

**FUNCTIONAL SERVICING &
STORMWATER
MANAGEMENT REPORT**

**91 & 131 EGLINTON AVENUE EAST AND
5055 HURONTARIO STREET**

**CITY OF MISSISSAUGA
REGION OF PEEL**

PREPARED FOR:

91 EGLINTON LTD. PARTNERSHIP

PREPARED BY:

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MAY 2019

CFCA FILE NO. 1525-4876

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Revision Number	Date	Comments
Rev. 0	September 10, 2018	Issued for 1 st Submission
Rev.1	May 31, 2019	Issued for 2 nd Submission

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by 91 Eglinton Ltd. Partnership (the Owner) to prepare a Functional Servicing and Stormwater Management Report. The report will support the applications for an official plan amendment, rezoning, and draft plan of subdivision required to permit the residential development at 91 & 131 Eglinton Avenue East and 5055 Hurontario Street in the City of Mississauga, Region of Peel (the Site).

The purpose of this report is to demonstrate that the proposed development can be implemented in accordance with the Region of Peel's servicing guidelines and the City of Mississauga's stormwater management (SWM) guidelines.

The report was previously submitted in September 2018 and has since been revised to address comments on the Planning Application Status Report (File 21T-M 18 5) printed February 6, 2019.

The following reports and design standards were referenced during the preparation of this report:

- Region of Peel 2013 Water and Wastewater Master Plan for the Lake-Based Systems, dated March 31, 2014 (Master Plan, March 2014)
- Region of Peel Public Works Design, Specifications & Procedures Manual – Sanitary Design Criteria, dated March 2017 (Sanitary Design Criteria, March 2017)
- Region of Peel Public Works Design, Specifications & Procedures Manual – Watermain Design Criteria, dated June 2010 (Watermain Design Criteria, June 2010)
- City of Mississauga Development Requirements Manual, dated September 2016 (Development Requirements Manual, September 2016)
- Analysis in Support of the Growth-Related Water and Wastewater Servicing Plan for 91 Eglinton Avenue East prepared by the Region of Peel, dated June 11, 2018 (Servicing Analysis, June 2018)
- Master Plan for 91 Eglinton Avenue East prepared by Dialog, dated August 31, 2018 (Master Plan, August 2018)
- Storm Area Drainage Plan and Storm Sewer Design Sheet prepared by Urbantech, dated February 2014 and July 2014 respectively

2.0 General Site Description

The subject site covers an area of approximately 4.4 ha and is located in a primarily residential area in the City of Mississauga. The property, currently occupied by a greenfield, is bounded by the future extension of Armdale Road to the north, existing townhouses to the east, Eglinton Avenue East to the south, and a low-rise commercial complex to the west.

The proposed development includes six high-rise-residential towers complete with underground parking (Master Plan, May 2019). The development is proposed to be constructed in four phases.

- **Phase 1** (10,443 m²): A 45-storey and 40-storey residential tower connected by a podium varying in height from 2-storeys to 8-storeys, containing a total of 920 units, and underground parking. A central amenity area containing a 1-storey building with underground parking is also included.
- **Phase 2** (5,800 m²): A 33-storey, 452-unit residential tower with a podium varying in height from 2-storeys to 9-storeys, and underground parking.
- **Phase 3** (7,094 m²): A 40-storey, 570-unit residential tower with a podium varying in height from 2-storeys to 12-storeys, and underground parking.
- **Phase 4** (11,726 m²): A 30-storey, 586-unit residential tower complete with a podium varying in height from 2-storeys to 12-storeys, and underground parking. This phase also includes three townhouse blocks (H1-H3) with a total of 14 units.

The Site also includes a 3,241 m² (0.8 acre) public park and two municipal road extensions. The park is located at the north of the Site, east of Phase 3. The road extensions include:

- Extending the existing 22.0 m right-of-way known as Armdale Road west to intersect with the proposed extension of Thornwood Drive (this will form the north border of the site)
- Extending the existing Thornwood Drive south, with right-of-way widths ranging from 24.0 m to 27.50 m, to intersect with Eglinton Avenue East. The proposed Thornwood Drive extension cuts through the site between Phase 2 and Phase 4

This report will consider the proposed development in its entirety to ensure adequate sizing and locations of the required civil services (i.e. storm, water and sanitary) for the complete build-out.

