# Fairview Street Apartments

## Functional Servicing & Stormwater Management Report

**Project Location:**
2362 Fairview Street, Burlington, ON

**Prepared for:**
Lockwood Leasing
1411 South Service Road West, Oakville, ON

**Prepared by:**
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March 15, 2024

**MTE File No.:** 38934-200

*Engineers, Scientists, Surveyors.*

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# 1.0 Introduction

## 1.1 Overview

MTE Consultants Inc. were retained by Lockwood Leasing to complete the site grading, servicing, and stormwater management design for the proposed development located at 2362 Fairview Street in the City of Burlington (see Figure 1 for Location Plan). This report will outline a functional servicing and stormwater management strategy for the proposed development.

The site is located on a 0.77ha parcel of land bounded by Fairview Street to the north, existing commercial properties to the east and west, and existing residential lots to the south. The property is currently a gravel and asphalt overflow parking lot. The proponent plans to construct a 11-storey apartment building with ground level commercial spaces. Parking will be provided on site via surface (above grade) and three levels of underground (below grade) parking. A green roof will be constructed covering approximately 12% of the roof area. Existing municipal storm sewers, sanitary sewers, and watermain are located on Fairview Street. There is also an existing storm sewer within an easement at the south limit of the site. The sanitary sewer and watermain on Fairview Street, and the storm sewer at the south site limit will be used to service the proposed development.

## 1.2 Background Information

The following documents were referenced in the preparation of this report:

- Ref. 1: *Ontario Building Code (2023).*
- Ref. 2: *Interim Phase Two Environmental Site Assessment (June 9, 2022).*
- Ref. 3: *Development Charges Background Study, Region of Halton (2022).*
- Ref. 4: *Conservation Halton Guidelines for Stormwater Management Engineering Submissions (November 2021).*
- Ref. 5: *Stormwater Management Design Guidelines (City of Burlington, May 21, 2020).*
- Ref. 6: *Water Supply for Public Fire Protection, Fire Underwriters Survey (2020).*
- Ref. 7: *Water and Wastewater Linear Design Manual, Region of Halton (April, 2019).*
- Ref. 8: *Preliminary Geotechnical Investigation, 2362 Fairview Street (Terraprobe, January 24, 2018).*
- Ref. 9: *Design Guidelines for Drinking-Water Systems, Ministry of the Environment and Climate Change (2008).*
- Ref. 10: *Design Guidelines for Sewage Works, Ministry of the Environment and Climate Change (2008).*
- Ref. 11: *Erosion & Sediment Control Guideline for Urban Construction (December 2006).*
- Ref. 12: *MOE Stormwater Management Practices Planning and Design Manual (Ministry of Environment, March 2003).*

## 1.3 Geotechnical Investigation

A geotechnical investigation was undertaken by Terraprobe dated January 24, 2018. Five (5) boreholes were advanced to depths ranging from 5.4 to 7.7m below the existing grade. The investigation revealed gravel fill in all boreholes underlain by sandy silt till. Shale and weathered shale were found at approximately 6m below existing grade.

At the completion of drilling, four (4) of the five (5) boreholes were dry upon completion of drilling. Groundwater was encountered in one (1) borehole at approximately 4.5m below the existing ground surface. Monitoring wells installed in four (4) boreholes measured groundwater 1.8 to 2.1m below existing grade (elevation 95.91m to 96.26m). Additional groundwater measurements were taken as part of the Environmental Site Assessment.

Based on the above information, a value of 82 was used for the pervious CN, falling under Hydrologic Soil Group C.

## 1.4 Environmental Site Assessment

An interim Phase Two Environmental Site Assessment was completed by MTE Consultants Inc. (June 9, 2020). In 1989 and 1990 one or more waste oil underground storage tanks were decommissioned and found to have leaked to the subsurface soils and groundwater. Remedial efforts were conducted in multiple stages between 1990 and 1997. A recovery well and groundwater pump and treat system was installed on the site in 1992 and continues to operate. Long-term groundwater recordings and analysis indicate that a shallow groundwater table exists approximately 3m below existing ground surface and generally flows south, following the topography. A recommendation from the assessment is that all service conduits and structures (storm, sanitary, water, electrical, etc.) be sealed watertight. As such, all storm and sanitary sewers will be constructed watertight, and trenches will include clay plugs in accordance with OPSD 802.095. Structures will be specified to be wrapped in an impermeable membrane as required.

## 1.5 Long-term Groundwater Discharge

The proposed underground parking structure will be below the shallow ground structure. The parking structure will be constructed water-tight with no sub-surface drainage system. Therefore, the proposed development will not have any long-term groundwater discharge.




FIGURE 1

Date: APR.27/23
Scale: NTS

**LOCATION PLAN**

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Project No.: 38934-200

April 27, 2023 — 3:40 p.m. — Plotted By: CManiya

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# 2.0 Stormwater Management

The following sections will describe the proposed stormwater management (SWM) plan for the proposed development.

## 2.1 Stormwater Management Criteria

Based on City of Burlington pre-consultation comments (see Appendix D), the following stormwater management (SWM) criteria will be applied to the site:

### 2.1.1 Quantity Control

Control either the 100-year post-development or Regional storm, whichever is greater, to the 5-year pre-development flow rate. A maximum pre-development imperviousness of 36% (C=0.50) is to be used for pre-development calculations. Quantity control facilities must account for long-term groundwater discharge (if any).

### 2.1.2 Quality Control

An enhanced (Level 1) water quality treatment (80% TSS Removal) is required for all impacted surface runoff prior to discharging to the receiving system.

### 2.1.3 Water Budget

The City of Burlington recommends that the first 5mm of rainfall be retained and infiltrated onsite.

## 2.2 Existing Conditions

Under existing conditions, the site is a gravel and asphalt overflow parking lot. There is an existing 750mm diameter storm sewer on Fairview Street, conveying flows west, and a 375 – 450mm diameter storm sewer at the back of the site, conveying flows west, within an existing easement to Barclay Road. The site is generally sloped north-to-south, and drainage is currently conveyed by the existing storm sewer at the back of the site (south property limit). There are no existing stormwater management quantity or quality controls on-site.

The existing conditions have been delineated using one (1) catchment area (see Table 2.1 and Figure 2). Since the site is an existing gravel and asphalt parking lot, the impervious cover exceeds the maximum design value of 36% (C=0.50). As such, to calculate the allowable release rate, a runoff coefficient (C) of 0.50 has been used. The allowable discharge rate to the existing 375 – 450mm diameter sewer was calculated using the Rational Method for the 5-year City of Burlington design storm as follows:

$$Q = 0.00278\ CiA$$

Where:

Q = runoff rate ($m^3/s$)

C = runoff coefficient (see Table 2.1)

i = rainfall intensity (mm/hr)

A = area (see Table 2.1)




# LEGEND

SITE BOUNDARY

EXISTING SPOT ELEVATIONS

EXISTING DIRECTION OF DRAINAGE

EXISTING STORM SEWER

CATCHMENT 101

101 — ID No.
0.77 — AREA (Ha)
0.50 — RUNOFF COEFFICIENT

FIGURE 2

Date: MAR.08/24
Scale: 1:200

**EXISTING CONDITIONS CATCHMENT AREA**

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March 15, 2024 – 11:49:31 AM – Plotted By: Joseph Asztalos

**Table 2.1 – Existing Conditions and Allowable Storm Release Rate**

| Catchment ID | Description | Area (ha) | Runoff Coefficient [A] | Allowable Site Peak Discharge [B] ($m^3/s$) |
|---|---|---|---|---|
| 101 | Existing site (gravel and asphalt parking lot) | 0.77 | 0.50 | 0.109 |

[A] Maximum allowable runoff coefficient of 0.50 used since existing conditions impervious cover exceeds 0.50 (gravel & asphalt parking lot).
[B] Peak discharge rate calculated using Rational Method (see Appendix A).

## 2.3 Proposed Conditions

### 2.3.1 Quantity Control

The proposed conditions drainage pattern is delineated by two (2) catchment areas. Stormwater runoff from the building roof and above the underground parking level will be collected by roof and area drains connecting to internal building plumbing. Perimeter drainage swales and drain basins will capture runoff from the perimeter landscaped areas. Stormwater drainage will be conveyed to the existing 450mm diameter storm sewer, within an existing easement, at the back of the site via a new manhole connection. Stormwater management controls will include a small diameter orifice pipe and attenuation storage installed upstream of the existing storm sewer to control the 100-year and Regional storm event to the allowable 5-year release rate as shown in Table 2.1. Volume storage will be provided via underground storage tanks within the underground parking structure (P1 Level). There will be three (3) separate tanks (left, centre and right) connected internally via building plumbing. The tanks will outlet to the external storm sewer system via a single outlet located at the left tank. The plumbing details will be provided by the mechanical consultant during the building permit stage; however, a schematic representation has been shown on the site servicing drawing during the zoning approval stage. The tanks will form part of the underground parking structure and will require structural design and waterproofing (to be designed by others at the building permit stage). The site will be graded such that emergency overland flow from asphalt surfaces will be directed towards Fairview Street. Due to grading constraints, a portion of the site fronting Fairview Street will drain uncontrolled towards Fairview Street. This area consists of landscape plantings and walkways and thus will only generate a small amount of surface runoff.

Table 2.2 provides a brief description of each catchment area as well as the size and impervious cover associated with each. Figure 3 provides an illustration of the post-development catchment areas. Appendix A contains detailed information pertaining to the stormwater management model.

**Table 2.2 – Proposed Conditions Catchment Areas**

| Catchment ID | Description | Area (ha) | %Imp. |
|---|---|---|---|
| 201 | Majority of site to existing storm sewer at back of site (parking, building roof, perimeter landscaped area) [controlled] | 0.73 | 80 [A] |
| 202 | Site frontage to Fairview Street (walkways and landscaped areas) [uncontrolled] | 0.04 | 88 |
| | **Total** | **0.77** | |

[A] Landscaped areas above underground parking structure considered impervious.

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# FAIRVIEW STREET

Ex. 750mmø STM @ 0.17%±
EX. SW INV=95.63±
Ex. 750mmø STM @ 0.24%±
Ex. 300mmø STM±
EX. NE INV=95.93±
EX. SW INV=95.84±
Ex. 600mmø STM @ 0.5%±

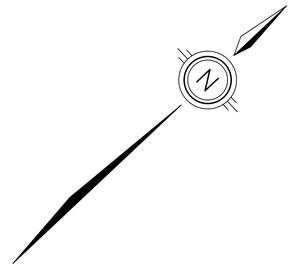
202
0.04
88

201
0.73
0.80

DRAINBASIN 9
DRAINBASIN 8
DRAINBASIN 7
DRAINBASIN 6
DRAINBASIN 5
DRAINBASIN 4
DRAINBASIN 3
DRAINBASIN 2
DRAINBASIN 1
MH3(JF6)
MH2(JF6-DIVERSION)
MH1

250mmø STM
450mmø STM
150mmø STM
Sloped

Ex. 525mmø STM @ 0.3%±
Ex. W INV.=95.15±
EX. E INV.=95.00±
Ex. 450mmø STM @ 0.5%±
Ex. 375mmø STM @ 0.55%±
Ex. W INV.=96.07±
EX. E INV.=96.10±



SITE BOUNDARY

+326.23
EXISTING SPOT ELEVATIONS

EXISTING DIRECTION OF DRAINAGE

Ex. MH
Ex. 375mmø STM
EXISTING STORM SEWER

CATCHMENT 201

CATCHMENT 202

MH
21.3m–300mmø STM @ 1.3%
STORM SEWER

201
0.73
76
ID No.
AREA (Ha)
% IMPERVIOUS

UNDERGROUND STORM TANK

FIGURE 3
Date: MAR.08/24
Scale: 1:200

**PROPOSED CONDITIONS CATCHMENT AREAS**

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March 15, 2024 – 1:08:18 PM – Plotted By: Joseph Astolos
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The table below summarize the stage-storage-discharge characteristics for the proposed storm tanks and orifice control. This information is used in the hydrologic model.

**Table 2.3 – Stage-Storage-Discharge Calculations for Underground Storm Tanks**

| Elevation (m) | Head, H (m) | Cumulative Storage Volume ($m^3$) [A] | Discharge Q ($m^3/s$) [B] | Comments |
|---|---|---|---|---|
| 95.78 | 0.000 | 0.00 | 0.0000 | Orifice Invert |
| 95.86 | 0.000 | 0.00 | 0.0000 | CL of orifice |
| 95.87 | 0.015 | 0.00 | 0.0077 | Bottom of Left Tank |
| 95.98 | 0.125 | 6.92 | 0.0221 | |
| 96.09 | 0.235 | 13.84 | 0.0304 | Bottom of Centre Tank |
| 96.20 | 0.345 | 28.90 | 0.0368 | |
| 96.31 | 0.455 | 43.96 | 0.0422 | Bottom of Right Tank |
| 96.60 | 0.745 | 101.90 | 0.0540 | |
| 96.90 | 1.045 | 161.84 | 0.0640 | |
| 97.20 | 1.345 | 221.78 | 0.0726 | Top of Tanks |

[A] Storage volume includes volume provided by internal storage tanks located in P1 level. See Appendix A and drawing C2.2 for more details. Storage from storm sewers and structures not included to be conservative.
[B] From orifice equation $Q = CA\,(2gH)^{0.5}$ for a 150 mm diameter orifice pipe.
Where: C = 0.8, A=cross-sectional area, g=9.81, H=pressure head

The proposed conditions were assessed using the SWMHYMO hydrologic modeling program developed by J.F. Sabourin & Associates for the 100-year City of Burlington 6-hour, 12-hour and 24-hour Chicago distribution and Regional (Hurricane Hazel) design storms. Of the three 100-year scenarios, the 24-hour distribution yielded the highest release rates. For the Regional design storm, the final 12 hours were modelled assuming pre-saturated soils (AMC III conditions) in accordance with City of Burlington and Conservation Halton guidelines. Appendix A contains detailed hydrologic modeling parameters and input/output printouts for the proposed conditions.

The following table summarizes the proposed conditions site peak discharge rates for the site with the proposed stormwater management controls and compares them to the allowable peak discharge rate.

**Table 2.4 – Proposed Conditions Peak Discharge Rate (Total Site)**

| Storm Event | Post-Development Conditions | | | Allowable Site Peak Discharge Rate ($m^3/s$) [B] |
|---|---|---|---|---|
| | Peak Flow to Existing Storm Sewer at Site Rear (Catchment 201) ($m^3/s$) [A] | Peak Flow to Fairview Street (Catchment 202) ($m^3/s$) [A] | Total Site Discharge ($m^3/s$) [A] | |
| 100-yr (6-hr) | 0.068 | 0.017 | 0.080 | **0.109** |
| 100-yr (12hr) | 0.069 | 0.017 | 0.080 | |
| 100-yr (24hr) | 0.069 | 0.017 | 0.081 | |
| Regional | 0.072 | 0.006 | 0.076 | |

[A] Discharge rate taken from SWMHYMO Output (see Appendix A).
[B] See Table 2.1.

**Table 2.5 – Proposed Conditions Storage Volume Requirements**

| Storm Event | Underground Storm Tanks | | |
|---|---|---|---|
| | Storage Volume Req. [A] ($m^3$) | Water Elevation [B] (m) | Total Storage Volume Provided [C] ($m^3$) |
| 100-yr (6-hr) | 191.4 | 97.05 | **221.78** |
| 100-yr (12hr) | 195.0 | 97.07 | |
| 100-yr (24hr) | 198.3 | 97.08 | |
| Regional | 217.2 | 97.18 | |

[A] Storage volume taken from SWMHYMO output (see Appendix A).
[B] Interpolated using the stage-storage-discharge relationship.
[C] See Table 2.3.

As seen in the results above, the proposed stormwater management design is able to control the 100-year and Regional design storm event to the allowable release rate.

### 2.3.2 Quality Control

Water quality control for the proposed development will be provided by a Jellyfish filtration unit (or approved equivalent) that will be installed at the downstream end of the stormwater management system prior to connecting into the existing storm sewer at the back of the site. Jellyfish units are ETV verified to provide over 80% TSS removal. Additional treatment measures on the site include perimeter drainage swales, however due to the site layout, these features are only able to capture runoff from landscaped areas which produce inherently clean runoff. The Jellyfish unit will treat runoff from the surface asphalt, building rooftop and some landscaped areas. A Jellyfish unit will be able to provide 80% TSS removal as a single water quality measure therefore satisfying the City's quality control requirement. Due to site layout constraints, environmentally sensitive soils in the surrounding areas and high-ground water elevations a treatment train using various infiltration measures is not viable.

The following parameters were used to size and select an appropriate Jellyfish unit.

- Drainage Area = 0.71ha
- % Impervious = 78% (includes perimeter landscaping)
- Treatment Flow Rate = 17.07 L/s (represents 90% of annual average runoff)

The sizing analysis indicates that a Jellyfish JF6-3-1 will be suitable for the site. Sizing details and ETV verification have been included in Appendix A.

### 2.3.3 Water Budget

The City of Burlington recommends that the first 5mm of rainfall for every rainfall event be retained and infiltrated on site. With the relatively high ground level and contaminated soils, infiltration is not recommended. The total recommended retention volume can be calculated as:

$$V_{retention} = 0.77ha \times 5mm = 38.5m^3$$

A green roof will be constructed on the proposed building roof. The site will utilize initial abstraction to retain as much water as feasible given the site constraints. Initial abstraction refers to losses from rainfall and includes some losses before runoff begins. The water is retained in surface depressions, taken up by vegetation and evaporation. Initial abstraction values have been assigned to each applicable surface type.

**Table 2.6 – Water Retention Summary**

| Surface Type | Area ($m^2$) | IA (mm) | IA ($m^3$) |
|---|---|---|---|
| Landscaped (not above parking garage) | 1526 | 5 | 7.63 |
| Green roof | 324 | 5 | 1.62 |
| Hard surfaces & landscaped above parking garage | 5874 | 1 | 5.87 |
| **Total** | **7724** | | **15.12** |

Although the site is not able to meet the recommended volume, the inclusion of a green roof demonstrates best-efforts given the site constraints.

## 2.4 Sediment and Erosion Control

Sediment and erosion control measures will be implemented on site during construction and will conform to the Erosion & Sediment Control Guideline for Urban Construction and City of Burlington Standards.

Sediment and erosion control measures will include:

- Installation of silt control fencing at strategic locations around the perimeter of the site where feasible.
- Preventing silt or sediment laden water from entering inlets (catch basins / catch basin manholes) by wrapping their tops with filter fabric or installing silt sacks.
- Construction of a mud mat at the exit from the site to Fairview Street to mitigate the transportation of sediments to the surrounding roads.

- Maintaining sediment and erosion control structures in good repair (including periodic cleaning as required) until such time that the Engineer or City approves their removal. Erosion control measures to be inspected daily and after any rainfall event.

# 3.0 Sanitary Sewer Servicing

## 3.1 Existing Conditions

There is an existing 600mm diameter sanitary sewer on Fairview Street, flowing west, which will be used to service the proposed development. There is an existing manhole at the property line and associated service connection to the main-line sewer that will be reused.

## 3.2 Sanitary Demands

Sanitary discharge from the site was estimated using Region of Halton design criteria and population densities from the Region of Halton Development Charges Background Study. The calculated discharge rate is based off the total number of bedrooms and ground-floor commercial space.

**Table 3.1 – Population Estimate & Sanitary Discharge**

| **Commercial Space** | | | |
|---|---|---|---|
| **Total GFA [A] ($m^2$)** | **Unit Flow Rate [B] (L/day per $m^2$)** | **Avg. Flow (L/day)** | **Avg. Flow (L/s)** |
| 247 | 5 | 1235 | 0.01 |

| **Residential** | | | | |
|---|---|---|---|---|
| **Unit Type [A]** | **Number of Units [A]** | **Population Density [C]** | **Occupant Count** | **Avg. Flow [D] (L/s)** |
| 1-bedroom | 238 | 1.36 | 324 | 1.03 |
| 2-bedroom | 88 | 1.83 | 161 | 0.51 |
| 3-bedroom | 12 | 1.83 | 22 | 0.07 |
| **Sub-Total** | **338** | | **507** | **1.61** |

| **Site Totals** | |
|---|---|
| **Infiltration Allowance [E] (L/s)** | **0.22** |
| **Average Flow (L/s)** | **1.63** |
| **Peak Flow [F] (L/s)** | **6.29** |
| **Total Design Flow (L/s)** | 0.22 + 6.29 = **6.51** |

[A] Referenced from site plan site statistics tables.
[B] As per OBC Table 8.2.1.3B.
[C] Population density based on Region of Halton Development Charges Background Study (2022), Table A-4
[D] Calculated using unitary flow rate of 275 L/day/person per Halton Region Guidelines Table 3-1.
[E] Calculated using unitary flow rate of 0.268 L/s/ha per Halton Region Guidelines Section 3.2.4.
[F] Peak flow calculated with modified Harmon peaking factor. PF = 3.86.

