, cable, internet, streetlights, and Canada Post for mail. At this time there are no known encumbrances with the utilities and the specific servicing needs for the subdivision blocks will be determined during the project's detailed design process. The following provides a summary of the existing utility provider's plant data, street lighting and traffic signals information surrounding the Study Area.

16.1. Gas

The Enbridge Atlas Tile Mapping data shows there are four-inch PE mains within Airport Road's eastern boulevard, Mayfield Road's southern boulevard and running along the west side of Maisonneuve Boulevard. A copy of the mapping data has been included in **Appendix G**.

New gas mains will connect to the existing service at the Study Area entrances and loop through the future right-of-ways. The proposed mains actual size will be determined during the detailed designs stage. A composite utility plan (CUP) will summarize all the utility design and construction works for the Study Area.

16.2. Hydro

Hydro One Networks Inc. (HONI) currently services the existing developments within the Study Area and surrounding the site. The HONI servicing map shows three phase primary overhead lines (16/27.6 KV) and poles running along Airport Road's eastern boulevard and Mayfield Road's northern boulevard. A site visit confirmed that there is a second set of hydro poles and lines running along Mayfield Road's southern boulevard. A copy of the mapping data has been included in **Appendix G**.

Figure 38: Mayfield Road and Maisonneuve Boulevard Intersection

The existing hydro network will service the Study Area by connecting to the grid at the future site entrances and installing underground cables and pad mounted transformers that will loop through the

future right-of-ways. The primary and secondary hydro servicing specifics for the future commercial and industrial blocks will be determined through consultation with HONI during the detailed designs stage.

16.3. Rogers

Rogers was contacted to obtain their networks utility information surrounding the Study Area, but it was not made available at the time of this report's preparation. Based on the other utilities that are available in the area it is assumed that there will be no encumbrances to equip the site with Rogers services.

16.4. Bell

Bell currently has buried cable and conduit servicing the properties surrounding the Study Area. There are services running along both side of Airport Road and Mayfield Road. These services will be extended through the Study Area to service the individual blocks. A copy of the Bell mark-up mapping data has been included in **Appendix A.8.**

16.5. Street Lighting

Airport Road is currently equipped with streetlights along both sides of the right-of-way. These lights are operated by the Region. Mayfield Road only has lighting at the intersection of Maisonneuve Boulevard.

New streetlights will be installed throughout the Study Area in accordance with the Town and HONI's latest standards for industrial subdivisions. All lighting will be approved by the Electrical Safety Authority (ESA) before being energized and assumed into the Town's streetlighting inventory. For new development LED lighting sources are typically required with 6 Lux at 3:1 illumination ratios, spaced at 55 – 60 meter intervals for industrial collector roads but will be confirmed during the detailed design. A copy of the Town's applicable street lighting standards has been attached in **Appendix G**.

16.6. Traffic Signals

The Airport Road and Mayfield Road intersection is currently equipped with traffic control signals operated by the Region. There are also existing signals at the intersection of Airport Road and the Mayport Distribution Facility entrance (referred to as Street A). A copy of the existing signal diagrams are attached in **Appendix G**.

Figure 39: Airport Road and Mayfield Road Intersection

The Study Area's ultimate build-out will require traffic signals at the Davis Lane and Airport Road intersection and at the Davis Lane, Mayfield Road, and Maisonneuve Boulevard intersection. The traffic created from the Study Area developments and neighbouring growth demands will warrant the traffic signal installation timing. The design and installation timing for the traffic signals will be coordinated with the Region and the Town during the detailed design. Further details for the traffic signal construction timing and triggers have been described in the TIS prepared for the Study Area.

17. Conclusions

This Master Environmental Servicing Plan Update report provides a summary of the Tullamore Secondary Plan Study Area development conditions, the existing municipal infrastructure surrounding the Study Area, the Study Area current environmental conditions and assessment recommendations and, based on these conditions and the recommendations in the MESP (2000), a conceptual development plan for the Study Area with the location of the future road network, environmentally protected channel, and stormwater management facilities

Further, this Report read in conjunction with the conceptual civil engineering drawings illustrates the conceptual infrastructure required to service the site for water, wastewater, roads, stormwater management quality control, quantity control, water balance, and erosion and sediment control, conventional utilities, street lighting and traffic signals.