3.0 Water Servicing

The Region of Peel is responsible for the operation and maintenance of the public water and treatment system in the City of Mississauga, and any local system will have to connect to this public system. The existing and proposed water servicing is discussed in the following sections.

3.1 Existing Water Servicing

The development falls within water pressure Zone 4. The pressure zone changes to Zone 3 directly south of the Site on Eglinton Avenue East, and east of Forum Drive. A review as-constructed drawings from the City and the Region the following watermains in proximity to the Site and within the same pressure zone (Zone 4):

- Existing 300 mm and 400 mm diameter parallel watermains on Hurontario Street that loop through the local road network. Stubs for the proposed development are provided from the existing 300 mm diameter watermain at the intersections of Future Armdale Road extension & Kencourt Drive and Future Armdale Road Extension & Thornwood Drive.
- Existing 300 mm diameter watermain on the north side of Eglinton Avenue East. This watermain is stubbed at the Future Thornwood Drive extension entrance and extends east. The watermain is constructed but not currently in use.

Multiple hydrants are located near the site for fire protection:

- One on the east side of Preston Meadow Avenue near Armdale Road.
- One on the east side of Kencourt Drive near Future Armdale Road.
- One on the north side of Armdale Road midway between Hurontario Street and Preston Meadow Avenue.
- One in front of the Site on Eglinton Avenue East, between Future Thornwood Drive and Forum Drive.

3.2 Design Water Demand

The Region of Peel Linear Infrastructure Sanitary Sewer Manual (March 2017) was used to determine the equivalent population estimate for each phase of the proposed residential development. The results are provided in **Table 1** and detailed calculations are provided in **Appendix A**.

Table 1: Equivalent Population Estimate

Standard	Phase	Number of Units	Person per Unit	Total Persons
Region of Peel Public Works Design, Specification & Procedures Manual – Linear Infrastructure Sanitary Sewer Manual (March 2017)	1	920	2.7	2484
	2	452		1220
	3	570		1539
	4	600		1620
	Site Total	2542	--	6863

With an occupancy density of 2.7 person/unit, a total number of 6863 persons are in the proposed development.

The Region of Peel Linear Infrastructure Watermain Design Criteria (June 2010) was used to determine the maximum domestic water demand generated by the proposed development based on the equivalent population estimate for each phase. An average daily water demand of 280 L/cap/day was used. **Table 2** summarizes the estimated design water demand. **Appendix A** contains detailed water demand calculations.

Table 2: Estimated Design Water Demand

Standard	Phase	Average Daily Demand (L/s)	Maximum Daily Demand (L/s)	Peak Hourly Demand (L/s)
Region of Peel Public Works Design, Specification & Procedures Manual – Linear Infrastructure Watermain Design Criteria (June 2010)	1	8.1	16.3	24.4
	2	4.0	8.0	11.9
	3	5.0	10.0	15.0
	4	5.3	10.6	15.9
	Site Total	22.4	44.9	67.3

For this application, the domestic water service for each phase will be designed to convey a water demand equivalent to the peak hourly demand shown in **Table 2**.

3.3 Fire Flow Demand

The Fire Underwriters Survey method was used to estimate the fire flow demand for the proposed development. This calculation is used to estimate the size of incoming fire lines and does not provide a recommendation for fire protection. According to the letter received from Dialog Architects dated July 5, 2018, the towers have non-combustible construction and therefore, a construction coefficient of 0.8 was applied to the fire flow calculations (Water Supply for Public Fire Protection by Fire Underwriters Survey, 1999). The proposed residential buildings will be equipped with automatic sprinkler systems which reduces the initial fire flow demand of each building by up to 50%. Each automated sprinkler system is to be designed by the Mechanical Engineer; therefore, the detailed design of the system is not included in this report. **Table 3** summarizes the required fire flow demand and duration of flow required for each phase.