### 3.3 Proposed Sanitary Servicing Plan and Capacity Analysis

The site will be serviced by a 150mm diameter sanitary service connecting to the existing sewer on Fairview Street via the existing service connection. The existing municipal sewer has a full flow capacity of approximately 245 L/s. The proposed peak sanitary flow is less than 3% of the total sewer capacity. Therefore, it is not expected that the proposed development will adversely impact the existing sewer system.

# 4.0 Domestic and Fire Water Supply Servicing

### 4.1 Existing Conditions

The existing municipal water distribution system near the site consists of a 250mm diameter watermain beneath the Fairview Street boulevard. There is an existing hydrant east of the site entrance which will provide hydrant coverage for the development.

### 4.2 Domestic Water Demands

The expected domestic water demand for the site was estimated using Region of Halton design criteria. The table below summarizes the domestic water demands for average day, maximum day and peak hour scenarios.

**Table 4.1 – Domestic Water Demands**

| | | |
|---|---|---|
| **Commercial Space** | | |
| Average Daily Demand | 0.0248 L/ha/s | |
| GFA | 0.028ha | |
| Average Day Demand | 0.0248 L/ha/s x 0.028ha = | 0.001 L/s |
| **Residential** | | |
| Population: | 507 (see Table 3.1) | |
| Average Day Demand: | 275 L/c/d x 507 people= | 1.61 L/s |
| **Site Totals** | | |
| Average Day Demand: | | 2.86 L/s |
| Maximum Day Demand: | 1.61 x 2.25 L/s = | 3.63 L/s |
| Peak Hour Demand: | 1.61 x 4.0 L/s = | 6.46 L/s |

### 4.3 Fire Flow Demands

Fire flow demands for the proposed development was determined using the methodology outlined in Water Supply for Public Fire Protection (Fire Underwriters Survey (FUS), 2020) and are summarized below.

**Table 4.2 – FUS Fire Flow Requirements**

| Apartment Building | Flow Rate |
|---|---|
| FUS Fire Flow | 135 L/s |
| Max Day + Fire Flow | 138.63 L/s |

### 4.4 Proposed Water Servicing Plan and Analysis

Water servicing for the site will include the installation of a 200mm diameter fire water service, a 150mm diameter domestic water service for the residential units, and a 100mm diameter domestic water service for the commercial spaces. The residential units and commercial units will be metered separately in accordance with the Region's Multi-Unit Servicing Policy. The connection to the existing watermain will be constructed using a 3-valve chamber in accordance with Region standards.

The Region of Halton requires that water distribution systems maintain a minimum residual pressure of 20 psi when subject to Maximum Day + Fire Flow demands, and a normal operating pressure of 50 to 80 psi. A hydrant flow test is recommended to evaluate available system pressure.

## 5.0 Conclusions and Recommendations

Based on the information provided herein, it is concluded that the development can be constructed to meet the requirements of the City of Burlington and Halton Region. Therefore, it is recommended that:

i. On-site storm sewers be connected to the existing 450mm storm sewer, within an easement, located at the back of the property.

ii. The stormwater management controls be installed as described in Section 2 of this report.

iii. Erosion and sediment controls be installed as described in Section 2.4 of this report.

iv. Sanitary servicing for the development be installed as described in Section 3 of this report.

v. Water servicing for the development be installed as described in Section 4 of this report to meet water supply requirements.

We trust the information enclosed herein is satisfactory. Should you have any questions please do not hesitate to contact our office.

All of which is respectfully submitted,

**MTE Consultants Inc.**




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# Appendix A

# Stormwater Management

**FAIRVIEW APARTMENT BUILDING**
**2362 FAIRVIEW STREET, BURLINGTON**
**STORMWATER MANAGEMENT RATIONAL METHOD - EXISTING CONDITIONS RELEASE RATES**

## Design Storm Information

Intensity-Duration-Frequency (IDF) equations for the City of Burlington [(A)] in the form:

$$i = \frac{A}{(t + B)^C}$$

Where: i = Rainfall intensity (mm/hr)
t = Time of duration (10 min)
A, B and C = Constant (see below)

The value of the parameters for the various storm events is provided below:

| Constant | 2-Yr. | 5-Yr. | 10-Yr. | 25-Yr. | 50-Yr. | 100-Yr. |
|---|---|---|---|---|---|---|
| A | 681.52 | 802.04 | 918.00 | 1065.95 | 1172.34 | 1281.34 |
| B | 6.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| C | 0.780 | 0.764 | 0.763 | 0.762 | 0.761 | 0.761 |
| **Antecedant run-off factor** | | | | | | |
| Ca | 1.00 | 1.00 | 1.00 | 1.10 | 1.20 | 1.25 |
| **Runoff Rate Q (m3/s)** | | | | | | |
| Catchment 101 | 0.084 | **0.109** | 0.125 | 0.160 | 0.192 | 0.219 |
| Total | 0.084 | **0.109** | 0.125 | 0.160 | 0.192 | 0.219 |

[(A)] IDF parameters from City of Burlington's SWM Design Guidelines (May 2020)
Note: IDF equations used to generate rainfall files with Duration (TD) = 6, 12, 24 hours for 100-year STM

**FAIRVIEW APARTMENT BUILDING**
**2362 FAIRVIEW STREET, BURLINGTON**
**STORMWATER MANAGEMENT - HYDROLOGIC PARAMETERS**

**EXISTING DEVELOPMENT CONDITIONS HYDROLOGIC MODELING PARAMETERS**

| Catchment ID | Catchment Description | Hydrograph Method | Area (ha) | Perv. CN | Perv. Ia (mm) | Impervious % | Impervious C | Flow Length (m) Perv. | Flow Length (m) Imperv. | Manning "n" Perv. | Manning "n" Imperv. | Slope (%) Perv. | Slope (%) Imperv. | Time to Peak Tp (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101 | Existing Site (parking lot) | RATIONAL | 0.77 | | | 36 | 0.50 | | | | | | | |
| | | **TOTAL** | **0.77** | | | | | | | | | | | |

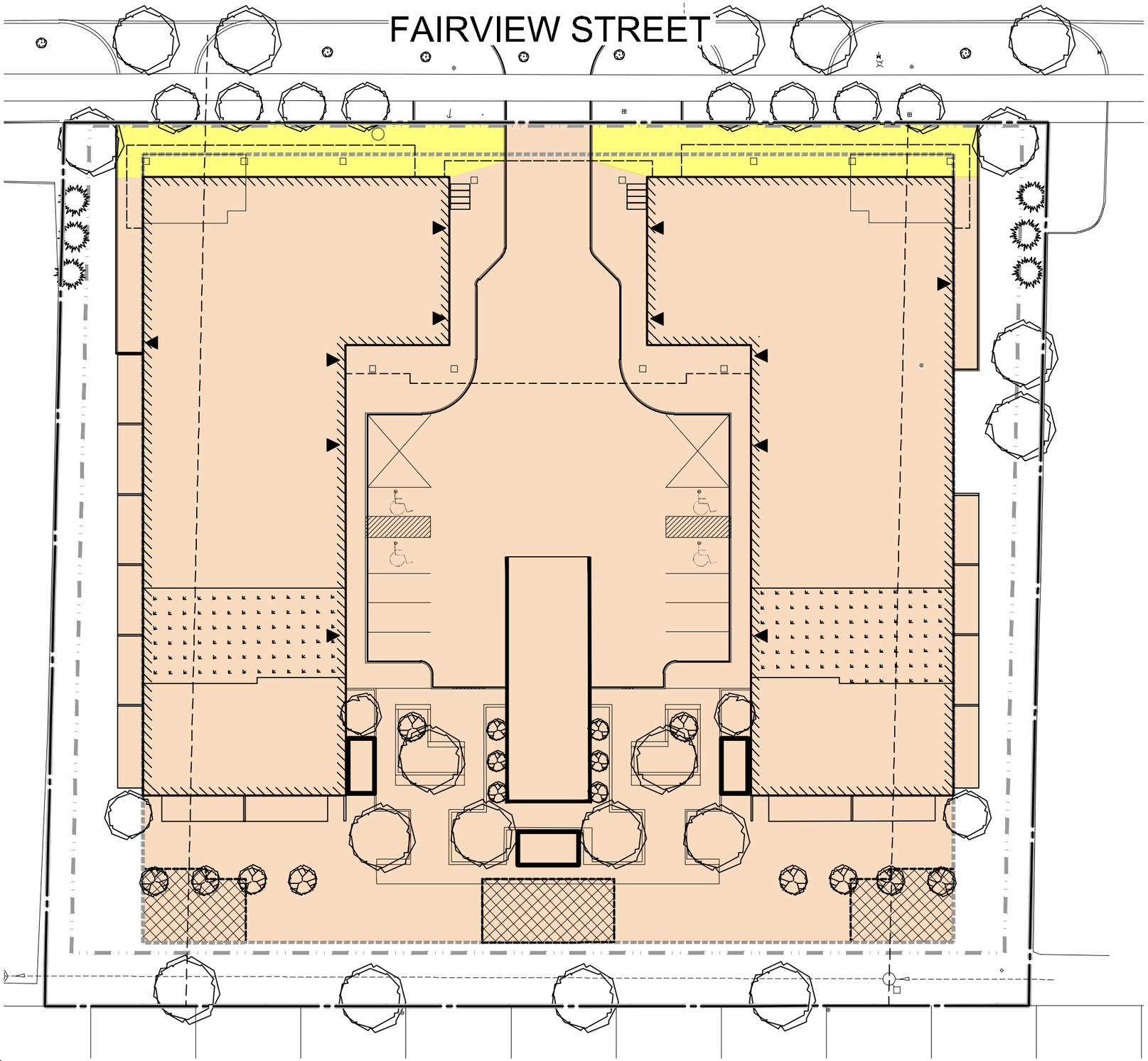
**PROPOSED DEVELOPMENT CONDITIONS HYDROLOGIC MODELING PARAMETERS**

| Catchment ID | Catchment Description | Hydrograph Method | Area (ha) | Perv. CN | Perv. Ia (mm) | Impervious (%) TIMP | Impervious (%) XIMP | Flow Length (m) Perv. | Flow Length (m) Imperv. | Manning "n" Perv. | Manning "n" Imperv. | Slope (%) Perv. | Slope (%) Imperv. | Time to Peak Tp (hrs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 201 | Majority of site (building + parking) | STANDHYD | 0.73 | 82 | 5.6 | 80 | 80 | 20 | 20 | 0.250 | 0.013 | 2.0 | 1.0 | |
| 202 | Frontage to Fairview Street | STANDHYD | 0.04 | 82 | 5.6 | 88 | 88 | 10 | 10 | 0.250 | 0.013 | 2.0 | 1.0 | |
| | | **TOTAL** | **0.77** | | | **80** | | | | | | | | |

Notes:

For NASHYD Commands:
- DT=1
- DWF=0
- N=3

For STANDHYD Commands:
- Pervious Initial Abstraction (Perv. Ia) = 0.1 x S , where S = (25400 / CN) - 254
-CN taken based off Soil Type C




CATCHMENT 201
TOTAL AREA = 7300m²
IMPERV.AREA (orange)= 5816
%imp=(5816/7300)x100 = 80%

CATCHMENT 202
TOTAL AREA = 416m²
IMPERV.AREA (yellow)= 366m²
%imp=(366/416)x100 = 88%

FIGURE A1
Date: MAR.08/24
Scale: 1:400

**PERCENT IMPERVIOUS CALCULATIONS**

MTE
Engineers, Scientists, Surveyors

Project No.: 38934-200

May 25, 2023 — 11:56 a.m. — Plotted By: JAsztalos

P:\P\38934\200\38934-200-F4.dwg

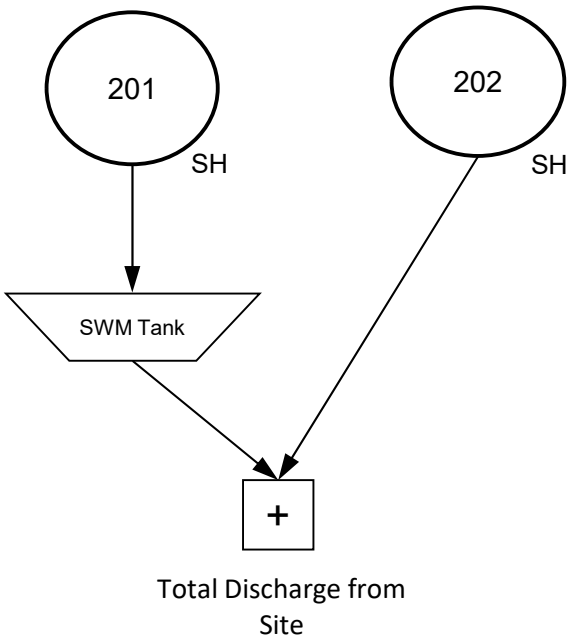
**FAIRVIEW APARTMENT BUILDING**
**2362 FAIRVIEW STREET, BURLINGTON**
## STORMWATER MANAGEMENT
**TANK Stage Storage Discharge Curve**

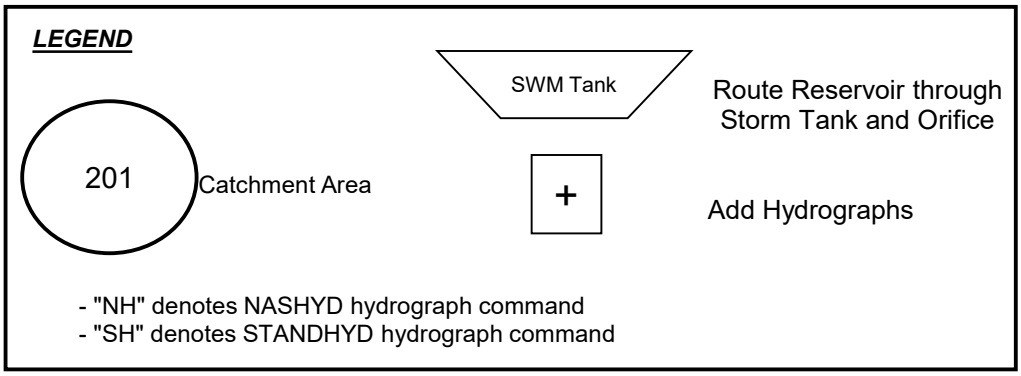
| Outlet Device No. 1 (Quantity) | |
|---|---|
| Type: | Orifice Pipe |
| Diameter (mm) | 150 |
| Area ($m^2$) | 0.01767 |
| Invert Elev. (m) | 95.78 |
| C/L Elev. (m) | 95.86 |
| Disch. Coeff. ($C_d$) | 0.8 |
| Discharge (Q) = | $C_d A ( 2 g H )^{0.5}$ |
| Number of Orifices: | 1 |

| | | SWM Storage Volumes | | | | Outlet No. 1 | | Total |
|---|---|---|---|---|---|---|---|---|
| Description | Elevation m | Area $m^2$ | Increm. Tank Volume $m^3$ | Increm. External Volume $m^3$ | Cumulative Volume $m^3$ | Head m | Discharge $m^3/s$ | Discharge $m^3/s$ |
| Orifice Invert | 95.78 | - | 0 | | 0.00 | 0.000 | 0.0000 | 0.0000 |
| CL of orifice | 95.86 | - | 0 | | 0.00 | 0.000 | 0.0000 | 0.0000 |
| Bottom of Left Tank | 95.87 | - | 0 | | 0.00 | 0.015 | 0.0077 | 0.0077 |
| | 95.98 | - | 7 | | 6.92 | 0.125 | 0.0221 | 0.0221 |
| Bottom of Centre Tank | 96.09 | - | 7 | | 13.84 | 0.235 | 0.0304 | 0.0304 |
| | 96.20 | - | 15 | | 28.90 | 0.345 | 0.0368 | 0.0368 |
| Bottom of Right Tank | 96.31 | - | 15 | | 43.96 | 0.455 | 0.0422 | 0.0422 |
| | 96.60 | - | 58 | | 101.90 | 0.745 | 0.0540 | 0.0540 |
| | 96.90 | - | 60 | | 161.84 | 1.045 | 0.0640 | 0.0640 |
| Top of Tanks | 97.20 | - | 60 | | 221.78 | 1.345 | 0.0726 | 0.0726 |
| | | Total | 222 | 0 | | | | |