In particular, this Report recommends the following:

- The post-development stormwater runoff from the Study Area lands and the portion of Mayfield Road fronting onto the site can be accommodated by the construction of two on-site stormwater quality and quantity control facilities (ponds).
- At the Site Plan stage of development, the future blocks will incorporate on-site lot level and rooftop stormwater quantity controls, Low Impact Development (LID) quality controls, and water balance measures.
- Base flow to the existing Environmental Policy Area and culvert crossing Mayfield Road at Maisonneuve Boulevard can be maintained by constructing an environmentally protected corridor and discharging the future phases of the development's building roof-leaders via a third-pipe system. The corridor is consistent with the MESP requirements to establish an integrated restoration area/stormwater pond in Tributary 3 to promote the linkage to Salt Creek through the Vales of Castlemore (North) development. Based on the conceptual grading design the valley top of bank and appropriate vegetative buffers within the corridor can be accommodated by the 35 m width.
- The Study Area's grading, landform, future road profile and environmentally protected corridor center line elevations can accommodate the sanitary and storm sewer servicing crossing constraints.

- The Region of Peel's wastewater (sanitary sewers) infrastructure within Airport Road and Mayfield Road (Maisonneuve Boulevard) can accommodate the effluent from the Study Area's full build-out.
- The Study Area's ultimate road network connections at Airport Road and Mayfield Road can accommodate the developments traffic demands by installing traffic signals at both locations.
- The Study Area's landscaping, street lighting and boulevard features will be designed in accordance with the *Tullamore Community Design Guidelines.*
- The existing hydro, gas, telephone and cable networks within Airport Road and Mayfield Road can accommodate the Study Area's future utility requirements.
- The conceptual designs are consistent with the Town of Caledon, Region of Peel, Ministry of Natural Resources and Forestry, Ministry of the Environment and Climate Chance, and the Toronto and Region Conservation Authority standards and development criteria.

We trust the enclosed is appropriate for the Study Area's preliminary design. It is recommended that this Report be accepted as demonstrating a functional servicing approach for the Study Area and an update to the Tullamore Secondary Plan Area's Master Environmental Servicing Plan Report.

All of which is respectfully submitted,

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References

- Town of Caledon, Development Standards Manual (Version 5), 2019
- Town of Caledon, Official Plan, April 2018 Consolidation
- Region of Peel, Linear Wastewater Standards, 2023
- Region of Peel, Public Works Design, Specifications & Procedures Manual – Linear Infrastructure, Sanitary Sewer Design Criteria, July 2009
- Region of Peel, Public Works Design, Specifications & Procedures Manual – Linear Infrastructure, Watermain Design Criteria, June 2011
- Region of Peel Public Work Stormwater Design Criteria and Procedural Manual, June 2019
- Toronto and Region Conservation Authority, Stormwater Management Criteria (Version 1.0), August 2012
- Toronto Region Conservation Authority, Watershed Mapping, 2022
- Tullamore Industrial Subdivision, Town of Caledon File 21T-00001C, AECOM, September 2003
- Torbram Electric Supply, Site Servicing and Grading Plan, Building Elevations and Site Plan, Schad Engineering, April 2006
- Strada Aggregates, Site Servicing and Grading Plan, Site Plan, Section and Detail Plan, Scale, House and Refueling Plan, Stormwater Management Report, Candevcon Limited Consulting Engineers and Planners, November 15, 2014
- Harmon Transport, Site Servicing, Grading and Stormwater Management Plan, Site Plan, Stormwater Management Report, A.M. Candaras Associates Inc. Consulting Engineers, September 5, 2007
- A.T.S. Container Services Inc., Site Servicing Plan, Site Grading Plan, Site Plan, Stormwater Management Report, Urban Watershed Group Ltd., September 2019 & August 2022
- Proposed Office Development, Site Servicing Plan, Site Grading Plan, Stormwater Management Plan, Erosion and Sediment Control Plan, Stormwater Management Report, Luban, Limited, August 2024