Table 3: Estimated Fire Demand Flows

Standard	Phase	Floor Area ¹ (m ²)	Demand Flow		Duration (h)
			(L/s)	(USGPM)	
Water Supply for Public Fire Protection by Fire Underwriters Survey (1999)	1	2,802	116.7	1,849	2.0
	2	3,471	133.3	2,113	2.0
	3	2,998	116.7	1,849	2.0
	4	4,384	150.0	2,378	2.0

Note: 1. Floor area was determined by the largest floor plus 25% of each of the two immediately adjoining floors

The proposed fire service for each phase is required to accommodate fire flows according to the calculated demand flows and for durations as indicated above. **Appendix A** contains the Fire Underwriters Survey calculations.

3.4 Proposed Water Servicing

Municipal watermains are required to support the proposed development. A 300 mm diameter watermain is proposed on Armdale Road extending west from the existing watermain on Armdale Road, to a proposed 300 mm diameter watermain, located on the east side of Future Thornwood Drive. The existing stubs from Kencourt and Beblin Street will connect to the proposed watermain on Armdale Road to create a loop. The proposed watermain on Future Thornwood Drive will connect to the existing 300 mm diameter watermain on Eglinton Avenue East.

The proposed residential towers are higher than 84 m high and therefore, require at least two sources of water from a public water system (OBC 3.2.9.7.4). The required water services are proposed as follows:

- **Phase 1** is proposed to connect to the proposed 300 mm watermain on the Thornwood Drive, near Eglinton Avenue East.
- **Phase 2** is proposed to connect to the proposed 300 mm watermain on the Thornwood Drive, near Armdale Road.
- **Phase 3** is proposed to connect to the existing 300 mm watermain on Armdale Road, between Hurontario Street and Preston Meadow Avenue.
- **Phase 4** is proposed to connect to the existing 300 mm watermain on Eglinton Avenue East.

A 100mm diameter PVC domestic water service and a 200mm diameter PVC fire line is proposed for each phase. The Mechanical Engineer will design the internal private water system including the internal sprinkler system within the building and underground parking structure. The proposed municipal watermains and water services are shown on **Figure 1**.

Based on the Analysis in Support of the Growth-Related Water and Wastewater Servicing Plan for 91 Eglinton Avenue East, dated June 11, 2018, the Region concluded that the existing water infrastructure is sufficient to service the proposed development and no upgrades are required. They indicate that "Treatment, pumping and transmission are assumed to be sufficient to service the proposed development based on future planned infrastructure". Based on the Region's analysis no further water system analyses are required for this development (such as hydrant flow tests).

4.0 Sanitary Servicing

The Region of Peel is responsible for the operation and maintenance of the sanitary sewer network in the City of Mississauga. The area is serviced by the East Trunk (Etobicoke Creek West) system and the G.E. Booth Wastewater Treatment Facility (Servicing Analysis, June 2018). The existing and proposed sanitary servicing is outlined in the following sections.

4.1 Existing Sanitary Servicing

According to the Water and Wastewater Analysis Report prepared by the Region, the following infrastructure exists in proximity to the site:

- Existing 450 mm diameter sanitary sewer on Eglinton Avenue East conveys flows east from a stub in front of the property. It connects to the existing 525 mm diameter sewer on Tailfeather Crescent. The sewer on Tailfeather Crescent runs south along the creek and conveys flow to the Central Park Way trunk sewer.
- Existing 250 mm diameter sanitary sewer along Sorrento Drive, directly south of the site, conveys flows to the 300/375 mm diameter sewer on Ella Avenue. The sewer on Ella Avenue conveys flows west, across Hurontario Street, and into the Upper Cooksville Creek Trunk sewer.

4.2 Design Sanitary Flow

The sanitary design flow for the subject property was calculated using the Region of Peel Public Works Design, Specifications & Procedures Manual – Linear Infrastructure Sanitary Sewer Manual (March 2017) and the equivalent population estimate described in **Section 3.2**. A unit sewage flow of 302.8 L/cap/d was used, and infiltration flow and a peaking factor were applied to the unit sewage flow to obtain the total estimated design sewage flow.

A summary of the results is presented in **Table 4** and detailed calculations are provided in **Appendix B**.