**FAIRVIEW APARTMENT BUILDING**
**2362 FAIRVIEW STREET, BURLINGTON**
**STORMWATER MANAGEMENT**

## PROPOSED DEVELOPMENT CONDITIONS MODEL SCHEMATIC



```
00001> 2     Metric units
00002> *#*****************************************************************************
00003> *#  Project Name: Fairview Street Apartments
00004> *#  JOB NUMBER  : 38934-100
00005> *#       Date   : April 2023
00006> *#    Company   : MTE CONSULTANTS INC.
00007> *#       File   : 38934.DAT
00008> *#   Modeller   : JRA
00009> *#*****************************************************************************|
00010> *
00011> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[002]
00012>                     B100_6.stm
00013> *
00014> READ STORM          STORM_FILENAME "STORM.001"
00015> *
00016> *#*****************************************************************************|
00017> *#############################################################################|
00018> *#
00019> *#                      POST DEVELOPMENT HYDROLOGIC MODELING (100-YEAR)
00020> *#                    ==========================================
00021> *#############################################################################|
00022> *#*****************************************************************************|
00023> *AREA 201 - Majority of Site (Building, Parking)
00024> *#*****************************************************************************|
00025> CALIB STANDHYD      ID=[1], NHYD=["201"], DT=[1.0](min), AREA=[0.73](ha),
00026>                     XIMP=[0.80], TIMP=[0.80], DWF=[0](cms), LOSS=[2],
00027>                     SCS curve number CN=[82],
00028>                     Pervious   surfaces: IAper=[5.6](mm), SLPP=[2.0](%),
00029>                                          LGP=[20](m), MNP=[0.250], SCP=[0](min),
00030>                     Impervious surfaces: IAimp=[1.0](mm), SLPI=[1.0](%),
00031>                                          LGI=[20](m), MNI=[0.013], SCI=[0](min),
00032>                     RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1
00033> *#*****************************************************************************|
00034> *%-----------------|---------------------------------------------------------|
00035> *Control flows from site with orifice control and underground storage
00036> *%-----------------|---------------------------------------------------------|
00037> ROUTE RESERVOIR     IDout=[2],   NHYD=["CTL"],  IDin=[1],
00038>                     RDT=[1](min),
00039>                           TABLE of ( OUTFLOW-STORAGE ) values
00040>                                    (cms) - (ha-m)
00041>  0.0000     0.0000
00042>  0.0000     0.0000
00043>  0.0077     0.0000
00044>  0.0221     0.0007
00045>  0.0304     0.0014
00046>  0.0368     0.0029
00047>  0.0422     0.0044
00048>  0.0540     0.0102
00049>  0.0640     0.0162
00050>  0.0726     0.0222
00051>                                      -1       -1   (max twenty pts)
00052>                           IDovf=[9], NHYDovf=["OVF"]
00053> *%-----------------|---------------------------------------------------------|
00054> *#*****************************************************************************|
00055> *AREA 202 - Frontage to Fairview Street
00056> *#*****************************************************************************|
00057> CALIB STANDHYD      ID=[4], NHYD=["202"], DT=[1.0](min), AREA=[0.04](ha),
00058>                     XIMP=[0.88], TIMP=[0.88], DWF=[0](cms), LOSS=[2],
00059>                     SCS curve number CN=[82],
00060>                     Pervious   surfaces: IAper=[5.6](mm), SLPP=[2.0](%),
00061>                                          LGP=[10](m), MNP=[0.250], SCP=[0](min),
00062>                     Impervious surfaces: IAimp=[1.0](mm), SLPI=[1.0](%),
00063>                                          LGI=[10](m), MNI=[0.013], SCI=[0](min),
00064>                     RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1
00065> *#*****************************************************************************|
00066> *Add flows STM Easement
00067> ADD HYD             IDsum=[5], NHYD=["STM"], IDs to add=[2,9]
00068> *%-----------------|---------------------------------------------------------|
00069> *Area Check
00070> ADD HYD             IDsum=[10], NHYD=["TOTAL"], IDs to add=[4,5]
00071> *%-----------------|---------------------------------------------------------|
00072> *Run additional City of Burlington design storms (12hr, 24hr)
00073> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[003]
00074>                     B100_12.stm
00075> *
00076> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[004]
00077>                     B100_24.stm
00078> *
00079> FINISH
00080>
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00144>
```

```
00001> ================================================================================
00002>
00003>    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO         999    999    =========
00004>    S      W W W  MM MM  H   H   Y Y   MM MM  O   O       9   9  9   9
00005>    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##   9   9  9   9   Ver  4.05
00006>        S  W W W  M   M  H   H    Y    M   M  O   O        9999   9999   Sept 2011
00007>    SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9    =========
00008>                                                          9   9  9   9   # 3053466
00009>          StormWater Management HYdrologic Model           999    999    =========
00010>
00011>  ********************************************************************************
00012>  ***************************** SWMHYMO Ver/4.05  ********************************
00013>  *********  A single event and continuous hydrologic simulation model  *********
00014>  *********     based on the principles of HYMO and its successors      *********
00015>  *********                    OTTHYMO-83 and OTTHYMO-89.                *********
00016>  ********************************************************************************
00017>  ******** Distributed by:  J.F. Sabourin and Associates Inc.           *********
00018>  *********                    Ottawa,  Ontario: (613) 836-3884         *********
00019>  *********                    Gatineau, Quebec: (819) 243-6858         *********
00020>  *********                    E-Mail: swmhymo@jfsa.com                 *********
00021>  ********************************************************************************
00022>
00023>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++++ Licensed user: MTE Consultants Inc.                          +++++++++
00025>  +++++++++                  Burlington          SERIAL#:3053466       +++++++++
00026>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
00030>  *********           Maximum value for ID numbers  :     10            *********
00031>  *********           Max. number of rainfall points: 105408            *********
00032>  *********           Max. number of flow points    : 105408            *********
00033>  ********************************************************************************
00034>
00035>
00036>  **********************   D E T A I L E D   O U T P U T   **********************
00037>  ********************************************************************************
00038>  *         DATE: 2024-03-11     TIME: 09:19:55     RUN COUNTER: 000179         *
00039>  ********************************************************************************
00040>  * Input   filename: Q:\38934\200\SWM\SWMHYMO\100YR.DAT                        *
00041>  * Output  filename: Q:\38934\200\SWM\SWMHYMO\100YR.out                        *
00042>  * Summary filename: Q:\38934\200\SWM\SWMHYMO\100YR.sum                        *
00043>  * User comments:                                                             *
00044>  * 1:_____________________________________________________________________    *
00045>  * 2:_____________________________________________________________________    *
00046>  * 3:_____________________________________________________________________    *
00047>  ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001--------------------------------------------------------------------------
00051> *#*****************************************************************************
00052> *#  Project Name: Fairview Street Apartments
00053> *#  JOB NUMBER  : 38934-100
00054> *#       Date   : April 2023
00055> *#    Company   : MTE CONSULTANTS INC.
00056> *#       File   : 38934.DAT
00057> *#   Modeller   : JRA
00058> *#*****************************************************************************|
00059> *
00060>   ** END OF RUN :   1
00061>
00062>  ********************************************************************************
00063>
00064>
00065>
00066>
00067>
00068> --------------------
00069> | START            |  Project  dir.: Q:\38934\200\SWM\SWMHYMO\
00070> --------------------  Rainfall dir.: Q:\38934\200\SWM\SWMHYMO\
00071>     TZERO =   .00 hrs on       0
00072>     METOUT=   2 (output = METRIC)
00073>     NRUN  = 002
00074>     NSTORM=   1
00075>              #  1=B100_6.stm
00076> --------------------------------------------------------------------------------
00077> 002:0002--------------------------------------------------------------------------
00078> *#*****************************************************************************
00079> *#  Project Name: Fairview Street Apartments
00080> *#  JOB NUMBER  : 38934-100
00081> *#       Date   : April 2023
00082> *#    Company   : MTE CONSULTANTS INC.
00083> *#       File   : 38934.DAT
00084> *#   Modeller   : JRA
00085> *#*****************************************************************************|
00086> *
00087> --------------------------------------------------------------------------------
00088> 002:0002--------------------------------------------------------------------------
00089> *
00090> --------------------
00091> | READ STORM       |    Filename: CITY OF BURLINGTON 100-YEAR (6HR) CHICAG
00092> | Ptotal=  86.27 mm|    Comments: CITY OF BURLINGTON 100-YEAR (6HR) CHICAG
00093> --------------------
00094>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00095>                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00096>                .17   3.862 |   1.67  17.445 |   3.17   9.657 |   4.67   4.936
00097>                .33   4.172 |   1.83  39.736 |   3.33   8.649 |   4.83   4.704
00098>                .50   4.546 |   2.00 163.177 |   3.50   7.853 |   5.00   4.495
00099>                .67   5.008 |   2.17  51.779 |   3.67   7.206 |   5.17   4.306
00100>                .83   5.595 |   2.33  28.205 |   3.83   6.670 |   5.33   4.135
00101>               1.00   6.369 |   2.50  19.806 |   4.00   6.217 |   5.50   3.979
00102>               1.17   7.443 |   2.67  15.465 |   4.17   5.829 |   5.67   3.835
00103>               1.33   9.048 |   2.83  12.795 |   4.33   5.492 |   5.83   3.703
00104>               1.50  11.752 |   3.00  10.979 |   4.50   5.197 |   6.00   3.581
00105>
00106> --------------------------------------------------------------------------------
00107> 002:0003--------------------------------------------------------------------------
00108> *
00109> *#*****************************************************************************|
00110> *###############################################################################|
00111> *#
00112> *#                      POST DEVELOPMENT HYDROLOGIC MODELING (100-YEAR)
00113> *#                    ===========================================
00114> *###############################################################################|
00115> *#*****************************************************************************|
00116> *AREA 201 - Majority of Site (Building, Parking)
00117> *#*****************************************************************************|
00118> ----------------------
00119> | CALIB STANDHYD     |   Area    (ha)=     .73
00120> | 01:201    DT= 1.00 |   Total Imp(%)=   80.00   Dir. Conn.(%)=   80.00
00121> ----------------------
00122>                              IMPERVIOUS    PERVIOUS (i)
00123>      Surface Area     (ha)=        .58          .15
00124>      Dep. Storage     (mm)=       1.00         5.60
00125>      Average Slope     (%)=       1.00         2.00
00126>      Length            (m)=      20.00        20.00
00127>      Mannings n             =      .013         .250
00128>
00129>      Max.eff.Inten.(mm/hr)=     163.18        99.79
00130>                  over (min)        1.00         5.00
00131>      Storage Coeff.  (min)=        .80 (ii)    5.46 (ii)
00132>      Unit Hyd. Tpeak (min)=       1.00         5.00
00133>      Unit Hyd. peak  (cms)=       1.21          .21
00134>                                                          *TOTALS*
00135>      PEAK FLOW       (cms)=        .26          .03          .292 (iii)
00136>      TIME TO PEAK    (hrs)=       2.00         2.03         2.000
00137>      RUNOFF VOLUME    (mm)=      85.27        47.70        77.757
00138>      TOTAL RAINFALL   (mm)=      86.27        86.27        86.271
00139>      RUNOFF COEFFICIENT   =        .99          .55          .901
00140>
00141>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00142>             CN* =  82.0    Ia = Dep. Storage  (Above)
00143>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00144>             THAN THE STORAGE COEFFICIENT.
00145>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00146>
00147> --------------------------------------------------------------------------------
00148> 002:0004--------------------------------------------------------------------------
00149> *#*****************************************************************************|
00150> *Control flows from site with orifice control and underground storage
00151> ---------------------
00152> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00153> |  IN>01:(201   )   |
00154> | OUT<02:(CTL   )   |    =========  OUTLFOW STORAGE TABLE  =========
00155> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00156>                            (cms)     (ha.m.)   |    (cms)    (ha.m.)
00157>                            .000  .0000E+00   |     .037  .2900E-02
00158>                            .000  .0000E+00   |     .042  .4400E-02
00159>                            .008  .0000E+00   |     .054  .1020E-01
00160>                            .022  .7000E-03   |     .064  .1620E-01
00161>                            .030  .1400E-02   |     .073  .2220E-01
00162>
00163>      ROUTING RESULTS            AREA     QPEAK     TPEAK        R.V.
00164>      --------------------       (ha)     (cms)     (hrs)        (mm)
00165>      INFLOW >01: (201   )        .73      .292     2.000      77.757
00166>      OUTFLOW<02: (CTL   )        .73      .068     2.200      77.757
00167>     OVERFLOW<09: (OVF   )        .00      .000      .000       .000
00168>
00169>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00170>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=       .00
00171>                    PERCENTAGE OF TIME OVERFLOWING    (%)=       .00
00172>
00173>
00174>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   23.333
00175>                    TIME SHIFT OF PEAK FLOW          (min)=    12.00
00176>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1914E-01
00177>
00178> --------------------------------------------------------------------------------
00179> 002:0005--------------------------------------------------------------------------
00180> *#*****************************************************************************|
00181> *AREA 202 - Frontage to Fairview Street
00182> *#*****************************************************************************|
00183> ----------------------
00184> | CALIB STANDHYD     |   Area    (ha)=     .04
00185> | 04:202    DT= 1.00 |   Total Imp(%)=   88.00   Dir. Conn.(%)=   88.00
00186> ----------------------
00187>                              IMPERVIOUS    PERVIOUS (i)
00188>      Surface Area     (ha)=        .04          .00
00189>      Dep. Storage     (mm)=       1.00         5.60
00190>      Average Slope     (%)=       1.00         2.00
00191>      Length            (m)=      10.00        10.00
00192>      Mannings n             =      .013         .250
00193>
00194>      Max.eff.Inten.(mm/hr)=     163.18       101.80
00195>                  over (min)        1.00         4.00
00196>      Storage Coeff.  (min)=        .53 (ii)    3.58 (ii)
00197>      Unit Hyd. Tpeak (min)=       1.00         4.00
00198>      Unit Hyd. peak  (cms)=       1.44          .30
00199>                                                          *TOTALS*
00200>      PEAK FLOW       (cms)=        .02          .00          .017 (iii)
00201>      TIME TO PEAK    (hrs)=       1.95         2.02         2.000
00202>      RUNOFF VOLUME    (mm)=      85.27        47.70        80.763
00203>      TOTAL RAINFALL   (mm)=      86.27        86.27        86.271
00204>      RUNOFF COEFFICIENT   =        .99          .55          .936
00205>
00206>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00207>             CN* =  82.0    Ia = Dep. Storage  (Above)
00208>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00209>             THAN THE STORAGE COEFFICIENT.
00210>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00211>
00212> --------------------------------------------------------------------------------
00213> 002:0006--------------------------------------------------------------------------
00214> *#*****************************************************************************|
00215> *Add flows STM Easement
00216> ------------------------
00217> | ADD HYD (STM      ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
00218> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
00219>                       ID1 02:CTL           .73     .068    2.20  77.76    .000
00220>                      +ID2 09:OVF           .00     .000     .00    .00    .000
00221>                       ========================================================
00222>                       SUM 05:STM           .73     .068    2.20  77.76    .000
00223>
00224>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00225>
00226> --------------------------------------------------------------------------------
00227> 002:0007--------------------------------------------------------------------------
00228> *Area Check
00229> ------------------------
00230> | ADD HYD (TOTAL     ) | ID: NHYD          AREA     QPEAK   TPEAK   R.V.    DWF
00231> ------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
00232>                       ID1 04:202           .04     .017    2.00  80.76    .000
00233>                      +ID2 05:STM           .73     .068    2.20  77.76    .000
00234>                       ========================================================
00235>                       SUM 10:TOTAL         .77     .080    2.00  77.91    .000
00236>
00237>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00238>
00239> --------------------------------------------------------------------------------
00240> 002:0008--------------------------------------------------------------------------
00241> *Run additional City of Burlington design storms (12hr, 24hr)
00242>   ** END OF RUN :   2
00243>
00244>  ********************************************************************************
00245>
00246>
00247>
00248>
00249>
00250> --------------------
00251> | START            |  Project  dir.: Q:\38934\200\SWM\SWMHYMO\
00252> --------------------  Rainfall dir.: Q:\38934\200\SWM\SWMHYMO\
00253>     TZERO =   .00 hrs on       0
00254>     METOUT=   2 (output = METRIC)
00255>     NRUN  = 003
00256>     NSTORM=   1
00257>              #  1=B100_12.stm
00258> --------------------------------------------------------------------------------
00259> 003:0002--------------------------------------------------------------------------
00260> *#*****************************************************************************
00261> *#  Project Name: Fairview Street Apartments
00262> *#  JOB NUMBER  : 38934-100
00263> *#       Date   : April 2023
00264> *#    Company   : MTE CONSULTANTS INC.
00265> *#       File   : 38934.DAT
00266> *#   Modeller   : JRA
00267> *#*****************************************************************************|
00268> *
00269> --------------------------------------------------------------------------------
00270> 003:0002--------------------------------------------------------------------------
```

```
*
--------------------
| READ STORM       |    Filename: CITY OF BURLINGTON 100-YEAR (12HR) CHICA
| Ptotal= 102.36 mm|    Comments: CITY OF BURLINGTON 100-YEAR (12HR) CHICA
--------------------
               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .17   2.149 |   3.17   7.443 |   6.17   5.829 |   9.17   2.930
               .33   2.226 |   3.33   9.048 |   6.33   5.492 |   9.33   2.859
               .50   2.308 |   3.50  11.752 |   6.50   5.197 |   9.50   2.791
               .67   2.399 |   3.67  17.445 |   6.67   4.936 |   9.67   2.727
               .83   2.498 |   3.83  39.736 |   6.83   4.704 |   9.83   2.666
              1.00   2.607 |   4.00 163.177 |   7.00   4.495 |  10.00   2.608
              1.17   2.727 |   4.17  51.779 |   7.17   4.306 |  10.17   2.553
              1.33   2.861 |   4.33  28.205 |   7.33   4.135 |  10.33   2.500
              1.50   3.012 |   4.50  19.806 |   7.50   3.979 |  10.50   2.450
              1.67   3.182 |   4.67  15.465 |   7.67   3.835 |  10.67   2.403
              1.83   3.376 |   4.83  12.795 |   7.83   3.703 |  10.83   2.357
              2.00   3.600 |   5.00  10.979 |   8.00   3.581 |  11.00   2.313
              2.17   3.862 |   5.17   9.657 |   8.17   3.468 |  11.17   2.271
              2.33   4.172 |   5.33   8.649 |   8.33   3.363 |  11.33   2.231
              2.50   4.546 |   5.50   7.853 |   8.50   3.265 |  11.50   2.193
              2.67   5.008 |   5.67   7.206 |   8.67   3.173 |  11.67   2.156
              2.83   5.595 |   5.83   6.670 |   8.83   3.087 |  11.83   2.120
              3.00   6.369 |   6.00   6.217 |   9.00   3.006 |  12.00   2.086

--------------------------------------------------------------------------------
003:0003--------------------------------------------------------------------------
*
*#*************************************************************************|
*#########################################################################|
*#
*#                    POST DEVELOPMENT HYDROLOGIC MODELING (100-YEAR)
*#                  ==============================================
*#########################################################################|
*#*************************************************************************|
*AREA 201 - Majority of Site (Building, Parking)
*#*************************************************************************|
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .73
| 01:201    DT= 1.00 |   Total Imp(%)=   80.00   Dir. Conn.(%)=   80.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .58          .15
     Dep. Storage     (mm)=       1.00         5.60
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      20.00        20.00
     Mannings n             =     .013         .250

     Max.eff.Inten.(mm/hr)=     163.18       106.93
                   over (min)       1.00         5.00
     Storage Coeff.  (min)=        .80 (ii)    5.33 (ii)
     Unit Hyd. Tpeak (min)=       1.00         5.00
     Unit Hyd. peak  (cms)=       1.21          .22
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .26          .03        .296 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.03       4.000
     RUNOFF VOLUME    (mm)=     101.36        61.38      93.364
     TOTAL RAINFALL   (mm)=     102.36       102.36      102.358
     RUNOFF COEFFICIENT   =        .99          .60         .912

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  82.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
003:0004--------------------------------------------------------------------------
*#*************************************************************************|
*Control flows from site with orifice control and underground storage
----------------------
| ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
|  IN>01:(201   )    |
| OUT<02:(CTL   )    |    =========  OUTLFOW STORAGE TABLE  =========
----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00    |     .037  .2900E-02
                            .000  .0000E+00    |     .042  .4400E-02
                            .008  .0000E+00    |     .054  .1020E-01
                            .022  .7000E-03    |     .064  .1620E-01
                            .030  .1400E-02    |     .073  .2220E-01

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (201   )        .73      .296     4.000     93.364
     OUTFLOW<02: (CTL   )        .73      .069     4.200     93.364
    OVERFLOW<09: (OVF   )        .00      .000      .000       .000

                   TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                   CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                   PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=   23.230
                   TIME SHIFT OF PEAK FLOW         (min)=    12.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.1950E-01

--------------------------------------------------------------------------------
003:0005--------------------------------------------------------------------------
*#*************************************************************************|
*AREA 202 - Frontage to Fairview Street
*#*************************************************************************|
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .04
| 04:202    DT= 1.00 |   Total Imp(%)=   88.00   Dir. Conn.(%)=   88.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .04          .00
     Dep. Storage     (mm)=       1.00         5.60
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      10.00        10.00
     Mannings n             =     .013         .250

     Max.eff.Inten.(mm/hr)=     163.18       110.19
                   over (min)       1.00         3.00
     Storage Coeff.  (min)=        .53 (ii)    3.48 (ii)
     Unit Hyd. Tpeak (min)=       1.00         3.00
     Unit Hyd. peak  (cms)=       1.44          .34
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .02          .00        .017 (iii)
     TIME TO PEAK    (hrs)=       3.95         4.00       4.000
     RUNOFF VOLUME    (mm)=     101.36        61.38      96.561
     TOTAL RAINFALL   (mm)=     102.36       102.36      102.358
     RUNOFF COEFFICIENT   =        .99          .60         .943

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  82.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
003:0006--------------------------------------------------------------------------
*#*************************************************************************|
*Add flows STM Easement
-------------------------
| ADD HYD (STM       ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                         ID1 02:CTL          .73     .069    4.20  93.36    .000
                        +ID2 09:OVF          .00     .000     .00    .00    .000
                         ========================================================
                         SUM 05:STM          .73     .069    4.20  93.36    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
003:0007--------------------------------------------------------------------------
*Area Check
-------------------------
| ADD HYD (TOTAL     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
-------------------------                  (ha)     (cms)   (hrs)   (mm)    (cms)
                         ID1 04:202          .04     .017    4.00  96.56    .000
                        +ID2 05:STM          .73     .069    4.20  93.36    .000
                         ========================================================
                         SUM 10:TOTAL        .77     .080    4.00  93.53    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
003:0008--------------------------------------------------------------------------
*Run additional City of Burlington design storms (12hr, 24hr)
--------------------------------------------------------------------------------
003:0002--------------------------------------------------------------------------
*
  ** END OF RUN :   3

************************************************************************


--------------------
| START            |  Project  dir.: Q:\38934\200\SWM\SWMHYMO\
--------------------  Rainfall dir.: Q:\38934\200\SWM\SWMHYMO\
    TZERO =   .00 hrs on       0
    METOUT=   2 (output = METRIC)
    NRUN  = 004
    NSTORM=   1
              #  1=B100_24.stm
--------------------------------------------------------------------------------
004:0002--------------------------------------------------------------------------
*#*************************************************************************|
*#  Project Name: Fairview Street Apartments
*#  JOB NUMBER  : 38934-100
*#       Date   : April 2023
*#    Company   : MTE CONSULTANTS INC.
*#       File   : 38934.DAT
*#   Modeller   : JRA
*#*************************************************************************|
*
--------------------------------------------------------------------------------
004:0002--------------------------------------------------------------------------
*
--------------------
| READ STORM       |    Filename: BURLINGTON 100-YEAR 24-HR CHICAGO STORM