- Khalsa Business Centre Inc. (Block 6), Site Servicing and Grading Plan, Site Plan, Stormwater Management Brief, Candevcon Limited Consulting Engineers and Planners, June 20, 2022
- Ministry of Natural Resources and Forestry Guidance for Development Activities in Reside Dace Protected Habitat (Draft), February 2011
- Ministry of the Environment, Stormwater Management Planning and Design Manual, March 2003
- Ministry of the Environment, Design Guidelines for Sewage Works, 2008
- Ministry of the Environment, Design Guidelines for Drinking-Water Systems, 2008
- Ministry of the Environment, Guidelines for the Design of Water Storage Facilities, Water Distribution Systems, Sanitary Sewage Systems and Storm Sewers, May 1979
- Ministry of Transportation, Drainage Management Manual, 1997
- Preliminary Stormwater Management Report, The Jones Consulting Group Ltd., February 2025
- Transportation Study, Proposed Tullamore Industrial Development, Town of Caledon, CGE Transportation Consultants, March 24, 2023
- Natural Heritage Existing Conditions Report, Six Properties within the Tullamore Secondary Plan Area, Town of Caledon, Azimuth Environmental Consulting Inc., November 2022
- Soil Map of Peel County, Ontario - Report No. 18, 1953
- Preliminary Geotechnical Investigation, Proposed Commercial Development, Airport Road and Mayfield Road, Caledon, Ontario, Golder Associates, February 2012
- Phase 1 Environmental Site Assessment, 6034 Mayfield Road, Barenco Inc., December 2010
- Tullamore Industrial Park Soil Survey and Agricultural Report, Ecoplans Limited, March 1989
- The Physiography of Southern Ontario (Third Edition), Ontario Geological Survey, Special Report #2, Ontario Ministry of Natural Resources, Toronto, Chapman, L.J. & D.F. Putnam, 1984
- Geotechnical Investigation, Proposed Industrial/Commercial Development, 6086, 6186, 6230 Mayfield Road and 12151 Airport Road, Town of Caledon, Soil Engineers Ltd., September 2023
- Tullamore Secondary Plan Area Master Environmental Servicing Plan, AGRA Earth & Environmental and Giffels Associates Ltd., June 2000

- Tullamore Business Park Stormwater Management Plan, Counterpoint Engineering, November 2005
- Airport Road Distribution Facility Functional Servicing Report and Stormwater Management Report, JSW + Associates, August 2013
- Brentview Construction Ltd. Development (Laidlaw Transit) Site Servicing and grading Plan, EMC Group Limited, February 2003
- Tullamore Industrial Park Functional Servicing Report, IBI Group Inc., February 2009
- Castlemore North Secondary Plan (Area 49), City of Brampton, Office Consolidated July 2014
- Mayfield Road Improvements Class Environmental Assessment Study Report, Stantec Consulting Ltd., April 2013
- Mayfield Road Improvements Detailed Design, IBI Group Inc., April 2015
- Tullamore Community Design Guidelines, Paul Cosburn and Associates Ltd., May 2000
- Airport Road, New Construction, Plan No. 38362-D to No. 38366-D, Plan No. 38115-D and 38116-D, Giffels Associates Limited, January 2010
- Highlands of Castlemore, Maisonneuve Boulevard, Plan and Profile No. 34313-D and 34314-D, Candevcon Limited, July 2002
- Sanitary Drainage Area Plan, Sheet No. D.2, Candevcon Limited, July 2002 and accompanying Sanitary Sewer Design Sheet 3, January 2003
- Mayfield Road, Tullamore Transmission Main, Contract No. 2, Plan No. 48180-D to 4815, CH2MHILL, January 2011
- Mayfield Road, Proposed 750mm Bolton Feeder Main, Plan No. 29038-D and 29039-D, Plan No. 29043-D and 29044-D, KMK Consultants Limited, August 2001
- 17th Sideroad (Regional Road 14), 300 mm Watermain, Plan No. 4683-D and 4684-D, Region of Peel, July 1981
- Water and Wastewater DC Map(s), Region of Peel, January 2014
- Water Master Plan for the Lake-Based Systems, Volume IV, Figure 3.2, Appendix 3G, Region of Peel, BluePlan, Aecom, March 2014

- Wastewater Master Plan for the Lake-Based Systems, Volume IV, Figure 4.2, Sheet 3, Sheet 14, Sheet 15, Sheet 18, Sheet 21, Appendix 4I, Region of Peel, BluePlan, Aecom, March 2014
- Water System Policy and Criteria (Page 6), Water and Wastewater Master Plan for the Lake-Based Systems, Volume III, Region of Peel, BluePlan, Aecom, March 2014
- Wastewater System Policy and Criteria (Page 6 and 7), Water and Wastewater Master Plan for the Lake-Based Systems, Volume IV, Region of Peel, BluePlan, Aecom, March 2014
- Water Distribution System, Infrastructure Capacity Review, Figure 8, City of Brampton, Aecom, April 2009
- Wastewater Collection System, Infrastructure Capacity Review, Figure 9, City of Brampton, Aecom, April 2009
- Environmental Impact Study Five Properties within the Tullamore Secondary Plan Area, Town of Caledon, Azimuth Environmental Consulting, Inc. March 2025
- Headwater Drainage Feature Assessment, Tullamore Secondary Plan Area, Town of Caledon, Azimuth Environmental Consulting, Inc. March 2024