Table 4: Estimated Sanitary Design Flows

Standard	Phase	Average Daily Flow (L/s)	Peaking Factor	Infiltration Flow (L/s)	Total Flow (L/s)
Region of Peel Public Works Design, Specification & Procedures Manual – Linear Infrastructure Sanitary Sewer Manual (March 2017)	1	9.1	3.5	0.2	32.3
	2	4.3	3.7	0.1	16.3
	3	5.4	3.7	0.1	20.0
	4	5.7	3.7	0.2	21.0
Site Total					89.7

The proposed sanitary services must convey a total design sanitary demand for each phase according to the total flows indicated in **Table 4**.

4.3 Proposed Sanitary Servicing

Municipal sanitary sewers are required to support the proposed development. A series of 300 mm and 375 mm diameter sanitary sewers are proposed on the extension of Armdale Road and Thornwood Drive respectively. The required sizing for the sewers and the minimum sloping was specified by the Region in an email dated July 9, 2018 (**Appendix B**). The proposed sanitary sewers will extend from the existing 450 mm diameter sanitary sewer on Eglinton Avenue East and stub at the intersection of Armdale Road and Belbin Street.

The proposed sanitary laterals are 200 mm diameter PVC pipes. The pipe capacity for 200 mm diameter laterals sloping at 2% is 46 L/s, which is greater than the total sanitary design flow for each phase. Each phase will have an individual connection to the proposed sanitary sewers. The *Preliminary Overall Servicing Plan: Figure 1*, illustrates the location of the sanitary sewers and all connections. The internal sanitary system of the buildings will be designed according to the Mechanical Engineer's details and specifications.

4.4 Downstream Sanitary Capacity

The Region of Peel Public Works completed the *Analysis in Support of the Growth-Related Water and Wastewater Servicing Plan for 91 Eglinton Avenue East*, dated June 11, 2018. Based on the analysis, which included sanitary demand calculations, the Region concluded the treatment capacity of the existing G.E. Booth Wastewater Treatment Facility is sufficient to support the new development. A subsequent meeting with the Region held May 23, 2019 confirmed that there is sufficient downstream capacity for all phases of the project to proceed. Refer to **Appendix D** for details.

5.0 Drainage Conditions

5.1 Existing Drainage Conditions

According to the topographic survey that was completed by Schaeffer Dzaldov Bennett Ltd. (June 21, 2018), existing topography conveys stormwater drainage overland to Eglinton Avenue East. The east portion of the site drains from the north-east corner to roughly the middle of the site where it is then conveyed south to the municipal right-of-way. A berm with a contour of 173 m, on the west portion of the site, splits drainage between the middle outlet and a low point in the south-west corner. The far west portion of the site demonstrates imperfect drainage. A portion of the stormwater drainage in this area is conveyed overland to the municipal right-of-way through the south-west corner and a portion is conveyed overland to the adjacent property across the west property line.

There is no existing internal storm system on the site.

Three existing storm sewers are located near the subject property:

- A 900 mm diameter storm sewer conveys stormwater flow west on Eglinton Avenue East.
- A 375 mm diameter storm sewer conveys stormwater flow south on Hurontario Street, connecting into the 900 mm storm sewer on Eglinton Avenue East.
- A series of 575/600/675 mm diameter storm sewers convey stormwater flow through an easement in the center of the commercial property directly west of the Site, from existing MH7 on Armdale Road to existing MH6 on Eglinton Avenue East.

5.2 Proposed Drainage Conditions

The proposed development consists of six residential towers with podiums and a central amenity area, which includes a 1-storey building. The development includes underground parking, a public park, and two road extensions.

The subject property has been divided into four phases, each of them analyzed separately to form the stormwater catchment areas. A storm sewer network internal to the Site will convey minor system flows generated within each phase towards the existing 900 mm diameter storm sewer on Eglinton Avenue East. The drainage will be controlled from the 100-year post-development storm event to the 2-year pre-development storm event using underground storage tanks complete with orifice controls. Drainage in each of the phases will be overcontrolled to meet the target flow rate and facilitate uncontrolled catchments in each phase.

The proposed grading, demonstrated in **Figure 2**, will convey the major system flows overland towards the municipal right-of-way. Major system flows from Phase 1 and Phase 4 will be conveyed to the existing Eglinton Avenue East right-of-way. Major system flows from Phase 2 and Phase 3 will be conveyed to the rights-of-way of the proposed municipal road extensions, either Thornwood Drive or Armdale Road.