| Ptotal= 121.12 mm|    Comments: BURLINGTON 100-YEAR 24-HR CHICAGO STORM
--------------------
               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .17   1.233 |   6.17   3.862 |  12.17   3.468 |  18.17   1.733
               .33   1.254 |   6.33   4.172 |  12.33   3.363 |  18.33   1.711
               .50   1.275 |   6.50   4.546 |  12.50   3.265 |  18.50   1.690
               .67   1.298 |   6.67   5.008 |  12.67   3.173 |  18.67   1.670
               .83   1.321 |   6.83   5.595 |  12.83   3.087 |  18.83   1.650
              1.00   1.345 |   7.00   6.369 |  13.00   3.006 |  19.00   1.631
              1.17   1.371 |   7.17   7.443 |  13.17   2.930 |  19.17   1.612
              1.33   1.397 |   7.33   9.048 |  13.33   2.859 |  19.33   1.594
              1.50   1.425 |   7.50  11.752 |  13.50   2.791 |  19.50   1.576
              1.67   1.454 |   7.67  17.445 |  13.67   2.727 |  19.67   1.559
              1.83   1.484 |   7.83  39.736 |  13.83   2.666 |  19.83   1.542
              2.00   1.516 |   8.00 163.177 |  14.00   2.608 |  20.00   1.525
              2.17   1.549 |   8.17  51.779 |  14.17   2.553 |  20.17   1.509
              2.33   1.585 |   8.33  28.205 |  14.33   2.500 |  20.33   1.493
              2.50   1.622 |   8.50  19.806 |  14.50   2.450 |  20.50   1.478
              2.67   1.661 |   8.67  15.465 |  14.67   2.403 |  20.67   1.463
              2.83   1.703 |   8.83  12.795 |  14.83   2.357 |  20.83   1.448
              3.00   1.747 |   9.00  10.979 |  15.00   2.313 |  21.00   1.434
              3.17   1.793 |   9.17   9.657 |  15.17   2.271 |  21.17   1.420
              3.33   1.843 |   9.33   8.649 |  15.33   2.231 |  21.33   1.406
              3.50   1.896 |   9.50   7.853 |  15.50   2.193 |  21.50   1.393
              3.67   1.953 |   9.67   7.206 |  15.67   2.156 |  21.67   1.380
              3.83   2.014 |   9.83   6.670 |  15.83   2.120 |  21.83   1.367
              4.00   2.079 |  10.00   6.217 |  16.00   2.086 |  22.00   1.355
              4.17   2.149 |  10.17   5.829 |  16.17   2.053 |  22.17   1.342
              4.33   2.226 |  10.33   5.492 |  16.33   2.021 |  22.33   1.330
              4.50   2.308 |  10.50   5.197 |  16.50   1.990 |  22.50   1.319
              4.67   2.399 |  10.67   4.936 |  16.67   1.961 |  22.67   1.307
              4.83   2.498 |  10.83   4.704 |  16.83   1.932 |  22.83   1.296
              5.00   2.607 |  11.00   4.495 |  17.00   1.904 |  23.00   1.285
              5.17   2.727 |  11.17   4.306 |  17.17   1.877 |  23.17   1.274
              5.33   2.861 |  11.33   4.135 |  17.33   1.851 |  23.33   1.263
              5.50   3.012 |  11.50   3.979 |  17.50   1.826 |  23.50   1.253
              5.67   3.182 |  11.67   3.835 |  17.67   1.802 |  23.67   1.242
              5.83   3.376 |  11.83   3.703 |  17.83   1.778 |  23.83   1.232
              6.00   3.600 |  12.00   3.581 |  18.00   1.755 |  24.00   1.222

--------------------------------------------------------------------------------
004:0003--------------------------------------------------------------------------
*
*#*************************************************************************|
*#########################################################################|
*#
*#                    POST DEVELOPMENT HYDROLOGIC MODELING (100-YEAR)
*#                  ==============================================
*#########################################################################|
*#*************************************************************************|
*AREA 201 - Majority of Site (Building, Parking)
*#*************************************************************************|
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .73
| 01:201    DT= 1.00 |   Total Imp(%)=   80.00   Dir. Conn.(%)=   80.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .58          .15
     Dep. Storage     (mm)=       1.00         5.60
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      20.00        20.00
     Mannings n             =     .013         .250

     Max.eff.Inten.(mm/hr)=     163.18       113.73
                   over (min)       1.00         5.00
     Storage Coeff.  (min)=        .80 (ii)    5.22 (ii)
     Unit Hyd. Tpeak (min)=       1.00         5.00
     Unit Hyd. peak  (cms)=       1.21          .22
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .26          .04        .299 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.03       8.000
     RUNOFF VOLUME    (mm)=     120.12        77.91      111.679
```

```
00541>      TOTAL RAINFALL   (mm)=     121.12       121.12       121.120
00542>      RUNOFF COEFFICIENT   =        .99          .64          .922
00543>
00544>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00545>            CN* =  82.0    Ia = Dep. Storage  (Above)
00546>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00547>            THAN THE STORAGE COEFFICIENT.
00548>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00549>
00550> ------------------------------------------------------------------------------
00551> 004:0004----------------------------------------------------------------------
00552> *#*************************************************************************|
00553> *Control flows from site with orifice control and underground storage
00554> ---------------------
00555> | ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
00556> |  IN>01:(201   )   |
00557> | OUT<02:(CTL   )   |    =========  OUTLFOW STORAGE TABLE  =========
00558> ---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00559>                            (cms)    (ha.m.)   |    (cms)    (ha.m.)
00560>                             .000  .0000E+00   |     .037  .2900E-02
00561>                             .000  .0000E+00   |     .042  .4400E-02
00562>                             .008  .0000E+00   |     .054  .1020E-01
00563>                             .022  .7000E-03   |     .064  .1620E-01
00564>                             .030  .1400E-02   |     .073  .2220E-01
00565>
00566>      ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
00567>      -------------------        (ha)     (cms)     (hrs)       (mm)
00568>      INFLOW >01: (201   )        .73      .299     8.000    111.679
00569>      OUTFLOW<02: (CTL   )        .73      .069     8.200    111.679
00570>     OVERFLOW<09: (OVF   )        .00      .000      .000       .000
00571>
00572>                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00573>                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00574>                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00575>
00576>
00577>                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   23.134
00578>                    TIME SHIFT OF PEAK FLOW         (min)=    12.00
00579>                    MAXIMUM  STORAGE   USED       (ha.m.)=.1983E-01
00580>
00581> ------------------------------------------------------------------------------
00582> 004:0005----------------------------------------------------------------------
00583> *#*************************************************************************|
00584> *AREA 202 - Frontage to Fairview Street
00585> *#*************************************************************************|
00586> ---------------------
00587> | CALIB STANDHYD     |   Area    (ha)=     .04
00588> | 04:202    DT= 1.00 |   Total Imp(%)=   88.00   Dir. Conn.(%)=   88.00
00589> ---------------------
00590>                              IMPERVIOUS    PERVIOUS (i)
00591>      Surface Area     (ha)=        .04          .00
00592>      Dep. Storage     (mm)=       1.00         5.60
00593>      Average Slope     (%)=       1.00         2.00
00594>      Length            (m)=      10.00        10.00
00595>      Mannings n            =       .013         .250
00596>
00597>      Max.eff.Inten.(mm/hr)=     163.18       116.41
00598>                over (min)        1.00         3.00
00599>      Storage Coeff.  (min)=        .53 (ii)    3.42 (ii)
00600>      Unit Hyd. Tpeak (min)=       1.00         3.00
00601>      Unit Hyd. peak  (cms)=       1.44          .34
00602>                                                          *TOTALS*
00603>      PEAK FLOW        (cms)=        .02          .00          .017 (iii)
00604>      TIME TO PEAK     (hrs)=       8.00         8.00         8.000
00605>      RUNOFF VOLUME     (mm)=     120.12        77.91        115.055
00606>      TOTAL RAINFALL   (mm)=     121.12       121.12       121.120
00607>      RUNOFF COEFFICIENT   =        .99          .64          .950
00608>
00609>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00610>            CN* =  82.0    Ia = Dep. Storage  (Above)
00611>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00612>            THAN THE STORAGE COEFFICIENT.
00613>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00614>
00615> ------------------------------------------------------------------------------
00616> 004:0006----------------------------------------------------------------------
00617> *#*************************************************************************|
00618> *Add flows STM Easement
00619> ------------------------
00620> | ADD HYD (STM       ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00621> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
00622>                       ID1 02:CTL            .73     .069    8.20 111.68    .000
00623>                      +ID2 09:OVF            .00     .000     .00    .00    .000
00624>                       ========================================================
00625>                       SUM 05:STM            .73     .069    8.20 111.68    .000
00626>
00627>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00628>
00629> ------------------------------------------------------------------------------
00630> 004:0007----------------------------------------------------------------------
00631> *Area Check
00632> ------------------------
00633> | ADD HYD (TOTAL     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00634> ------------------------                  (ha)     (cms)   (hrs)   (mm)   (cms)
00635>                       ID1 04:202            .04     .017    8.00 115.05    .000
00636>                      +ID2 05:STM            .73     .069    8.20 111.68    .000
00637>                       ========================================================
00638>                       SUM 10:TOTAL          .77     .081    8.00 111.85    .000
00639>
00640>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00641>
00642> ------------------------------------------------------------------------------
00643> 004:0008----------------------------------------------------------------------
00644> *Run additional City of Burlington design storms (12hr, 24hr)
00645> ------------------------------------------------------------------------------
00646> 004:0002----------------------------------------------------------------------
00647> *
00648> ------------------------------------------------------------------------------
00649> 004:0002----------------------------------------------------------------------
00650> *
00651>       FINISH
00652> ------------------------------------------------------------------------------
00653> ******************************************************************************
00654>      WARNINGS / ERRORS / NOTES
00655>      -------------------------
00656>    Simulation ended on 2024-03-11     at 09:19:56
00657> ==============================================================================
00658>
```

```
2     Metric units
*#*************************************************************************
*#  Project Name: Fairview Street Apartments
*#  JOB NUMBER  : 38934-100
*#       Date   : April 2023
*#    Company   : MTE CONSULTANTS INC.
*#       File   : 38934.DAT
*#   Modeller   : JRA
*#*************************************************************************|
*
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[002]
                    Hazel12.stm
*
READ STORM          STORM_FILENAME "STORM.001"
*
*#*************************************************************************|
*#########################################################################|
*#
*#                     POST DEVELOPMENT HYDROLOGIC MODELING (REGIONAL)
*#                    ================================================
*#########################################################################|
*#*************************************************************************|
*AREA 201 - Majority of Site (Building, Parking)
*#*************************************************************************|
CALIB STANDHYD      ID=[1], NHYD=["201"], DT=[1.0](min), AREA=[0.73](ha),
                    XIMP=[0.80], TIMP=[0.80], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[92],
                    Pervious   surfaces: IAper=[5.6](mm), SLPP=[2.0](%),
                                         LGP=[20](m), MNP=[0.250], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.0](mm), SLPI=[1.0](%),
                                         LGI=[20](m), MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1
*#*************************************************************************|
*%-----------------|-------------------------------------------------------|
*Control flows from site with orifice control and underground storage
*%-----------------|-------------------------------------------------------|
ROUTE RESERVOIR     IDout=[2],   NHYD=["CTL"],  IDin=[1],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                   (cms) - (ha-m)

 0.0000     0.0000
 0.0000     0.0000
 0.0077     0.0000
 0.0221     0.0007
 0.0304     0.0014
 0.0368     0.0029
 0.0422     0.0044
 0.0540     0.0102
 0.0640     0.0162
 0.0726     0.0222

                                    -1       -1   (max twenty pts)
                          IDovf=[9], NHYDovf=["OVF"]
*%-----------------|-------------------------------------------------------|
*#*************************************************************************|
*AREA 202 - Frontage to Fairview Street
*#*************************************************************************|
CALIB STANDHYD      ID=[4], NHYD=["202"], DT=[1.0](min), AREA=[0.04](ha),
                    XIMP=[0.88], TIMP=[0.88], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[92],
                    Pervious   surfaces: IAper=[5.6](mm), SLPP=[2.0](%),
                                         LGP=[10](m), MNP=[0.250], SCP=[0](min),
                    Impervious surfaces: IAimp=[1.0](mm), SLPI=[1.0](%),
                                         LGI=[10](m), MNI=[0.013], SCI=[0](min),
                    RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1
*#*************************************************************************|
*Add flows STM Easement
ADD HYD             IDsum=[5], NHYD=["STM"], IDs to add=[2,9]
*%-----------------|-------------------------------------------------------|
*Area Check
ADD HYD             IDsum=[10], NHYD=["TOTAL"], IDs to add=[4,5]
*%-----------------|-------------------------------------------------------|
FINISH
```

```
00001> ================================================================================
00002>
00003>   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
00004>   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
00006>       S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
00007>   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
00008>                                                          9   9  9   9   # 3053466
00009>         StormWater Management HYdrologic Model            999    999    =========
00010>
00011> ********************************************************************************
00012> ***************************** SWMHYMO Ver/4.05 ***********************************
00013> *********  A single event and continuous hydrologic simulation model  *********
00014> *********     based on the principles of HYMO and its successors      *********
00015> *********                   OTTHYMO-83 and OTTHYMO-89.                *********
00016> ********************************************************************************
00017> ******** Distributed by:  J.F. Sabourin and Associates Inc.          *********
00018> *********                  Ottawa,  Ontario: (613) 836-3884          *********
00019> *********                  Gatineau, Quebec: (819) 243-6858          *********
00020> *********                  E-Mail: swmhymo@jfsa.Com                  *********
00021> ********************************************************************************
00022>
00023> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024> +++++++++ Licensed user: MTE Consultants Inc.                        +++++++++
00025> +++++++++                 Burlington          SERIAL#:3053466       +++++++++
00026> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028> ********************************************************************************
00029> *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
00030> *********           Maximum value for ID numbers  :     10            *********
00031> *********           Max. number of rainfall points: 105408            *********
00032> *********           Max. number of flow points    : 105408            *********
00033> ********************************************************************************
00034>
00035>
00036> **********************   D E T A I L E D   O U T P U T   **********************
00037> ********************************************************************************
00038> *         DATE: 2024-03-11     TIME: 09:26:48     RUN COUNTER: 000181         *
00039> ********************************************************************************
00040> * Input   filename: Q:\38934\200\SWM\SWMHYMO\REGIONAL.DAT                       *
00041> * Output  filename: Q:\38934\200\SWM\SWMHYMO\REGIONAL.out                       *
00042> * Summary filename: Q:\38934\200\SWM\SWMHYMO\REGIONAL.sum                       *
00043> * User comments:                                                               *
00044> * 1:_____________________________________________________________________________*
00045> * 2:_____________________________________________________________________________*
00046> * 3:_____________________________________________________________________________*
00047> ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001--------------------------------------------------------------------------
00051> *#*****************************************************************************
00052> *#  Project Name: Fairview Street Apartments
00053> *#  JOB NUMBER  : 38934-100
00054> *#       Date   : April 2023
00055> *#    Company   : MTE CONSULTANTS INC.
00056> *#       File   : 38934.DAT
00057> *#   Modeller   : JRA
00058> *#*****************************************************************************|
00059> *
00060>   ** END OF RUN :   1
00061>
00062> ********************************************************************************
00063>
00064>
00065>
00066>
00067>
00068> --------------------
00069> | START            |  Project  dir.: Q:\38934\200\SWM\SWMHYMO\
00070> --------------------  Rainfall dir.: Q:\38934\200\SWM\SWMHYMO\
00071>     TZERO =   .00 hrs on      0
00072>     METOUT=   2 (output = METRIC)
00073>     NRUN  = 002
00074>     NSTORM=   1
00075>               #  1=Hazel12.stm
00076> --------------------------------------------------------------------------------
00077> 002:0002--------------------------------------------------------------------------
00078> *#*****************************************************************************
00079> *#  Project Name: Fairview Street Apartments
00080> *#  JOB NUMBER  : 38934-100
00081> *#       Date   : April 2023
00082> *#    Company   : MTE CONSULTANTS INC.
00083> *#       File   : 38934.DAT
00084> *#   Modeller   : JRA
00085> *#*****************************************************************************|
00086> *
00087> --------------------------------------------------------------------------------
00088> 002:0002--------------------------------------------------------------------------
00089> *
00090> --------------------
00091> | READ STORM       |    Filename: Hurricane Hazel 12 hour storm
00092> | Ptotal= 211.00 mm|    Comments: Hurricane Hazel 12 hour storm
00093> --------------------
00094>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00095>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00096>              1.00   6.330 |   4.00  12.660 |   7.00  23.210 |  10.00  52.750
00097>              2.00   4.220 |   5.00  16.880 |   8.00  12.660 |  11.00  37.980
00098>              3.00   6.330 |   6.00  12.660 |   9.00  12.660 |  12.00  12.660
00099>
00100> --------------------------------------------------------------------------------
00101> 002:0003--------------------------------------------------------------------------
00102> *
00103> *#*****************************************************************************|
00104> *##############################################################################|
00105> *#
00106> *#                     POST DEVELOPMENT HYDROLOGIC MODELING (REGIONAL)
00107> *#                  ================================================
00108> *##############################################################################|
00109> *#*****************************************************************************|
00110> *AREA 201 - Majority of Site (Building, Parking)
00111> *#*****************************************************************************|
00112> ----------------------
00113> | CALIB STANDHYD     |   Area    (ha)=     .73
00114> | 01:201    DT= 1.00 |   Total Imp(%)=   80.00   Dir. Conn.(%)=   80.00
00115> ----------------------
00116>                                IMPERVIOUS    PERVIOUS (i)
00117>      Surface Area     (ha)=         .58          .15
00118>      Dep. Storage     (mm)=        1.00         5.60
00119>      Average Slope     (%)=        1.00         2.00
00120>      Length            (m)=       20.00        20.00
00121>      Mannings n           =        .013         .250
00122>
00123>      Max.eff.Inten.(mm/hr)=       52.75        51.90
00124>                    over (min)        1.00         7.00
00125>      Storage Coeff.  (min)=        1.26 (ii)    7.31 (ii)
00126>      Unit Hyd. Tpeak (min)=        1.00         7.00
00127>      Unit Hyd. peak  (cms)=         .93          .16
00128>                                                      *TOTALS*
00129>      PEAK FLOW       (cms)=         .09          .02          .107 (iii)
00130>      TIME TO PEAK    (hrs)=        9.32        10.00         10.000
00131>      RUNOFF VOLUME    (mm)=      210.00       185.46        205.091
00132>      TOTAL RAINFALL   (mm)=      211.00       211.00        211.000
00133>      RUNOFF COEFFICIENT   =        1.00          .88          .972
00134>
00135>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00136>            CN* =  92.0    Ia = Dep. Storage  (Above)
00137>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00138>            THAN THE STORAGE COEFFICIENT.
00139>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00140>
00141> --------------------------------------------------------------------------------
00142> 002:0004--------------------------------------------------------------------------
00143> *#*****************************************************************************|
00144> *Control flows from site with orifice control and underground storage
00145> ----------------------
00146> | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
00147> |  IN>01:(201    )   |
00148> | OUT<02:(CTL    )   |    =========  OUTFLOW STORAGE TABLE  =========
00149> ----------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
00150>                             (cms)     (ha.m.)   |    (cms)    (ha.m.)
00151>                             .000  .0000E+00   |     .037  .2900E-02
00152>                             .000  .0000E+00   |     .042  .4400E-02
00153>                             .008  .0000E+00   |     .054  .1020E-01
00154>                             .022  .7000E-03   |     .064  .1620E-01
00155>                             .030  .1400E-02   |     .073  .2220E-01
00156>
00157>      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
00158>      ----------------------      (ha)     (cms)     (hrs)       (mm)
00159>      INFLOW >01: (201    )        .73      .107    10.000    205.091
00160>      OUTFLOW<02: (CTL    )        .73      .072    11.000    205.099
00161>     OVERFLOW<09: (OVF    )        .00      .000      .000       .000
00162>
00163>                     TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
00164>                     CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
00165>                     PERCENTAGE OF TIME OVERFLOWING    (%)=      .00
00166>
00167>
00168>                     PEAK   FLOW   REDUCTION [Qout/Qin](%)=   67.449
00169>                     TIME SHIFT OF PEAK FLOW         (min)=   60.00
00170>                     MAXIMUM  STORAGE   USED       (ha.m.)=.2172E-01
00171>
00172> --------------------------------------------------------------------------------
00173> 002:0005--------------------------------------------------------------------------
00174> *#*****************************************************************************|
00175> *AREA 202 - Frontage to Fairview Street
00176> *#*****************************************************************************|
00177> ----------------------
00178> | CALIB STANDHYD     |   Area    (ha)=     .04
00179> | 04:202    DT= 1.00 |   Total Imp(%)=   88.00   Dir. Conn.(%)=   88.00
00180> ----------------------
00181>                                IMPERVIOUS    PERVIOUS (i)
00182>      Surface Area     (ha)=         .04          .00
00183>      Dep. Storage     (mm)=        1.00         5.60
00184>      Average Slope     (%)=        1.00         2.00
00185>      Length            (m)=       10.00        10.00
00186>      Mannings n           =        .013         .250
00187>
00188>      Max.eff.Inten.(mm/hr)=       52.75        51.91
00189>                    over (min)        1.00         5.00
00190>      Storage Coeff.  (min)=         .83 (ii)    4.82 (ii)
00191>      Unit Hyd. Tpeak (min)=        1.00         5.00
00192>      Unit Hyd. peak  (cms)=        1.19          .23
00193>                                                      *TOTALS*
00194>      PEAK FLOW       (cms)=         .01          .00          .006 (iii)
00195>      TIME TO PEAK    (hrs)=        9.18        10.00         10.000
00196>      RUNOFF VOLUME    (mm)=      210.00       185.46        207.055
00197>      TOTAL RAINFALL   (mm)=      211.00       211.00        211.000
00198>      RUNOFF COEFFICIENT   =        1.00          .88          .981
00199>
00200>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00201>            CN* =  92.0    Ia = Dep. Storage  (Above)
00202>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00203>            THAN THE STORAGE COEFFICIENT.
00204>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00205>
00206> --------------------------------------------------------------------------------
00207> 002:0006--------------------------------------------------------------------------
00208> *#*****************************************************************************|
00209> *Add flows STM Easement
00210> ----------------------
00211> | ADD HYD (STM       ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00212> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00213>                        ID1 02:CTL           .73     .072   11.00 205.10    .000
00214>                       +ID2 09:OVF           .00     .000     .00    .00    .000
00215>                        ================================================================
00216>                        SUM 05:STM           .73     .072   11.00 205.10    .000
00217>
00218>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00219>
00220> --------------------------------------------------------------------------------
00221> 002:0007--------------------------------------------------------------------------
00222> *Area Check
00223> ----------------------
00224> | ADD HYD (TOTAL     ) | ID: NHYD         AREA     QPEAK   TPEAK   R.V.    DWF
00225> ----------------------                    (ha)     (cms)   (hrs)   (mm)    (cms)
00226>                        ID1 04:202           .04     .006   10.00 207.05    .000
00227>                       +ID2 05:STM           .73     .072   11.00 205.10    .000
00228>                        ================================================================
00229>                        SUM 10:TOTAL         .77     .076   11.00 205.20    .000
00230>
00231>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00232>
00233> --------------------------------------------------------------------------------
00234> 002:0008--------------------------------------------------------------------------
00235>       FINISH
00236> --------------------------------------------------------------------------------
00237> ********************************************************************************
00238>      WARNINGS / ERRORS / NOTES
00239>      -------------------------
00240>    Simulation ended on 2024-03-11     at 09:26:48
00241> ================================================================================
00242>
```