The public park and road extensions are not included within the phases and are not subject to stormwater quantity or quality controls. This was confirmed in a meeting with City Staff on June 11, 2018. These areas will ultimately drain to the existing storm sewer on Eglinton Avenue East. The proposed storm sewers along Future Armdale Road and Future Thornwood Drive will collect and convey runoff from the road extensions and the public park.

6.0 Stormwater Management

Stormwater management design criteria were established using the City of Mississauga standards. The stormwater management criteria include:

Water Quantity Control

Provide control for the private storm system to control the post-development peak flow for the 100-year storm event to the pre-development peak flow for the 2-year storm event, according to City requirements for developments within the Cooksville Creek watershed. No quantity control is required for the municipal park or roads within the development limit.

Water Quality Control

Private stormwater discharging from the proposed development must achieve Ontario Ministry of the Environment, Conservation and Parks (MOECP) Enhanced Level of protection (80% total suspended solids (TSS) removal) for water quality control prior to discharging to the City's storm sewer network. The water quality criteria must be achieved for each phase. No quality control is required for the municipal park or roads within the development limit.

Water Balance

Retention of the first 5 mm of rainfall for private development areas is required by the City of Mississauga Development Requirements Manual (September 2016) to achieve the water balance criteria. The retained water may be reused as grey water throughout the development or for irrigation purposes as discussed in the meeting with City Staff on June 11, 2018.

Minor System Design

For less than 100 ha of land, the minor storm sewer system shall be designed to accommodate a 10-year design storm according to the City of Mississauga Development Requirements Manual (September 2016).

6.1 Stormwater Quantity Control

The Modified Rational Method was used to determine the pre-development and post-development flow rates for each phase using the City of Mississauga standard IDF rainfall curve. The peak flow rates were then used to determine any stormwater quantity control required for the proposed development.

As discussed during a meeting with the City on June 11, 2018, areas such as the park and the road extensions, which are not included in any of the private development phases, will discharge stormwater uncontrolled to the municipal right-of-way. No quantity control will be provided for these areas.

The frontage of each phase will discharge stormwater uncontrolled to the municipal right-of-way to reduce the number of area drains required and facilitate a smooth transition from the right-of-way to the developments. These areas are accounted for by over controlling the rest of the phase.

Figure 6 and **Figure 7** show the delineation of catchment areas of the pre- and post-development, respectively. **Appendix C** contains detailed stormwater management calculations.

Stormwater from the Site will outlet into the municipal storm system. On-site storage, including underground storage, will be used to control the peak flow from the 100-year post-development storm to the allowable stormwater peak flow which is based on the 2-year storm event under pre-development conditions. A runoff coefficient of 0.25 was assumed for existing conditions.

A summary of the peak flow rates and storage volumes for each phase are presented in **Table 5**. Detailed calculations are in **Appendix C**.

Table 5: Summary of Peak Flow Rates and Storage Volumes

Standard	Criteria	Phase	Catchment Area	Peak Flow Rate (L/s)				Req. Storage (m ³)
				Pre-Development (2-year)	Post-Development			
					Uncontrolled (100-year)	Controlled (100-year)	Total (100-year)	
City of Mississauga Development Requirements Manual (September 2016)	Cooksville Creek: 100-year post- to 2-year pre-development	1	201, UC13, UC19	52	21	25	46	576
		2	202, UC15, UC16	29	20	10	30	331
		3	203, UC14	35	7	20	27	387
		4	204, UC12, UC17, UC18	59	34	24	58	637
		Total:			175	--	--	161

As shown in **Table 5**, each phase requires a particular volume of on-site storage to meet quantity control criteria. To achieve the quantity control requirement, each phase will have an orifice tube downstream of an underground tank. A 75 mm diameter orifice tube will be used in each phase to restrict the peak flows to achieve the post-to-pre-development control. Underground storage tanks, built into the underground parking structure, will be sized to hold the required storage volume. The post-development controlled and uncontrolled flow will meet the 2-year pre-development flow.

Appendix C contains the orifice sizing calculations.