Stormceptor®

Rinker MATERIALS™

# Stormceptor® EF Sizing Report

## Imbrium® Systems
## ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

03/15/2024

| | |
|---|---|
| Province: | Ontario |
| City: | Burlington |
| Nearest Rainfall Station: | HAMILTON RBG CS |
| Climate Station Id: | 6153301 |
| Years of Rainfall Data: | 20 |

| | |
|---|---|
| Site Name: | |

| | |
|---|---|
| Drainage Area (ha): | 0.71 |
| % Imperviousness: | 78.00 |

Runoff Coefficient 'c': 0.76

| | |
|---|---|
| Particle Size Distribution: | CA ETV |
| Target TSS Removal (%): | 60.0 |

| | |
|---|---|
| Required Water Quality Runoff Volume Capture (%): | 90.00 |
| Estimated Water Quality Flow Rate (L/s): | 17.07 |
| Oil / Fuel Spill Risk Site? | No |
| Upstream Flow Control? | No |
| Peak Conveyance (maximum) Flow Rate (L/s): | |
| Influent TSS Concentration (mg/L): | 200 |
| Estimated Average Annual Sediment Load (kg/yr): | 482 |
| Estimated Average Annual Sediment Volume (L/yr): | 392 |

| | |
|---|---|
| Project Name: | Fairview St Apartment |
| Project Number: | 64108 |
| Designer Name: | Joseph Asztalos |
| Designer Company: | MTE Consultants |
| Designer Email: | jasztalos@mte85.com |
| Designer Phone: | 905-639-2552 |
| EOR Name: | |
| EOR Company: | |
| EOR Email: | |
| EOR Phone: | |

imbrium

**Table 1**
**Design Flow Capacities**
**Standard Jellyfish Filter Manhole Configurations**

| Manhole Diameter (ft / m) [1] | Model No. | Hi-Flo Cartridges [2] 54 in / 1372 mm | Draindown Cartridges [2] 54 in / 1372 mm | Treatment Flow Rate (gpm / cfs) | Treatment Flow Rate (L/S) |
|---|---|---|---|---|---|
| 4 / 1.2 | JF4-2-1 | 2 | 1 | 200 / 0.45 | 12.6 |
| 6 / 1.8 | JF6-3-1 | 3 | 1 | 280 / 0.62 | 17.7 |
| | JF6-4-1 | 4 | 1 | 360 / 0.80 | 22.7 |
| | JF6-5-1 | 5 | 1 | 440 / 0.98 | 27.8 |
| | JF6-6-1 | 6 | 1 | 520 / 1.16 | 32.8 |
| 8 / 2.4 | JF8-6-2 | 6 | 2 | 560 / 1.25 | 35.3 |
| | JF8-7-2 | 7 | 2 | 640 / 1.43 | 40.4 |
| | JF8-8-2 | 8 | 2 | 720 / 1.60 | 45.4 |
| | JF8-9-2 | 9 | 2 | 800 / 1.78 | 50.5 |
| | JF8-10-2 | 10 | 2 | 880 / 1.96 | 55.5 |
| 10 / 3.0 | JF10-11-3 | 11 | 3 | 1000 / 2.23 | 63.1 |
| | JF10-12-3 | 12 | 3 | 1080 / 2.41 | 68.1 |
| | JF10-12-4 | 12 | 4 | 1120 / 2.50 | 70.7 |
| | JF10-13-4 | 13 | 4 | 1200 / 2.67 | 75.7 |
| | JF10-14-4 | 14 | 4 | 1280 / 2.85 | 80.8 |
| | JF10-15-4 | 15 | 4 | 1360 / 3.03 | 85.8 |
| | JF10-16-4 | 16 | 4 | 1440 / 3.21 | 90.8 |
| | JF10-17-4 | 17 | 4 | 1520 / 3.39 | 95.9 |
| | JF10-18-4 | 18 | 4 | 1600 / 3.56 | 100.9 |
| | JF10-19-4 | 19 | 4 | 1720 / 3.83 | 108.5 |
| 12 / 3.6 | JF12-20-5 | 20 | 5 | 1800 / 4.01 | 113.6 |
| | JF12-21-5 | 21 | 5 | 1880 / 4.19 | 118.6 |
| | JF12-22-5 | 22 | 5 | 1960 / 4.37 | 123.7 |
| | JF12-23-5 | 23 | 5 | 2040 / 4.54 | 128.7 |
| | JF12-24-5 | 24 | 5 | 2120 / 4.72 | 133.8 |
| | JF12-25-5 | 25 | 5 | 2200 / 4.90 | 138.8 |
| | JF12-26-5 | 26 | 5 | 2280 / 5.08 | 143.8 |
| | JF12-27-5 | 27 | 5 | 2360 / 5.26 | 148.9 |

[1] Smaller and larger systems may be custom designed
[2] Shorter length cartridge configurations are available

**FAIRVIEW APARTMENT BUILDING**
**2362 FAIRVIEW STREET, BURLINGTON**
**STORMWATER MANAGEMENT**

| Surface type | Area of Surface Type (m^2) | Initial Abstraction (mm) | Initial Abstraction (m^3) |
|---|---|---|---|
| Landscape (not above parking) | 1526 | 5.00 | 7.63 |
| Green roof | 324 | 5.00 | 1.62 |
| Hard surfaces & landscape over parking | 5874 | 1.00 | 5.87 |
| Totals | 7724 | | **15.12** |
| Requirement | | | **38.62** |

FAIRVIEW STREET

6
0.02
0.35
DRAINBASIN 9

4.6m–250mmø
STM @ 0.9%

7
0.02
0.35
DRAINBASIN 8

4.6m–250mmø
STM @ 1.0%

8
0.02
0.35
4.6m–250mmø
STM @ 1.0%
DRAINBASIN 7

9
0.45
0.95

1
0.06
0.35

10
0.03
0.67

5
0.04
0.67

4
0.04
0.67

3
0.04
0.67

2
0.03
0.50

DRAINBASIN 5

4.7m–250mmø
STM @ 1.5%

2.3m–250mmø
STM @ 0.9%
MH3(JF6)
MH2(JF6–DIVERSION)
DRAINBASIN 6
MH1

1.0m–250mmø
STM @ 1.0%

1.0m–250mmø
STM @ 1.0%

1.0m–250mmø
STM @ 1.0%

3.9m–450mmø
STM @ 1.2%

1.0m–250mmø
STM @ 1.0%

DRAINBASIN 1
DRAINBASIN 2
DRAINBASIN 3
DRAINBASIN 4

4.5m–150mmø
STM @ 0.9%

Ex. W INV.=95.55±
Ex. E INV.=95.63±

Ex. W INV.=96.07±
Ex. E INV.=96.10±

## LEGEND

SITE BOUNDARY

+ 326.23
EXISTING SPOT ELEVATIONS

EXISTING DIRECTION OF DRAINAGE

Ex. 375mmø STM — Ex. MH
EXISTING STORM SEWER

CATCHMENT AREA

MH — 21.3m–300mmø STM @ 1.3%
STORM SEWER

1
0.73
0.50
ID No.
AREA (Ha)
RUNOFF COEFFICIENT

FIGURE A2
Date: APR.27/23
Scale: 1:400

**STORM SEWER CATCHMENT AREAS**

MTE
Engineers, Scientists, Surveyors

Project No.: 38934-200

May 25, 2023 — 11:56 a.m. — Plotted By: JAsztalos

P:\P\38934\200\38934-200-F4.dwg

**FAIRVIEW STREET APARTMENT**
**CITY OF BURLINGTON**

Project No.: 38934-200
Date: 3/11/2024
Design By: NXR

# STORM SEWER DESIGN

## 100-Year

**Design Parameters**

**IDF Parameters**

Design Storm Frequency: 100 year
a = 1281.34
b = 5.0
c = 0.761
Tc = 10

$$i = \frac{A}{(T+B)^c}$$

**Pipe Design**

Max Velocity 4.5 m/s
Min Velocity 0.75 m/s
Manning's "n" 0.013

| LOCATION | | | | STORM FLOW | | | | | | | DESIGN | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AREA No. | AREA NAME | FROM MH | TO MH | AREA A (ha.) | RUNOFF COEFF "C" | A x C | CUMMUL A x C | TIME OF CONCEN (min.) | RAIN INTENSITY (mm/hr) | PEAK FLOW "Q" ($m^3$/sec) | PIPE SIZE (mm) | SLOPE (%) | LENGTH (m) | CAPACITY ($m^3$/sec) | VELOCITY (m/sec) | TIME IN PIPE (min.) | % Pipe FULL | REMARKS |
| 1 | East Landscaped | 5 | STUB | 0.06 | 0.35 | 0.02 | 0.02 | **10.0000** | 163.1770 | 0.0095 | 250 | 1.5 | 4.7 | 0.0728 | 1.4837 | 0.05279 | 13.08 | |
| 2 | South Landscaped | 4 | STUB | 0.03 | 0.50 | 0.02 | 0.02 | **10.0000** | 163.1770 | 0.0068 | 250 | 1.0 | 1.0 | 0.0594 | 1.2115 | 0.01376 | 11.44 | |
| 3 | South Landscaped | 3 | STUB | 0.04 | 0.67 | 0.03 | 0.03 | **10.0000** | 163.1770 | 0.0121 | 250 | 1.0 | 1.0 | 0.0594 | 1.2115 | 0.01376 | 20.44 | |
| 4 | South Landscaped | 2 | STUB | 0.04 | 0.67 | 0.03 | 0.03 | **10.0000** | 163.1770 | 0.0121 | 250 | 1.0 | 1.0 | 0.0594 | 1.2115 | 0.01376 | 20.44 | |
| 5 | South Landscaped | 1 | STUB | 0.04 | 0.67 | 0.03 | 0.03 | **10.0000** | 163.1770 | 0.0121 | 250 | 1.0 | 1.0 | 0.0594 | 1.2115 | 0.01376 | 20.44 | |
| 6 | West Landscaped | 9 | STUB | 0.02 | 0.35 | 0.01 | 0.01 | **10.0000** | 163.1770 | 0.0032 | 250 | 0.9 | 4.6 | 0.0564 | 1.1493 | 0.06671 | 5.63 | |
| 7 | West Landscaped | 8 | STUB | 0.02 | 0.35 | 0.01 | 0.01 | **10.0000** | 163.1770 | 0.0032 | 250 | 1.0 | 4.6 | 0.0594 | 1.2115 | 0.06328 | 5.34 | |
| 8 | West Landscaped | 7 | STUB | 0.02 | 0.35 | 0.01 | 0.01 | **10.0000** | 163.1770 | 0.0032 | 250 | 1.0 | 4.6 | 0.0594 | 1.2115 | 0.06328 | 5.34 | |
| 9 | Building | BLDG | JF6 | 0.45 | 0.95 | 0.43 | 0.56 | 10.0667 | 162.6269 | 0.2552 | 450 | 1.2 | 3.9 | 0.3122 | 1.9637 | 0.03310 | 81.75 | |
| 10 | East Landscaped | 6 | JF6 | 0.03 | 0.67 | 0.02 | 0.02 | **10.0000** | 163.1770 | 0.0091 | 250 | 0.9 | 2.3 | 0.0564 | 1.1493 | 0.03335 | 16.16 | |
| | Southwest Landscaped | JF6 | MH1 | 0.00 | 0.00 | 0.00 | 0.59 | 10.0334 | 162.9014 | 0.2647 | 150 | 0.9 | 4.5 | | | | | Orifice Pipe |

**FAIRVIEW STREET APARTMENT**

**CITY OF BURLINGTON**

Project No.: 38934-200
Date: 3/11/2024
Design By: NXR

# STORM SEWER DESIGN

## 5-Year

**Design Parameters**

**IDF Parameters**

Design Storm Frequency: 5 year
a = 802.04
b = 5.0
c = 0.764
Tc = 10

$$i = \frac{A}{(T+B)^C}$$

**Pipe Design**

Max Velocity 4.5 m/s
Min Velocity 0.75 m/s
Manning's "n" 0.013

| LOCATION | | | | STORM FLOW | | | | | | | DESIGN | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AREA No. | AREA NAME | FROM MH | TO MH | AREA A (ha.) | RUNOFF COEFF "C" | A x C | CUMMUL A x C | TIME OF CONCEN (min.) | RAIN INTENSITY (mm/hr) | PEAK FLOW "Q" ($m^3$/sec) | PIPE SIZE (mm) | SLOPE (%) | LENGTH (m) | CAPACITY ($m^3$/sec) | VELOCITY (m/sec) | TIME IN PIPE (min.) | % Pipe FULL | REMARKS |
| 1 | East Landscaped | 5 | STUB | 0.06 | 0.35 | 0.02 | 0.02 | **10.0000** | 101.3123 | 0.0059 | 250 | 1.5 | 4.7 | 0.0728 | 1.4837 | 0.05279 | 8.12 | |
| 2 | South Landscaped | 4 | STUB | 0.03 | 0.50 | 0.02 | 0.02 | **10.0000** | 101.3123 | 0.0042 | 250 | 1.0 | 1.0 | 0.0594 | 1.2115 | 0.01376 | 7.10 | |
| 3 | South Landscaped | 3 | STUB | 0.04 | 0.67 | 0.03 | 0.03 | **10.0000** | 101.3123 | 0.0075 | 250 | 1.0 | 1.0 | 0.0594 | 1.2115 | 0.01376 | 12.69 | |
| 4 | South Landscaped | 2 | STUB | 0.04 | 0.67 | 0.03 | 0.03 | **10.0000** | 101.3123 | 0.0075 | 250 | 1.0 | 1.0 | 0.0594 | 1.2115 | 0.01376 | 12.69 | |
| 5 | South Landscaped | 1 | STUB | 0.04 | 0.67 | 0.03 | 0.03 | **10.0000** | 101.3123 | 0.0075 | 250 | 1.0 | 1.0 | 0.0594 | 1.2115 | 0.01376 | 12.69 | |
| 6 | West Landscaped | 9 | STUB | 0.02 | 0.35 | 0.01 | 0.01 | **10.0000** | 101.3123 | 0.0020 | 250 | 0.9 | 4.6 | 0.0564 | 1.1493 | 0.06671 | 3.49 | |
| 7 | West Landscaped | 8 | STUB | 0.02 | 0.35 | 0.01 | 0.01 | **10.0000** | 101.3123 | 0.0020 | 250 | 1.0 | 4.6 | 0.0594 | 1.2115 | 0.06328 | 3.31 | |
| 8 | West Landscaped | 7 | STUB | 0.02 | 0.35 | 0.01 | 0.01 | **10.0000** | 101.3123 | 0.0020 | 250 | 1.0 | 4.6 | 0.0594 | 1.2115 | 0.06328 | 3.31 | |
| 9 | Building | STUB | JF6 | 0.45 | 0.95 | 0.43 | 0.56 | 10.0667 | 100.9695 | 0.1584 | 450 | 1.2 | 3.9 | 0.3122 | 1.9637 | 0.03310 | 50.76 | |
| 10 | East Landscaped | 6 | JF6 | 0.03 | 0.67 | 0.02 | 0.02 | **10.0000** | 101.3123 | 0.0057 | 250 | 0.9 | 2.3 | 0.0564 | 1.1493 | 0.03335 | 10.03 | |
| | Southwest Landscaped | JF6 | MH1 | 0.00 | 0.00 | 0.00 | 0.59 | 10.0998 | 100.8003 | 0.1638 | 150 | 0.9 | 4.5 | | | | | Orifice Pipe |

# Appendix B

# Sanitary

## 2362 Fairview St. Development

City of Burlington
Project #: 38934-200
Date: February 2024
By: NXR

### Sanitary Demand Calculations

| Unit Type | Number of Units | Occupant Count | Avg. Dry Weather Flow (L/day) | Avg. Dry Weather Flow (L/s) | Peak Flow (L/s) | Total Design Flow [4] (L/s) |
|---|---|---|---|---|---|---|
| **Total Commercial** | 1 | | 1,235 | 0.01 | | |
| 1 bedroom | 238 | 324 | 89,100 | 1.03 | | |
| 2 bedroom | 88 | 161 | 44,275 | 0.51 | | |
| 3 bedroom | 12 | 22 | 6,050 | 0.07 | | |
| **Total Residential** | 338 | 507 | | 1.61 | | |
| | | | | | | |
| **Proposed Development** | | | 140,660 | 1.63 | 6.29 | 6.51 |

| Commercial Space [5] | |
|---|---|
| Unit Flow Rate (L/day/$m^2$) | 5 |
| Total GFA ($m^2$) | 247 |

| Sanitary Demand | | |
|---|---|---|
| Residential Daily Demands | 275 | L/ca/day |
| | 0.0032 | L/ca/sec |
| Harmon Peaking Factor[3] | 3.86 | |
| Site Area | 0.77 | ha |
| Infiltration Allowance [4] | 0.286 | L/s/ha |
| | 0.220 | L/s |

Note 1: Population Density based on Region of Halton Development Charges Background Study (2022), Table A-4
1-bed = 1.36ppu, 2-bed = 1.83, 3-bed = 1.83
Note 2: Residential Demand based on Halton Region W/WW Design Manual Section 3.2.2
Note 3: Modified Harmon Peaking Factor PF = $K_{av}$ x(1+(14/4+$P^{0.5}$))
Note 4: Infiltration allowance from Halton Region W/WW Design Manual Section 3.2.4 (Design Flow = Avg Dry Weather Flow * Avg Peak Wastewater Flow Factor + Inflow/Infiltration Allowance)
Note 5: From OBC Table 8.2.1.3B

# Appendix C

# Water

## 2362 Fairview St. Development

**City of Burlington, Ontario**
Project #: 38934-200
Date: 2/14/2024
By: NXR

### Water Demand Calculations

| Location | Residential | | | | Commerical | | Final Demand | | |
|---|---|---|---|---|---|---|---|---|---|
| | Number of Units (ea) [1] | Population Density [2] (people/unit) | Population (persons) | Demand (L/s) | Floor Area (ha) | Demand (L/s) | Avg Day Demand Qavg (L/s) | Max Day Demand [3] Qmax.day (L/s) | Peak Hour Demand [3] Qpeak (L/s) |
| **Residential** | | | | | | | | | |
| 1-Bedroom | 238 | 1.36 | 324 | 1.031 | | | 1.031 | 2.320 | 4.125 |
| 2-Bedroom | 88 | 1.83 | 161 | 0.513 | | | 0.513 | 1.153 | 2.050 |
| 3-Bedroom | 12 | 1.83 | 22 | 0.070 | | | 0.070 | 0.158 | 0.280 |
| **Commercial** | | | | | 0.028 | 0.001 | 0.001 | 0.001 | 0.002 |
| **Totals** | **338** | | **507** | **1.61** | | | **1.61** | **3.63** | **6.46** |

| Water Demand [3] | | |
|---|---|---|
| Average Daily Demand | 275 | L/d/person |
| Maximum Day Demand (2.25 Max Day Factor) | 618.75 | L/d/person |
| Peak Hour Demand (4.0 Peak Hour Factor) | 1100 | L/d/person |
| Commerical Demand | 0.0248 | L/ha/s |
| **Fire Flow [4]** | | |
| Fire Flow | 135.00 | L/s |

| Max Day + Fire Flow Demand | |
|---|---|
| Qmax.day+fire | **138.63** L/s |

Note 1: Unit info provided by Architect
Note 2: Population Density based on Region of Halton Development Charges Background Study (2022), Table A-4
Note 3: Water Demands and peaking factors based on Halton Region W/WW Design Manual V3.0
Note 4: Fire flows from FUS (2020) - See attached worksheet
Note 5: Daily flow density based on OBC Table 8.2.1.3.B.

## 2362 Fairview St. Development

**City of Burlington, Ontario**
Project #: 38934-200
Date: 2/14/2024
By: NXR

## FIRE FLOW DEMAND REQUIREMENTS - FIRE UNDERWRITERS SURVEY (FUS GUIDELINES)

Fire flow demands for the FUS method is based on information and guidance provided in "Water Supply for Public Protection" (Fire Underwriters Survey, 2020).

An estimate of the fire flow required is given by the following formula:

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

where:

RFF = the required fire flow in litres per minute
C = coefficient related to the type of construction
= 1.5 for **Type V** Wood Frame Construction
= 0.8 for **Type IV-A** Mass Timber Construction
= 0.9 for **Type IV-B** Mass Timber Construction
= 1.0 for **Type IV-C** Mass Timber Construction
= 1.5 for **Type IV-D** Mass Timber Construction
= 1.0 for **Type III** Ordinary Construction
= 0.8 for **Type II** Noncombustible Construction
= 0.6 for **Type I** Fire Resistive Construction
A = For a building classified with a Construction Coefficient below 1.0:
Assuming all vertical openings and exterior vertical communications are properly protected in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors

| Floor | Total GFA | Effective Area (A) |
|---|---|---|
| 1st | 2538 | 0 |
| 2nd | 3033 | 3033 |
| 3rd | 3033 | 758 |
| 4th | 3033 | 758 |
| 5th | 2867 | 0 |
| 6th | 2744 | 0 |
| 7th | 2573 | 0 |
| 8th | 2520 | 0 |
| 9th | 2086 | 0 |
| 10th | 2086 | 0 |
| 11th | 2086 | 0 |
| **TOTAL** | **28599** | **4549.50** |

Adjustments to the calculated fire flow can be made based on occupancy, sprinkler protection and exposure to other structures. The table below summarizes the adjustments made to the basic fire flow demand.

| | | | (1) | | (2) | | (3) | | (4) | | **Final Adjusted** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Building | Area "A" ($m^2$) | C (Type II) | Fire Flow "RFF" (l/min) | (l/s) | Occupancy % | Adjusted Fire Flow (L/min) | Sprinkler % | Adjustment (L/min) | Exposure % | Adjustment (L/min) | **Fire Flow (L/min)** | **Rounded (L/min)** | **(L/s)** |
| Proposed Building | 4,549.5 | 0.8 | 11,900 | 198.3 | -15 | 10,115 | -40 | -4,046 | 20 | 2,023 | 8,092 | 8,100 | **135.0** |
| | | | | | | | | | | | | | |

**(2) Occupancy**

| | |
|---|---|
| Non-Combustible | -25% |
| Limited Combustible | -15% |
| Combustible | No charge |
| Free Burning | 15% |
| Rapid Burning | 25% |

**(3) Sprinkler**

-30% - Automatic sprinkler protection designed and installed in accordance with NFPA 13
-10% - Water supply is standard for both the system and Fire Department hose line
-10% - Fully supervised system

**(4) Exposure**

| | | |
|---|---|---|
| 0 to 3m | 25% | |
| 3.1 to 10m | 20% | Calculate for all |
| 10.1 to 20m | 15% | sides. Maximum |
| 20.1 to 30m | 10% | charge shall not |
| >30 | 0% | exceed 75% |

| Direction | Distance | % |
|---|---|---|
| N | >30m | 0 |
| E | 26.5 | 10 |
| S | >30m | 0 |
| W | 21.0 | 10 |
| | **Total** | 20 |

# Appendix D

# Reference Documentation

**Preconsultation Meeting Notes**
**2362 Fairview Street – September 13, 2023**

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**Attendees:**

| | |
|---|---|
| City of Burlington: | Elyse Meneray, Bill Wallace, Adam Scott, Smeeta Adiga, Danielle Beck Kate Hill-Montague and Matt Wootton |
| Halton Region: | Adam Huycke, Amanda McNeish and John Kisneris |
| Proponents: | Martin Quarcoopome, Kevin Nunn and Terry Martino |

**Description of Development Concept:**

- 11 storey mixed use building with 356 units and 730 sq. m of ground floor commercial.
- There will be a total of 397 parking spaces within three levels of underground parking and surface parking (382 underground parking spaces for residents and 15 surface parking spaces for commercial use).
- The proposal will a proposed FSI of 3.87:1 with approximately 35,441.12 sq. m. of gross floor area.

**Planning Comments:**

*Current Official Plan (1997, as amended)*
***City of Burlington Official Plan 1997, as amended***

The subject lands are identified as Mixed-Use Activity Area on Schedule A – Settlement Pattern of the City of Burlington Official Plan, 1997.

The lands are designated as Mixed-Use Centre – General on Schedule B – Comprehensive Land Use – Urban Planning Area, of the City of Burlington Official Plan, 1997 as amended.

**'Mixed-Use Corridors General' Designation General Policies (Part III, Section 5.3.2)**

a) The following uses *may* be permitted within the Mixed Use Corridor – General, Mixed use Corridor – Employment and Mixed Use Corridor – Commercial Corridor designations:
    (i) a wide range of retail, *service commercial*, and personal service uses; financial institutions and services; a broad range of office uses; *entertainment, recreation* and other *community facilities* such as day care centres and *small scale motor vehicle dealerships;*
    (ii) *high density residential* uses and a full range of office uses. Townhouses may only be permitted as a component of an overall development of mixed residential or residential/commercial building forms, where the townhouse portion of the mixed development does not abut the multi-purpose arterial or major arterial road and where the development of the townhouse component does not compromise the long-term objectives for the Mixed Use Corridor

designation with respect to such matters as mix of uses, building form and intensity; and

b) Mixed Use Corridor lands are intended to provide for the day-to-day and weekly shopping needs of residents within and in close proximity to the Corridor.
c) Retail and service commercial uses are to be located at street level in office or residential buildings.
d) Zoning By-law regulations affecting Mixed Use Corridors shall be based on the following factors:
    (i) the maximum floor area ratio of development at any site shall be 1.5:1. City Council may consider a higher floor area ratio in conjunction with a site-specific rezoning or variance application, subject to the consideration of various factors such as adequacy of services and infrastructure and the provision of compatibility with adjacent uses through measures such as terracing, a high quality of building design, landscaping and streetscaping, and the provision of underground parking;
    (ii) the minimum building height shall be two storeys and the maximum building height shall be six storeys. Where required to ensure compatibility, four to six storey buildings may be required to be terraced back from adjacent residential areas and/or the street;
    (iii) the implementing zoning by-law shall identify a minimum portion of all buildings abutting the corridor street to be located in close proximity to the corridor street. These setbacks may be modified for specific corridors following the completion of Council approved Corridor studies;
e) The zoning of individual sites may not allow for the full range of permitted uses or the full extent of development intensity at every location based on site specific factors that may include, but are not limited to, traffic, land use compatibility, market impact, natural hazards and features, and environmental factors such as soil contamination.
f) Higher density land uses and taller buildings shall be permitted at locations where Mixed Use Corridor areas intersect with multi-purpose arterial roads, major arterial roads or provincial freeways; or existing areas of development concentration, subject to the criteria outlined in Part III, Subsection 5.3.2, d) (i).
g) The design and development of Mixed Use Corridors shall ensure compatibility between the Mixed Use Corridor uses and adjacent land uses, particularly residential uses. The following factors shall be considered in reviewing proposals for new and/or expanding Mixed Use Corridor uses:
    (i) buildings should be located so as to be in proximity to the street, to provide a sense of human comfort and pedestrian scale and interest, and should be in close proximity to transit services;
    (ii) the site plan includes features that integrate the development with surrounding uses;
    (iii) the site plan promotes safe, convenient and barrier-free pedestrian travel within the site, between the site and adjacent uses and to and from transit stops;

(iv) the number and location of vehicular access points shall be limited to minimize disruption to traffic flows and to minimize the impact on local streets;
(v) wherever possible, off-street parking should be located in the side and rear yards and away from adjacent residential uses. Off-street parking areas, loading areas and service areas shall be screened and landscaped and located to minimize adverse impacts on adjacent residential uses;
(vi) the site plan promotes public safety;
(vii) outdoor storage areas shall be fenced and/or screened;
(viii) lighting is directed to minimize impacts on adjacent residential uses;

h) transit-supportive and pedestrian-oriented urban design shall be required in the development of Mixed Use Corridor sites;
i) The design and development of Mixed Use Corridors shall encourage the use of public transit, pedestrian and bicycle travel as an alternative to the automobile and shall maximize personal safety by encouraging site plan features such as:
(i) buildings should be oriented to the street and transit services, and buildings should be located so as to be in proximity to, and face the street, to provide a sense of human comfort and pedestrian scale and interest;
(ii) safe and convenient access shall be provided for pedestrians between buildings and transit stops, parking areas, and other buildings and facilities; and
(iii) roads shall be designed for automobile use, efficient transit service as well as pedestrian and bicycle travel.
k) Retail, service commercial and other pedestrian-oriented use shall be encouraged at street level
l) Infilling of existing, linear Mixed use Corridors shall be encouraged rather than the designation of new areas.
m) It is recognized that certain segments of the Mixed Use Corridor designation differ in character from each other and City Council may require the preparation of Corridor Studies for all or part of various Mixed Use Corridors to provide specific guidance for their redevelopment and intensification. City Council may identify corridor segments on the basis of specific physical characteristics, identity and location, establish priority areas for which Corridor Studies will be undertaken, and outline specific items that Corridor Studies will address. The implementation of Council-approved Corridor Studies may require further amendments to this Plan or the Zoning By-law. Studies of this kind may also be required as part of an application for development or redevelopment along a Mixed Use Corridor.

**Housing Supply (Part III, Section 2.3.2)**

g) City Council shall consider the provision of innovative forms of housing tenure, such as common element, phased and vacant land condominiums, as a means of increasing housing diversity, choice and supply in the City.
h) The City shall, in co-operation with other orders of government, encourage the provision of a range of housing types, including rental housing, for individuals and families.

**Housing Affordability (Part III, Section 2.4.2)**

a) New residential development shall be required to satisfy the requirements of the Provincial Policy Statement relating to the provision of affordable housing/

*Council Adopted New Official Plan*

*New Official Plan (2020)*

- Burlington's new Official Plan was adopted by City Council on April 26, 2018 and approved, with modifications, by Halton Region on November 30, 2020. The Planning Act states that all parts of an approved Official Plan that are not subject to appeal will come into effect on the day after the end of the appeal period. That date was December 22, 2020 for the Burlington Official Plan.
- The record prepared for the Ontario Land Tribunal (OLT) by Halton Region on December 23, 2020 states that a total of 48 appeals were filed regarding the Burlington Official Plan, 2020. You can view a list of the appeals below. For those parts of the plan which have been referred to the OLT for a decision, relevant sections of the Burlington Official Plan, 1997 (as amended) will remain in effect until the applicable appeals have been resolved.
- As the OLT process advances, the Burlington Official Plan, 2020 is subject to change and the interim working version will require periodic updates. The interim working version of the Burlington Official Plan, 2020 must be read along with all appeals, as well as any orders and decisions resulting out of subsequent OLT proceedings, and users must satisfy themselves as to the legal status and applicability of the policies.
- The interim working version of the Burlington Official Plan, 2020 is provided for information purposes only. For legal purposes, reference should be made to the original certified documents which are on file with the City Clerk including the April 26, 2018 City of Burlington adopting bylaw (By-law 024-2018), the Nov. 30, 2020 Halton Region Notice of Decision and all subsequent orders and decisions issued by the OLT.
- You can view the status of the OLT case, scheduled hearings, and orders and decisions that have been issued by visiting the Ontario Land Tribunal's website and searching case number "OLT-22-002219" (legacy case number PL210040).

  For more information please visit the City's New Official Plan Project website https://www.burlington.ca/en/services-for-you/official-plan-review.asp.

- The lands are located within a *Secondary Growth Area*, in accordance with Schedule B-1 - Growth Framework, of the New Official Plan (2020).

**Secondary Growth Areas(subsection 2.4.2.(2))**

The lands are located within Secondary Growth Areas, in accordance with Schedule B-1 Growth Framework, of this Plan.

a) Secondary Growth Areas:
   (i) are identified on Schedule B-1: Growth Framework, of this Plan, and are located within Mixed Use Nodes and Intensification Corridors, as identified on Schedule B: Urban Structure, of this Plan, with some exceptions. In addition, Secondary Growth Areas also comprise select vacant residential sites and employment designated sites located immediately adjacent to a Major Arterial or Multi-

Purpose Arterial Street as identified on Schedule O-1: Classification of Transportation Facilities – Urban Area, of this Plan;

(ii) shall be recognized as a distinct area within the city's Urban Area accommodating growth in accordance with the permissions and densities of the current land use designations of this Plan;

(iii) are areas expected to transition over the planning horizon and beyond and will not result in a significant relocation of planned growth outside of the Primary Growth Areas in order to ensure that the objectives and policies of Chapter 6 Infrastructure, Transportation and Utilities can be met;

(iv) shall be limited to a maximum of mid-rise building form, unless otherwise permitted by the policies of this Plan; and

(v) where applicable, shall support the frequent transit corridors and accommodate development that is compact, mixed use and pedestrian-oriented in nature.

b) Secondary Growth Areas are also subject to the policies of Subsection 7.3.2(1) of this Plan.

- The lands are further designated *Urban Corridor* in accordance with Schedule C – Land Use – Urban Area, of the New Official Plan (2020).

**'Urban Corridor' Designation Policies (Section 8.1.3(7.2))**

a) Transit-supportive and pedestrian-oriented design shall be required in the development of Urban Corridor sites.

b) Urban Corridor lands are intended to provide for the day-to-day and goods and service needs of residents and employees within and in proximity to the Corridor and may also serve a broader city-wide market.

c) The following uses may be permitted on lands designated Urban Corridor:
   (i) retail and service commercial uses;
   (ii) automotive commercial uses, including large-scale motor vehicle dealerships existing on the date the Plan comes into effect;
   (iii) residential uses with the exception of single-detached and semi-detached dwellings;
   (iv) office uses;
   (v) entertainment uses; and,
   (vi) recreation uses.

d) Other forms of ground-oriented dwellings may only be permitted, provided that the ground-oriented residential portion of the development:
   (i) does not abut a Multi-Purpose Arterial Street, Urban Avenue or Main Street, as shown on Schedule 'O-1', Classification of Transportation Facilities-Urban Area, of the Plan;
   (ii) is developed in conjunction with, and is part of, a multi-residential or mixed use building; and
   (iii) does not compromise the objectives of the Urban Corridor designation.

e) Stand alone ground-oriented dwellings shall be prohibited in Urban Corridor lands located within MTSAs.

f) A maximum floor area ratio of development of 2.0:1 is an appropriate built form in Urban Corridor lands. An increase to this floor area ratio may occur through a site-specific Zoning By-law Amendment or Minor Variance Application, without the need for an amendment to the Plan, provided that the objectives of the Urban Corridor designation are maintained.

g) The minimum building height shall be two (2) storeys and the maximum building height shall not exceed six (6) storeys. Where required to ensure compatibility, four (4) to six (6) storey buildings may be required to be terraced back from adjacent residential areas and/or the street.

h) To ensure compatibility with adjacent residential areas the maximum six (6) storey building building height may not be permitted on sites that are small in size, have insufficient depth, are adjacent to areas designated Residential-Low Density, or front local streets.

(j) Retail and service commercial uses and other pedestrian-oriented uses shall be located on the ground floor of office or residential buildings and should be permitted above or below the first storey of buildings. A limited amount of office uses may also be permitted on the ground floor.

(k) Development located on sites designated Urban Corridor may contain a minimum of one permitted use as outlined in Subsection 8.1.3(7.2)(c) of the Plan, except in the following locations where mixed use buildings containing retail and service commercial uses at grade shall be required on:
   (i) sites located at the intersection of:
      a. Fairview Street and Walker's Line;
      b. Fairview Street and Guelph Line; and,
      c. Plains Road and King Road.
   (ii) sites located within MTSA Special Planning Areas, as shown on Schedule B: Urban Structure, and Schedule B-1: Growth Framework of the Plan.

(l) Development along Urban Corridors may be required to provide a minimum floor-to-floor height at grade, as established in the Zoning By-law, to facilitate land use flexibility and adaptability over time.

(m) Any proposed development of sites designated Urban Corridor shall retain the planned commercial function of the site, in accordance with the objectives of Subsections 8.1.3(7.1)(b) and (f), of the Plan, to the satisfaction of the City.

(n) The Zoning By-law shall establish a maximum floor area and a maximum floor area at grade per individual retail and service commercial unit, based on such considerations as planned commercial function, built form, and contribution to achieving vibrant, active and walkable built environments in Urban Corridor lands.

(p) Urban Corridor lands shall be served by frequent transit corridors.

Section 3.1.1 Housing

Housing is fundamental to the social, economic and physical well-being of the city's residents and neighbourhoods. The City will promote an appropriate and adequate range of housing choices by type, tenure and affordability level, to accommodate the needs of all city residents and workers, regardless of age, income level, physical, sensory and mental health and ability, culture, level of support services, household structure and family composition.

Section 3.1.1(2) Policies

(b) The City shall require the submission of a housing impact statement where a development proposal includes more than one hundred (100) dwelling units, identifying:

(i) how the proposal contributes to achieving the Region of Halton housing targets, including identification of any proposed new affordable or assisted housing units;
(ii) how the estimated rents and/or initial sales prices of the development are at or below the affordable housing thresholds by type
(iii) where construction of the units is expected to occur in phases, information regarding the number of affordable housing units to be provided per phase, where applicable; and
(iv) the proposed legal and/or financial mechanisms to ensure the delivery of any proposed new affordable housing commitments, and mechanisms to retain the long term affordability of units, where applicable.

**City of Burlington Housing Strategy**

Subsection 3.1.1(2)(g) of the new Official Plan (2020) and the City's Strategic Plan, directed the City to develop a city-wide housing strategy to among other things, support the Region of Halton's Housing Strategy, describe the current range and mix of housing in the city, establish city-wide housing objectives, examine opportunities for partnerships to increase the supply of affordable housing, to develop minimum targets in support of achieving the region of Halton's housing mix and affordable unit targets as well as two and three bedroom unit minimum targets.

The Burlington Housing Strategy and the Annual Housing Targets (Appendix B to the Housing Strategy) were approved by City Council on June 21, 2022. The City's Housing Strategy provides a roadmap for addressing local housing needs and increasing housing options that meet the needs of current and future residents at all stages of life and at all income levels. The Housing Strategy identifies 12 Actions to move toward the vision for housing in Burlington. It provides a set of action-oriented housing objectives (Themes) and an associated implementation plan that also identifies a list of Prioritized Actions and Quick Wins.

One of the Housing Strategy's stated objectives (Theme 2) of the Housing Strategy is to support a broad variety of housing types and forms to increase housing options to meet the needs of all current and future residents at all stages of life. Action 4 of the Housing Strategy established minimum targets around housing that build upon the policies of the Official Plan (2020) and use the findings of the Housing Strategy Project. These targets, appended to the Housing Strategy, set targets for new rental dwelling units, affordable residential units and 3-bedroom units.