Currently, due to restrictions on minimum orifice size (75mm), the total post-development stormwater flow leaving the Phase 2 exceeds the pre-development target (i.e. 30 L/s > 29 L/s). During detailed design, roof top controls and front yard catch basins can be implemented to reduce the uncontrolled catchments in Phase 2 and therefore achieve the target flow rate. The total post-development stormwater flows leaving all phases is less than the pre-development target (i.e. 161 L/s < 175 L/s) and therefore the overall impact on the stormwater network is negligible.

6.2 Stormwater Quality Control

Stormwater quality controls for the site must incorporate measures to provide an Enhanced Level of Protection (Level 1) according to the MOECP (March 2003) guidelines. Enhanced water quality protection involved the removal of at least 80% of TSS from 90% of the annual runoff volume. Water quality control will be provided for each phase separately through oil/grit separator (OGS).

A Stormceptor EF6 will be provided downstream of the underground tank and orifice tube, to provide quality control for Phases 1 to 3 prior to discharging to the City's storm sewer network. A Stormceptor EF8 will be provided to meet the water quality objective for Phase 4.

The new Stormceptor EF/EFO model's sized for 60% removal of the ETV PSD is comparable to sizing for 80% removal of the Stormceptor Fine PSD. The sizing results in **Appendix C** reflect this qualification. A technical bulletin explaining the equivalency is included in **Appendix C**.

6.3 Water Balance

As stated by the City of Mississauga Development Requirements Manual (September 2016), the minimum requirement to promote water balance is retention of the 5 mm rainfall event. The water balance retention volume was calculated for each phase considering initial abstraction of runoff based on impervious areas. **Table 6** describes the dead storage volume required below the invert of each underground tank to satisfy the water balance criteria.

Table 6: Water Balance Storage Requirement

Standard	Criteria	Phase	Impervious Area (ha)	Storage Required (m ³)
City of Mississauga Development Requirements Manual (September 2016)	Retention of first 5mm	1	0.78	39
		2	0.44	22
		3	0.53	27
		4	0.88	44

Once the final plan area of each underground tank has been established during detailed design, a depth will be indicated to achieve the required volume. Water in dead storage can be reused throughout the development as grey water or for irrigation purposes. On-site LID's illustrated in the Site Plan and Landscape Plan can also be used for water balance and will be detailed in the detailed design stage.

6.4 Minor System Design

A storm sewer design sheet was prepared for the proposed municipal storm sewers surrounding the proposed development. The design sheet accounts for the controlled flow leaving each phase, and the uncontrolled flow from the municipal park and the municipal roads. Using a 10-year design flow the velocity ranges from 0.97 m/s – 1.59 m/s which is within the acceptable range of 0.75 m/s – 4.0 m/s according to the *City of Mississauga Development Requirements Manual*, Section 2.01.01.02. **Appendix C** contains the Storm Sewer Design Sheet.

An approved Storm Sewer Design Sheet for this area was prepared by Urbantech and dated July 28, 2014. We compared flows from our design sheet to the Urbantech design sheet at key nodes. The total peak flow from the Site at Existing MH1 on Eglinton Avenue East is 261 L/s (approx. 0.26 m³/s), which is less than the Urbantech design peak flow at that node (PR. MH 7) of approximately 592 L/s (0.592 m³/s). Similarly, the total peak flow from the Site at Existing MH8 on Armdale Road is 54 L/s (0.054 m³/s), which is less than the Urbantech design peak flow of approximately 76 L/s (0.076 m³/s) at that location. Therefore, the quantity controls provided control the peak flow to below acceptable design flows for this system. The peak flow at key points match the approved Urbantech Storm Sewer Design (July 28, 2014) as agreed upon at the meeting with City Staff on June 11, 2018.

6.5 Sustainable Stormwater Management

Low Impact Development (LID) strategies will be considered for use throughout the proposed development during the detailed design stage for each phase. The following LID strategies may be applicable for this site:

- **Rainwater Harvesting:** With minimal pretreatment, the captured rainwater within the underground storage tanks can be used for outdoor non-potable water uses such as irrigation, or in the buildings as gray water.
- **Green Roofs:** This method is beneficial due to its water quality, water balance, and peak flow control benefits. In addition to water resource management, green roofs improve energy efficiency, reduce urban heat island effects, and create greenspace for passive recreation.
- **Enhanced Grass Swale and Bioretention:** Enhanced grass swales are designed to convey, treat and attenuate stormwater runoff. This feature slows the water to allow sedimentation, filtration through the soil matrix, evapotranspiration, and infiltration into the underlying native soil. Bioretention methods, such as rain gardens and stormwater planters, allow to temporarily store, treat and infiltrate runoff. It is typically designed to capture small storm events. Where underground parking facilities exists, infiltration is not a feasible option.
- **Permeable Pavement:** Porous asphalt, pervious concrete, permeable paver and plastic grid filled with gravel can be used for driveways and walkways to reduce the amount of impervious area throughout the site. This approach encourages infiltration and reduces runoff volumes. Again, where underground parking facilities exists, infiltration is not an option.
- **Enhanced Topsoil:** Enhanced topsoil provides water quality benefits in addition to water balance storage which will reduce the infrastructure required to store the required water balance volume.

LID strategies and an overall treatment train approach, where possible, will be specified during detailed design for each phase.

7.0 Conclusions and Recommendations

The proposed development can be serviced for water, sanitary, and stormwater in accordance with the City of Mississauga and Region of Peel requirements and standards. Our conclusions and recommendations include:

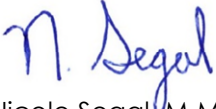
1. The development will be constructed over four phases.
2. The development includes a municipal park and two municipal road extensions: Armdale Road and Thornwood Drive.
3. Water demand for the proposed development will be provided using two 200 mm diameter fire lines and 100 mm diameter domestic lines for each phase. Each phase with a tower requires two fire line connections to the municipal watermain. Each phase will be serviced individually.
4. Based on the Analysis in Support of the Growth-Related Water and Wastewater Servicing Plan for 91 Eglinton Avenue East, dated June 11, 2018, the Region concluded that the existing water infrastructure is sufficient to service the proposed development and no upgrades are required.

5. Municipal watermains are required to support the development. A series of 300 mm diameter watermains are proposed along the proposed municipal street extensions.
6. Sanitary servicing for each phase of the proposed development will be provided using 200 mm diameter sanitary laterals extending from the proposed municipal sanitary sewer.
7. Municipal sanitary sewers are required to support the development. A series of 300 mm and 375 mm diameter sanitary sewers are proposed on the extension of Armdale Road and Thornwood Drive respectively. The proposed sanitary sewers will extend from the existing 450 mm diameter sanitary sewer on Eglinton Avenue East and stub at the intersection of Armdale Road and Belbin Street.
8. Based on the Analysis in Support of the Growth-Related Water and Wastewater Servicing Plan for 91 Eglinton Avenue East, dated June 11, 2018, the Region concluded the treatment capacity of the existing G.E. Booth Wastewater Treatment Facility is sufficient to support the new development.
9. A meeting held with Region staff of May 23, 2019 confirmed that there is sufficient downstream capacity in the sanitary sewer network to support all 4 phases of the project.
10. Stormwater for the Site is ultimately conveyed to the existing 900 mm diameter storm sewer on Eglinton Avenue East. The total peak flow leaving the site is below the design flow on the approved Urbantech Storm Sewer Design Sheet. During preliminary pre-consultation meetings it was confirmed by the City that the existing municipal storm sewers have enough capacity to allow the future development construction.
11. Stormwater runoff from the municipal road extensions and the public park is not subject to stormwater quantity or quality controls.
12. Quantity control has been provided for each phase using an orifice tube downstream of an underground storage tank. The post-development controlled and uncontrolled flow will meet the 2-year pre-development flow.
13. An oil/grit separator (OGS) Stormceptor Model EF6 (Phases 1 to 3) and EF8 (Phase 4) or approved equivalent was sized for each phase to provide an enhanced level of protection (80% TSS removal) for stormwater quality control.
14. Water balance for the Site will be provided through the retention of the 5 mm rainfall event as dead storage below the invert in each stormwater tank.

Based on the above conclusions, we recommend the approval of the development application for the site from the perspective of functional servicing and stormwater management.

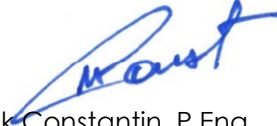
Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.



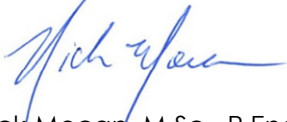
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