*Current Zoning*

- The subject lands are zoned Mixed – Use Corridor General (MXG-371) Zone.
- Site specific permits motor vehicle storage as an additional use

*Design Guidelines*

The following design guidelines are applicable:

- Design Guidelines for Mixed-Use and Residential Mid-Rise Buildings (March 2019) for mid-rise buildings
- Shadow Study Guidelines and Terms of Reference (June 2020)
- Pedestrian Level Wind Study Guidelines and Terms of Reference (June 2020)
- Sustainable Building and Design Guidelines (April 2018)
- Stormwater Management Design Guidelines (June 2020)

*Preliminary Planning Comments*

- While the new Official Plan policies contemplate this part of Fairview Street to be redeveloped with mixed-use buildings up to 6 storeys in height and a FAR of 2:1, the proposed development exceeds the height, density and intensity in the emerging vision. Justification for the increased height, density, intensity and reduced setback to the residential zones will be required.
- Development on the subject lands must be compatible with the existing neighbourhood character with respect to scale, massing, height, siting, setbacks, coverage, parking and amenity area so an appropriate transition is provided between existing and proposed buildings.
- As per Part III, section 5.3.2 (b) of the current Official Plan (1997), Mixed Use Corridor lands are intended to provide for the day-to-day and weekly shopping needs of residents within and in close proximity to the Corridor. It is important for the City that retail spaces be designed to be flexible and adaptable to attract a diverse range of commercial tenants to serve the current and evolving needs of the community over the long term. Please consider whether the proposed retail unit is sufficiently deep, has sufficient space for back-of-house functions, and has sufficient access to garbage and loading areas, to achieve this objective
- Please provide the length of the proposed building as it appears to be longer than 60 m. Refer to the Mid-Rise Guidelines for guidance on breaking up massing and ensuring appropriate streetwall and building separation along mixed-use corridors.
- The City's Mid-Rise Design Guidelines refer to a 45-degree angular plane, applied from the shared property line of low-density residential uses to provide a transition between built

forms and minimize overlook and privacy impacts of the mid-rise building. The entire building should fit within this plane, including balconies and terraces.
- Provide setbacks for underground parking area.
- Please ensure that the ground level parking and loading area is designed for pedestrian safety and conforms to the City's accessible parking requirements

*Application Requirements*

- An Official Plan and Zoning By-law Amendment is required to facilitate the proposed use.
- Prior to submitting the application, a Pre-Submission Neighbourhood Meeting is required. Please refer to the provided Applicant's Guide to Pre-Submission Neighbourhood Meetings.
    - The neighbourhood meeting is to be organized by the applicant and must be held before the application is submitted.
    - Circulation of the meeting invitation to residents and tenants within 120 metres of the development site will be completed by the City for a fee. Provide a PDF of the meeting invitation on own letterhead for distribution. Notice must be sent a minimum of 20 days in advance of the meeting.
    - Please notify the Ward Councilor and the Coordinator of Development Review of the date, time and location of the meeting. Meetings are currently being held virtually.
    - During the meeting, provide a detailed overview of the development proposal and allow time for questions and comments from the public. Take notes of the discussion.
    - As part of a complete application, the applicant must provide neighbourhood meeting minutes which include a written summary of public input received at the meeting. As part of the Planning Justification Report, the applicant must explain how this public input was used to modify the development proposal.
- Prior to submitting the application, consultation with the Burlington Urban Design Panel (BUD) will be required.
    - An Urban Design Brief will be required to explain how the City's Urban Design Guidelines have been addressed and how the comments of BUD have been taken into account.
    - A copy of the BUD meeting minutes must be submitted with the application. BUD Terms of Reference provided.
- A Planning Justification Report is required:
    - to discuss the impact of Provincial, Regional and local planning policy (both the existing and adopted Official Plan) on the proposed development;
    - to explain why the requested change to higher intensity residential use is desirable and represents good planning;
    - to discuss whether the requested amount of non-residential floor area is appropriate to support the planned commercial function of the Mixed Use Corridor;
    - to discuss how the results of required technical studies have been used to refine the redevelopment proposal;

    - to explain how the proposed development is compatible with surrounding residential, industrial and railway land uses including height, setbacks, massing, design and community features.
- A digital 3D model of the proposed building is required with the submission to assist with public engagement. Model specifications provided.
- A Shadow Study will be required to show how the proposed buildings and site design will impact the public realm, proposed outdoor amenity areas, and surrounding private outdoor amenity areas. Please refer to the City's Shadow Study Guidelines and Terms of Reference when preparing the Shadow Study. The study should show how height, setbacks, terracing, and massing have been considered to reduce impact on the low-rise houses to the east and south. A height survey of adjacent buildings should also be provided.
- A qualitative pedestrian level wind impact study (i.e. using wind tunnel testing) will be required to show how the proposed buildings and site designs will impact pedestrian comfort on the street and surrounding public and private open space areas, as the building height-to-separation ratio is less than 1:1 from the low-rise area to the south. Please refer to the City's Pedestrian Level Wind Study Guidelines and Terms of Reference.
- Please consider sustainable building design in your proposed development, using the City's Sustainable Building and Development Guidelines. An introductory letter from the Burlington Sustainable Development Committee is provided.

Staff contact: Elyse Meneray, Planner, Elyse.Meneray@burlington.ca

**Region of Halton Planning Comments:**

**REGIONAL OFFICIAL PLAN, 2009**

The subject lands are designated Urban Area (Map 1) per the Region's Official Plan (ROP), 2009 as amended by Regional Official Plan Amendment (ROPA) 48 and 49, and located within the Built Boundary. The subject lands are further located within an identified Regional Intensification Corridor and Commuter Rail Corridor, which is considered to be components of the Strategic Growth Area in the ROP.

***Regional Official Plan Amendment No. 48 & 49***

- The Urban Area (Section 72) policies of the Regional Official Plan (ROP) identify that the goal of the Urban Area and the Regional Urban Structure is to manage growth in a manner that fosters complete communities, enhances mobility across Halton, addresses climate change, and improves housing affordability, sustainability and economic prosperity.
- Within the Urban Area, the Regional Urban Structure as shown on Map 1H implements Halton's planning vision and growth management strategy to ensure efficient use of land, amongst other matters.
- Section 72.1 (6) identifies a Regional Urban Structure that directs growth to Strategic Growth Areas. The policies of the ROP provide for a structure and hierarchy in which to direct population and employment growth. Staff note that the Subject Lands are located along a 'Regional Intensification Corridor' which form part of the a defined Strategic Growth Areas as identified on Map 1H and Map 3 of the ROP. These corridors serve an existing or planned higher order transit function.

- The ROP identifies and supports the comprehensive planning for these areas in accordance with policy 77(5) of the ROP. Specifically, the Region's Official Plan (Section 48, 77 (5) and Section 79.3(3)) provides that Area Specific Plans are required for the development of new Strategic Growth Areas. An approved Area Specific Plan would provide for the comprehensive development for the area. Any application received in advance of the approval of approval of an Area Specific Plan for this area may be considered premature. Careful consideration of the proposed intensification of use for the subject lands needs to be given in the context of the Region's growth management strategy.
- Matters to be addressed should an application be submitted in advance of the completion of the Regional Comprehensive Review and City of Burlington Area Specific Plan for this area:
    - How the proposal addresses the Regional Urban Structure and growth management policies of the ROP as amended by ROPA 48 & 49.
    - Consideration and evaluation of Section 77(5) of the ROP;
    - Comprehensive evaluation of the municipal services within the area consistent with the Region's Area Servicing Plan requirements;
    - Comprehensive evaluation of traffic impacts for the area and the proposed development (also subject to City of Burlington input).

- Development/redevelopment proposal outside of identified Strategic Growth Areas should be carefully considered and evaluated to ensure that the comprehensive planning provided within the Regional Urban Structure and Strategic Growth Areas hierarchy is not negatively impacted as a result of development, and in turn does not negatively impact the City's ability to plan for and achieve the growth management objectives in the long-term. Development proposal that would result in significant intensification of uses outside Strategic Growth Areas may not be supported.
- Section 84 of the ROP speaks to the goal of housing to supply the Region with an adequate mix of housing types. Additional housing polices in the ROP speak to making efficient use of serviced lands to increase the supply of housing, and encouraging Local Municipalities and the development industry to be innovative in housing designs.

**Land Use compatibility:**

- ROP policy requires the assessment of Land Use Compatibility matters when a new sensitive uses are proposed in close proximity to major facilities and transportation uses. As part of the comprehensive planning analysis process, and future development applications in relation to adjacent major facilities, a Land Use Compatibility Assessment is required to evaluate the adjacent major facilities, and to make recommendations on setbacks and mitigation measures to address impacts.
- **Air Quality Assessment:** In accordance with Section 143 (9) b) of the Region's Official Plan, an air quality assessments are required to evaluate the impact of the adjacent major transportation network on the proposed development, in addition to evaluating any phasing impacts that may result should the redevelopment proposal be approved.
- **Noise Impact Study**: In accordance with Section 143 (9) a) a Noise Study must be completed by a qualified Noise consultant for the proposed development. The study must be completed as per Halton's Noise Abatement Policy and Noise Abatement Guidelines, and can be found online at https://www.halton.ca/Repository/Noise-Abatement-Guidelines. The final study, its assumptions & recommendations must be to the satisfaction of Transportation Planning and approved by Halton Region.
- A scope of Work is required for review and approval prior to the start of the studies listed above.

- Please note the above noted studies may be subject to peer review fees, at the cost of the applicant.

**Potential for Site Contamination**

- In accordance with S.147(17) of the Region's Official Plan states that a property is to be free of contamination prior to any development/change of use taking place.
    - Submission of a Regional Environmental Site Screening Questionnaire is required in addition to A Phase 1 (at minimum) (to O. Reg 153/04 standards and with a Letter of Reliance). Additional Environmental Site Assessments may be required depending upon the recommendation(s) of the Phase 1 ESA.

**Waste Management:**

- In accordance with Section 148 of the ROP, it is an objective of the Region to implement an integrated and sustainable waste management plan. Further, it is the Region's interest to ensure the safe and efficient collection of solid waste as part of the design and development approval.
- In accordance with ROP Guidelines, a Waste Management Plan is required to demonstrate how solid waste will be managed and collected from this site.

**Regional Transportation**

- The subject lands are located in close proximity to a Regional Road (Guelph Line) which terminates at Fairview Street. The intersection of Fairview Street and Guelph Line is a Regional intersection, as the north leg is a Regional Road.
- **Traffic Impact Study (TIS)** A TIS must be completed by a qualified Transportation consultant for the proposed development. The study must be completed as per Halton's Traffic Impact Study Guidelines. The final study, its assumptions & recommendations must be to the satisfaction of Transportation Planning and approved by Halton Region. The TIS Guidelines are available on-line at https://www.halton.ca/Repository/Transportation-Impact-Study-Guidelines
- A Scope of Work for the TIS is required for review and approval prior to the start of the study.
- For Information Only, it is noted that the property is situated within the Study Area for the ongoing QEW Prosperity Corridor Study.

**Municipal Servicing:**

- Section 89 of the Regional Official Plan require that approvals for all new development within the Urban Area be on the basis of connection to Halton's municipal water and wastewater systems, unless otherwise exempt by other policies of this Plan.
- There is a Halton Region local watermain within Fairview Street adjacent to the proposed development. There is a Halton Region trunk/transmission watermain within Fairview Street adjacent to the proposed development. No trunk watermain service connection laterals will be permitted.
- There is a Halton Region trunk wastewater main (sanitary sewer) within Fairview Street adjacent to the proposed development. Generally, no trunk wastewater main service connection laterals will be permitted. Any proposed trunk wastewater main connection lateral requires special review and Regional permission to connect into, and it should be noted that permission is not always guaranteed.
- The developer should undertake to locate the size and location of all watermains, water services, water meters, wastewater mains (sanitary sewers), wastewater (sanitary) services, property line wastewater (sanitary) inspection manholes, stormwater mains and stormwater services that exist within the road right-of-ways, to the property and within the

property and place them on an Existing Site Servicing Plan drawings within their reports. Public and private utility companies can be utilized for this purpose.

- A Functional Servicing Report is required to be prepared by the developer's civil engineering consultant (watermains, water services, fire hydrants, sanitary sewer mains, sanitary sewer services, property line wastewater (sanitary) inspection manholes, stormwater mains and stormwater services) to show options for how the property is proposed to be serviced according to City of Burlington and Halton Region standards. Local watermain and wastewater main (sanitary sewer) hydraulic analysis should be completed by the developer's consultant as well for the local sewers and the drainage area down the to the nearest trunk sewer. The consultant should include details about all other developments properties in the drainage area in their analysis of the local sewers. The report should speak to the number/type of units proposed and the phasing of the development with respect to the impacts on the Region's water distribution system and wastewater collection system. Phasing, timing of the development, and required/available capacity shall be detailed in the report. The consultant will include details about the potential external main upsizing and main extensions to accommodate the development, etc.. Also future forecast Regional capital works projects. The proposed development (FSR) will have to align with any Area Servicing Plan and Master Servicing Plan that is required for the area, City and Region.
- The FSR report should incorporate Fire Flow Rate Testing. The proponent should undertake fireflow rate testing of representative Regional fire hydrants in the area, with the proponent's fireflow contractor and Region forces present. Include within the Report a copy of the fireflow rate testing results, and the Fire Underwriters Survey (FUS) requirements for the development. This information will help to assist in informing the watermain design and watermain hydraulic modelling analysis that is being undertaken by the proponent's consultants.
- Further to the formal hydraulic analysis requirement, the developer's consultant can utilize the Region's current water and wastewater models (if required). The developer's civil consulting engineering firm will be required to enter into a Data License Agreement prior to obtaining any digital information from the Region.
- The FSR should include information related to all the other Utilities infrastructure in the area and potential conflicts.
- The FSR should show the existing site services and note how they are proposed to be decommissioned to make way for the development.
- The developer must physically locate the watermains and wastewater main (sanitary sewer) that are located immediately north of the property within Fairview Street. The developer's Professional Engineer that is preparing the FSR must consult with the Region regarding the proximity of the proposed development to the watermains and wastewater main (sanitary sewer), and the Region's approved set-back of the development from the watermains and wastewater main. There shall be no impact from the development on the Region's watermains and wastewater main. The Engineer shall prepare a number of cross-section engineering drawings along the north portion of the property and the City's road boulevard, for discussion with the Region. Proposed footings, foundation walls, overhangs, excavation, shoring, tie-backs, municipal mains and utilities will require to be detailed for review by the Region.
- Please note that this development may require additional municipal watermain isolation, and possibly a full size water chamber (including three/four valves) for the proposed development's water service connection, to the Region's water distribution system. The developer's civil engineering consultant must undertake a design exercise within the FSR in order to demonstrate that a full size water chamber, if required, can fit within the road/boulevard, while giving adequate separation distances from the other utilities in the

area. The Engineer shall prepare a number of detail drawings, for discussion with the Region early in the process.

- At the Site Plan application stage the proposed street tree planting and proposed street furniture will have to be reviewed closely in order to avoid tree planting/street furniture conflicts with the Region's watermain and wastewater main (sanitary sewer) located within the Fairview Street southerly boulevard, to the satisfaction of the City and the Region.
- New development must be on the basis of full municipal services.
- The developer should be aware of the Region's Multi-Unit Servicing Policy with respect to the number and location of water meters.
- Regional policies state that water and sanitary services cannot cross lot lines, the owner will ensure this throughout the process. Each lot must be independently serviced if it is proposed to be a separate lot.
- Any major servicing works required for this project would fall under the Regional Servicing Agreement process, including securities, Agreement registration, developer's liability insurance and the payment of Agreement fees.
- Servicing of a standard nature is required to go through the Regional Services Permit process.
- The size and scope of, utility trench and road cut, road restoration shall be to the satisfaction of the City of Burlington for local roads.
- Watermain and wastewater main (sanitary) servicing capacity is not guaranteed at the LOPA and ZBA stage. Servicing of development in the Burlington area of Halton Region is currently on a first-come-first-serve basis. The owner can pre-consult about servicing capacity with the Region at any time in the future going forward. This current development proposal capacity will be reviewed closely and commented upon at the time of Planning application receipt. Should a servicing capacity issue be identified at that time then it will have to be dealt with, working through it with the Region. Servicing capacity is deemed to be in hand at the issuance of a Regional Servicing Agreement, Special Financial Agreement, and Regional Services Permit, which is reviewed and obtained toward the end of the City's Site Plan approval process, or Regional Servicing Agreement.
- As always, acquiring land for development purposes and hiring consultants, at this time, is at the risk of the developer.
- Any water services and sanitary services that currently exist to the property that will not be utilized for any reason will be required to be disconnected right at the respective main by the developer.
- The developer's site servicing consultant can preconsult with the Region at any time regarding their proposed draft site servicing water design, wastewater design and identified utility conflicts (including storm).
- The Region would like to receive confirmation in writing when any required formal land assembly has taken place at the LOPA and ZBA stage in order for servicing to conform with Regional Policies, that water and wastewater services do not and will not cross lot lines for different property owners.

**Submission Requirements:**

- All submission materials on a USB/CD
- Applicable Regional Fee(s)
- Complete Application forms
- Planning Justification Report
- Concept Site Plans
- Functional Servicing Report
- Servicing Plan
- Land Use Compatibility Assessment (Noise, vibration, air quality, etc.)

- Traffic Impact Study
- Environmental Site Screening Questionnaire, Phase 1 & Phase 2 Environmental Site Assessment (ESA) to O.Reg 153/04 standards and with a Letter of Reliance.
- Waste Management Plan

- Staff contacts:
    - Adam Huycke, Senior Planner, Adam.Huycke@Halton.ca
    - John Kisneris, Development Project Manager, John.Kisneris@Halton.ca

**Development Engineering Comments:**

1. All plans to use the same base layer.
2. Identify existing and/or proposed property lines on all plans.
3. Identify existing and/or proposed easements on all plans.
4. Identify limits of existing and/or proposed underground parking on all plans.
5. Identify all applicable external agency setbacks on all plans.
6. All private utilities must be constructed within the subject property limits.
7. City Plan and Profile drawings may be downloaded from the Open Data Portal.

**RIGHT OF WAY**

1. A Municipal Consent Permit is required for any works on public lands, including but not limited to temporary staging, grading, servicing, construction or disturbance of vegetation.

**FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT**

Confirmation from the City's Stormwater Engineer is still pending therefore, details within number 4 may be subject to change.

1. All documents to be prepared in accordance with the Council approved Stormwater Management Design Guidelines (COB SWM), as amended.
2. To be stamped and certified by a Professional Engineer.
3. External agency may review the report. If differing requirements exist between them and the City than the most stringent criteria shall apply.
4. The City's Stormwater Engineer has provided the following criteria:
    a. **Quality Control (COB SWM 6.1.4.1 and 6.1.4.2):**
        - Enhanced 80.0% TSS removal achieved with a treatment train approach. An OGS will only be credited with 50.0% TSS removal.
        - OGS CA-ETV certified units only.
        - OGS to be sized to capture and treat a min. 90.0% of the runoff volume.
        - Rooftop areas may be considered clean if the flows are separated from non-roof areas as per COB SWM 3.6 and 6.1.4.1.
    b. **Quantity Control (COB SWM 6.1.1.1):**
        - Discharge to a storm sewer control either the 100-year post development or Regional Storm, whichever is greater to the 5-year pre-development.
        - A max. pre-development imperviousness of 36.0% (C = 0.50) for re-development is to be used for the pre-development calculations.

c. **Erosion Control (COB SWM 3.4 and 6.1.2)**:
   - na
d. **Water Budget (COB SWM 3.5 and 6.1.3):**
   - Strongly recommend the first 5mm of rainfall be retained and infiltrated or reused onsite.
e. **Groundwater:**
   - If there is a foundation drainage collection system, flows must be accommodated in the quantity control for the site, and discharge must meet the Storm Sewer Discharge Bylaw 59-2022 Table 1 criteria, as amended.
f. **External Flows**:
   - Identify all external flows and safely accommodate them under the developed conditions to avoid upstream flooding or ponding.
g. **Overland Flow Route (COB SWM 5.3.2 and 6.1.1.3):**
   - Provide the emergency overland flow route on the plans and direct it towards Fairview St. Include the neighbouring properties to ensure existing drainage patterns are being maintained.

5. Provide full sized scalable, signed, and stamped plans for the following:
   a. pre-development storm drainage area
   b. post-development storm drainage area
   c. grading
   d. servicing
   e. any additional applicable plans
6. Include a Letter of Reliance that allows the City to rely upon the documents.

**NOISE AND VIBRATION FEASIBILITY STUDY**

1. All documents to be prepared in accordance with the MECP's Environmental Noise Guideline Publication NPC-300, as amended.
2. To be stamped and certified by a Professional Engineer.
3. External agency may review the report. If differing requirements exist between them and the City than the most stringent criteria shall apply.
4. The study to include but not limited to the following:
   a. Considered a Class 1 property.
   b. Identify offsite stationary noise sources that may require mitigation for existing and/or proposed development and provide the mitigation requirements. If offsite mitigation is required, then confirmation of a legal agreement between the development and offsite sources is required. Please note, adjacent property owners are not obligated to mitigate their onsite stationary noise sources, as it relates to stationary noise impacts on the subject development. The applicant is responsible for mitigating the exceedances within the limits of the subject development, which may require a site redesign.
   c. Provide all model calculations for both onsite and offsite.
   d. Provide any onsite noise measurements.
   e. Use reflective surfaces for model calculations where applicable.
   f. Provide capacity volumes received from the City's Transportation Services for roads using model calculations. Include the correspondence within the appendix.

g. Provide any correspondence from external agencies to confirm traffic and/or train counts within the appendix.
h. Provide all mitigating measure calculations including but not limited to window glazing, façade requirements, noise walls, etc.
i. Provide a key plan identifying points of reception.
j. Provide a key plan identifying sources of noise for both stationary and linear and including distances from subject property.
k. NPC-300 exceedances and/or max. points of reception required for every floor and side of the building.
l. Points of reception required for every neighbouring property.
m. Provide a table for the points of reception and include the allowable noise level under NPC-300, estimated noise level, and the mitigated noise level.
n. Provide warning clause recommendations where applicable.
o. Provide a summary and drawing of any required mitigation measures.

Include a Letter of Reliance that allows the City to rely upon the documents.

Staff contact: Adam Scott, Senior Development Engineering Technologist
adam.scott@burlington.ca

**Urban Forestry & Landscape Comments**

Please be advised that the Urban Forestry and Landscaping review of this application is considered preliminary at this time. Urban Forestry and Landscaping may provide additional comments, raise additional concerns, or request additional information upon receiving the outstanding or revised information, and upon further comprehensive review of its contents

1. A Landscape Plan will be required showing the general layout and intent of what is proposed for landscaped areas, including landscape buffer planting, outdoor amenity areas, fence location and types and pedestrian circulation. See the Pre-Submission Checklist for requirements.
2. The Landscape Plan must show and dimension pedestrian walkways and connections to the city sidewalk (1500mm minimum width, 1800mm recommended). Consider the width of the pedestrian walkways minus the doors that open out to ensure pedestrians don't need to walk on vehicular driveways.
3. The Landscape Plan must show conceptually the proposed layout and use of any outdoor amenity areas.
4. There is an existing easement along the south rear property line on site. Please ensure the Landscape Plan shows all regulated limits/hazard lines on the landscape concept plan.
5. The Landscape Plan must show the location of air vents/shafts and coordinate with landscape concept (i.e., do not locate vents in walkways and coordinate with proposed planting locations).
6. The Landscape Plan must show bicycle parking and snow storage locations.
7. The Landscape Plan must show proposed tree plantings that follow the ESA's guide *Planting Under or Around Powerlines & Electrical Equipment:* trees and/or shrubs with a max. mature height and spread of 4.5m in the Low Zone (to 4.5m from the power lines), trees with a max. mature height and spread of 7.6m in the Medium Zone (7.6m from the

power line), and trees of any size beyond 7.6m from the power line. See the ESA Guidelines for Planting Under or Around Powerlines & Electrical Equipment.

8. Where trees are proposed, ensure the minimum required soil volumes are provided and documented on the landscape plans using good quality soil. The minimum requirements are as follows: 30$m^3$ of soil per tree in a single tree pit, 20$m^3$ per tree in a shared planting environment. Excavation for each planting environment should be 0.75m to 1.2m depth and should not exceed 1.5m depth and be tailored to stock size used. Smaller rooting volume (minimum 15-20$m^3$) may be proposed for smaller trees.
9. Where trees, shrubs and herbaceous material is proposed, ensure material is suitable for the existing and proposed conditions to ensure success (i.e., salt tolerant, and suitable for existing and proposed soil and other environmental conditions).
10. Any recommendations or issues of compatibility (i.e., noise, light, uncomfortable wind conditions) noted in the Planning Justification Report, Noise Report and Wind Study should be addressed and reflected on the Landscape Plan, for example with buffer planting, screens and fencing, trellises or awnings for outdoor areas including pedestrian walkways and amenity areas.
11. The property of 2362 Fairview Street backs onto residential properties on the south property line. Minimum 6m landscape buffers should be included to provide separation and be designed to partially obstruct the views to adjacent properties along shared property lines. The landscape buffers should be a dense landscape screen consisting of evergreen trees or a combination of solid screen fencing with evergreen and deciduous trees and understory shrubs.
12. Screen parking spaces from road frontages.
13. Please review and apply the Sustainable Building and Development Guidelines.
14. Once the number of parking spaces is finalized, confirm the required number of Type “A” and Type “B” barrier free parking spaces required. Type “A” shall be 3400 mm in width and signed to indicate Van Accessible Parking. Type “B” shall be 2750 mm as per city zoning by-law. As per city zoning by-law, the access aisle shall be 2000 mm. The access aisle is to be clearly identified and can be shared by both spaces. Please see GAATES Figure 2.6.4.1 (page 127) for Van Accessible Signage detail.
15. Locate the barrier free parking spaces closest to the main entrances and not crossing vehicular traffic.
16. Contact the city’s Accessibility Coordinator if you have any questions concerning **Accessibility:** Judi Lytle, 905-335-7600, ext. 7865, judi.lytle@burlington.ca.
17. An Arborist Report, Tree Inventory and Tree Protection Plan is required to document all existing trees greater than 10cm DBH on site and on adjacent properties within 6m of the property lines, and all trees of any size on city property. See the City of Burlington: Pre-Submission Checklist for further requirements. Ensure your tree inventory table is provided as an excel file in addition to the word file. Note, the inventory data for this file provided with the Arborist Report will require an update to existing conditions and a revised tree protection plan should evaluate the proposed development related impacts against all civil drawings (i.e., grading, servicing etc.).
18. Any existing private trees on the subject site should be considered for preservation. The removal of trees shall be considered as a last resort. Trees that are to be removed will require a plan for replacement. Private trees that are 15cm in DBH will be counted toward replacement requirements using the City’s aggregate caliper method. Tree replacements

will be based on 50mm caliper replacement sizes. Proposals for replacement shall consider planting on the existing subject property as a priority. Where there is no room for replacement trees, cash-in-lieu of replacement will be required.

19. Removal to trees on neighboring properties, or that are located on a shared property line (boundary trees) will require consent from the adjoining and/or adjacent owner(s).

    Where impacts are proposed (i.e., encroachment / injury) to neighbouring and/or boundary trees the adjoining and/or adjacent owner(s) shall be consulted and made aware of the proposed development and potential impacts to their trees and/or boundary trees and the applicant shall submit a document in writing from adjoining and/or adjacent owner(s) that there are no concerns with the proposal for those trees, or the applicant's qualified tree professional (as defined in Pre-Submission Checklist) shall address the potential impacts to the neighbor's trees and/or boundary trees and provide an attestation in the Arborist Report that the impacts proposed will not be a detriment to the trees, and they will remain in healthy condition. Information in the report shall also include the preservation methods, including pruning and fertilizing, that can be implemented by the owner to ensure the health of trees on neighboring properties.

20. Private trees that are regulated and require removal or injury to facilitate project works may require a private tree permit depending on the timing of removal and/or injury relative to planning application(s). Please consult with the City at all stages of your project (i.e., demolition) to ensure compliance. Additional documentation may be required.

21. There are public trees located within the ROW adjacent to this proposal's site. The City's Public tree by-law is applicable to the proposed development. The removal of public trees shall be considered as a last resort. Where City of Burlington public trees are proposed for removal, council approval is required prior to tree permit issuance. The number of replacements will be evaluated using the City's aggregate caliper method. Similarly, work shall be modified to avoid working inside the minimum tree protection zone of all public trees. Where impact is proposed for public trees, a public tree permit will be required and securities provided.

22. Trees and corresponding tree protection hoarding (vertical and/or horizontal) shall be illustrated and considered on all civil drawings and factored into all Construction Management and Mobility Plans.

23. Please provide a comment matrix that identifies the above comments and how they were addressed with the site plan submission.

Staff contact: Zelaikha Shareqi, Intermediate Technician – Landscaping Engineering Services Department, zelaikha.shareqi@burlington.ca

**Parks & Open Space Comments:**

- Collect cash in lieu of parkland, with CILP charged at the rate in effect at the time of building permit issuance.

Staff contact: Kyle Poole, Landscape Architect, Kyle.Poole@burlington.ca

**Transportation Planning Comments:**

**Site Context**

1. The proposed development site is on the south side of Fairview Street, west of Guelph Line:
    a. is in Mixed-Use Nodes and Intensification Corridors, per Schedule B, Urban Structure,
    b. is in a Secondary Growth Area, per Schedule B-1, Growth Framework
    c. is on a Frequent Transit Corridor and MTSA Primary Connector, per Schedule B-2, Growth Framework and Long-Term Frequent Transit Corridors.
    d. has a bike lane on north side and Multi-Use Path on south side of Fairview Street, per Schedule P, Long Term Cycling Master Plan.
    e. is in enhanced pedestrian realm, per Integrated Mobility Plan (IMP).
    f. is a truck priority network, per Integrated Mobility Plan (IMP).

2. Fairview Street is a Multi-Purpose Arterial, per Schedule O-1, Classification of Transportation Facilities-Urban Area, and has a four-lane basic cross-section with a two-way left-turn lane (center turn lane) as well as a on-street bicycle lane on north side and sharrows on south side of the road. It has a posted speed limit of 60 km/h.

**Deemed Right-of-Way Widths**

3. The deemed right-of-way width per the Official Plan and Zoning By-Law for Fairview Street is 36 meters. The existing right-of-way adjacent to the subject site is approximately 36 metres and no additional lands are required.

**Transportation Impact Study/Mobility Impact Assessment**

4. A Transportation Impact Study (TIS), also known as a Mobility Impact Assessment (MIA) is required for this application. The TIS/MIA shall be completed by a qualified/recognized traffic/transportation engineering consultant. It shall be submitted to the satisfaction and approval of the Director of Transportation Services or designate.

5. The TIS/MIA would follow the Region of Halton's Transportation Impact Study Guidelines (https://www.halton.ca/Repository/Transportation-Impact-Study-Guidelines). The transportation consultant is to provide and confirm their Terms of Reference, including proxy-site locations with Transportation Planning staff prior to initiation of work.

**Auto and Bicycle Parking Supply**

6. The subject land use and proposal shall meet the parking supply requirements of the Zoning By-Law Table 1.2.6: Off-Street Parking Standards. The proposal has 397 parking spaces which is less than the Burlington parking supply requirements. A Parking Supply Justification Study is required.

| Use | Units | Required Parking | Auto Spaces Required | Auto Spaces Provided |
|---|---|---|---|---|
| Residential | 356 | 1.25 spaces/unit inclusive of visitors parking | 445 | 397 |
| Commercial | 730 $m^2$ | 3.5 spaces per 100 $m^2$ of gross floor area | 26 | |
| **Total** | | | **471** | **397** |

7. The bicycle parking supply shall meet the requirements recommended in the Burlington City-Wide Parking Standards Review. The proposal has 164 bicycle parking whereas a minimum of 196 long-term plus short-term parking is required. The short-term parking area shall be close to the main pedestrian entrance. Long-term bicycle parking shall be in a weather-protected, limited access and secure location at ground-level or in a parking garage.

| Use | Unit/Area | Long term Bicycle parking | Short term Bicycle parking | Bicycle Spaces Required | Bicycle Spaces Provided |
|---|---|---|---|---|---|
| Residential | 356 | 0.5 spaces/unit | 0.05 spaces/unit | 178+18 | 164 |
| **Total** | | | | **196** | |

8. Transportation Planning recommends the access be aligned, centreline to centreline with the access on the opposite side of the street. If this is not possible, the access offset is to ensure left turn movements are not in conflict.

9. The underground parking ramp detail and dimensions shall comply with the City of Burlington Site Plan Guidelines.

10. A waste collection/ loading area is missing on the site plan drawing. A swept path analysis to/from proposed loading/garbage area including circulation to/from the ROW is required. The analysis will ensure vehicles do not reverse into the site from the municipal right-of-way and vehicles do not reverse from the site into the municipal ROW.

**Future Site Plan Comments**

11. There is an existing 2.5 m width sidewalk along the Fairview Street frontage. The area is designated as an enhanced pedestrian realm per Integrated Mobility Plan (IMP), and needs to accommodate sidewalks as wide as possible, and decorative paved boulevards and could include a variety of street furniture (benches, large planters, trash, and recycling cans) with decorative street lighting.

12. The developer is responsible to remove the existing two driveways which need to be closed and reinstate the boulevard, sidewalk, curbs, etc. as per City of Burlington standard, and as such provide a note on the site plan.

13. The developer shall submit a Construction Mobility Management Plan (CMMP) as a part of this application which shall be to the satisfaction and approval of the Director of Transportation Services or designate. During construction, staff will not support the closure of vehicle lanes, bike lanes, boulevards, sidewalks, etc.

14. At the vehicle entrances to the site, the sidewalk shall be continuous through the driveway. The driveway grade will be compatible with the existing sidewalk and a vehicle curb depression will be provided at the entrance. Site access must adhere to the standards of the City of Burlington.

15. Any internal traffic signage such as “stop”, “no parking”, “fire route”, accessible parking, and pavement markings shall be clearly indicated and depicted on the site plan.

Staff contact: Smeeta Adiga, Transportation Planning Technologist, Smeeta.adiga@burlington.ca

**Zoning Comments:**

**Zoning:**
The subject property is currently zoned MXG-371, Mixed-Use General Zone with a Site Exception, under By-law 2020 as amended.

**Proposal:**
The applicant is proposing an 11-storey mixed-use building with 356 residential units and commercial uses on the ground floor. Three levels of below-grade parking and at-grade parking is proposed comprised of 397 parking spaces.

**Zoning Comments:**
We have reviewed this Pre-consultation application for completeness and have the following comments. Please note that additional comments will be provided on the formal Zoning By-law Amendment Application review a proposed amending by-law has not been provided and the new zoning designation has been determined.

- Exception 371 includes an added permitted use for motor vehicle sales, this exception could be repealed and replaced to include the site-specific regulations for this development. OR this exception could be repealed and replaced by a new exception number to be assigned.

- The MXG zone permits commercial uses and an apartment building, the site exception shall be developed around the specifics of each.

- Based on the roof plan and definition of building height noted below, the building would be deemed to be a 12-storey building as the roof is accessible by the occupants and proposed to be used as amenity area and the 12$^{th}$-storey is not just mechanical penthouse space and is in excess of 9m$^2$.

- Gross Floor Area includes all areas of the building, except areas used for parking. The GFA calculation provided does not include the rooms in the below-grade parking levels

(lobbies, utilities, vestibules, mechanical rooms etc..) and therefore the FAR calculation is not accurate.

- A 6m landscape buffer is required abutting the residential zone along the rear of the property. Based on the concept plan, a 5m landscaping area is provided with a pergola, which would not meet the definition of landscape buffer.

- Amenity area calculations are required to be confirmed, an amenity area plan will be required and detailed floor plans will be required to confirm bedrooms for calculations.

Full Zoning statistics will be required, including, but not limited to:

1) Amenity area calculation:

> **Part 16 – Definitions**
> **Amenity Area**
> The area situated within the boundaries of a project and intended for recreational purposes, which may include open spaces, patios, balconies, communal play areas, lounges, sundecks, and roofdecks, but shall not include the area occupied at grade by the buildings, service areas, parking, and driveways.

2) FAR calculation does not use the “Floor Area, Gross” definition that is noted on the plans, with the exclusions, see below for the applicable definitions to be used:

> **Part 16 – Definitions**
> **Floor Area Ratio**
> The mathematical relationship between building floor area and lot area, determined by dividing the gross building floor area of all buildings on a lot by the net area of that lot.
>
> **Floor Area, Gross Building**
> The total area of the floor measured to the outside of all outside walls, including a basement or cellar but excluding areas used for parking of motor vehicles or areas above an atrium.

3) How to show building height on elevation plans:

> **Part 16 – Definitions**
> **Height, Building**
> For all other buildings, height means the vertical distance measured in linear metres, between grade and the highest point of a flat roof, or the mid-point between the eaves and the peak of a peaked roof, exclusive of any ornamental dome, chimney, tower, cupola, steeple, church spire, water storage tank, electric apparatus, sign, television antenna, structure for mechanical equipment required

for the operation of the building, including elevator and stairway receiving area no larger than 9 $m^2$.

**Grade**
When used with reference to a building, the average elevation of the finished surface of ground where it meets the front wall of such building, exclusive of any artificial embankment or depressed driveway.

4) If the retail area is a combination of two or more retail or service commercial units, it would be deemed a retail centre and a different parking rate would apply:

**Part 16 – Definitions**
**Retail Store**
A building or part of a building where merchandise is offered or kept for sale directly to the public at retail, including department stores.

**Retail Centre**
A combination of two or more retail, service commercial, recreation or office uses, in one or more buildings, on one or more parcels of land, designated as an integrated, planned development having common off-street parking and driveways.

**Deemed Road Width:**
Confirmation that Emery Ave is at the deemed road width. All zoning regulations are taken from the deemed road width as per Part 1, Section 2.26.

5) With respect to the rear landscape area abutting the residential zone:

**Landscape Buffer**
The area of a lot which serves to provide separation and to partially obstruct the view of adjacent land uses by means of a dense landscape screen consisting of evergreen trees or a combination of solid screen fencing and evergreen or deciduous trees. Snow storage and transformers are not permitted in a required landscape buffer.

6) With respect to amenity area calculations, detailed floor plans are required to confirm if the studio / 1-bedroom units are deemed to be efficiency dwelling units:

**Efficiency Dwelling Unit**
A dwelling unit containing not more than 60 $m^2$ of floor area, and consisting of not more than one room in addition to kitchen, dining, and sanitary facilities. For the purposes of computing density and parking, an efficiency unit shall be considered a one-bedroom unit.

**Proposed Zoning:**

The following regulations appear to require amending in a preliminary review. Please note this list is not exclusive and an in-depth review will occur on formal submission review:

- Front yard minimum reduction from required 3m, to 2m.
- Rear yard minimum reduction from required 12m, to approx. 2m for pergola.
- Maximum Floor Area Ratio for other buildings increase from 1.5:1, to 3.87:1 (see comments above regarding calculation for GFA and FAR).
- Landscape Area abutting a street reduction from required 3m, to 2m.
- Landscape Buffer abutting a residential zone from required 6m, to 0m. (see comments above)
- Building height increase from maximum permitted 6 storeys, to 12 storeys.
- Parking rate minimum reduction for residential from 1.25 spaces inclusive of visitor spaces, to 1.07 spaces inclusive of visitor spaces.
- Parking rate minimum reduction for retail centre from 5 spaces per 100m², to 2 spaces per 100m².
- Amenity area minimum reduction from required 8,180m², to 7,428m² (see comments above).

**Submission Requirements:**

1. Survey of the property stamped and signed by an OLS.
2. Fully dimensioned Site Plan, in metric, with property statistics, zoning statistics.
3. Fully dimensioned floor plans, in metric, showing property boundaries with setbacks from the building and balconies / terraces to property lines, for each floor. All bedrooms and dens are required to be dimensioned for their room area. All balconies and internal amenity areas are to be dimensioned.
4. Fully dimensioned amenity area plan (if cannot be accommodated on floor plans), in metric.
5. Fully dimensioned below-grade parking level plans, in metric, showing property boundaries with setbacks. All parking spaces including accessible parking spaces to be dimensioned and / or parking space width and area confirmed.
    a. All Parking spaces should be labeled (e.g., Occupant, visitor, non-residential, designated accessible spaces, accessible pathways, etc.)
6. Fully dimensioned landscape plan, in metric, with landscape areas / buffers labelled and amenity areas dimensioned.
7. Show all bike parking spaces, fully dimensioned in metric, or a detail typical, on the site plan or landscape plan.
8. Fully dimensioned floor plans, in metric. Please note that mezzanines and mechanical penthouses are included in height or be included a storey.
9. Fully dimensioned elevation plans, in metric, showing height as per the definitions noted above. Please note that the mechanical penthouses is included in height for the building.

**Notes:**

- A Zoning Clearance Certificate is required for the proposed building.
    - ❖ Separate Zoning Clearances required for each non-residential tenant fit-up.
        - ✓ A detailed letter of use will be required to be provide with each prospective tenant for zoning staff to categorize each use.
    - ❖ As part of each tenant fit up zoning, each tenant / use will be required to confirm that there is sufficient parking on site prior to zoning issuing any approvals.

- Development is subject City, Region, School Board Development Charges and Park Dedication fees, and may be subject to Community Benefits Charges. The following will be required prior to the Zoning Clearance issuance:
    - ❖ A letter from an Ontario land surveyor confirming the total floor area of the existing/demolished buildings for determining Development Charges credits.
    - ❖ Providing all dimensions and areas for dens, lofts, studies or other similar areas (not: including kitchen, bathrooms, living rooms, family rooms or dining rooms) on the floor plans, as well the information should be provided in a spreadsheet indicating the floor and unit number as well as the dimensions and areas.
    - ❖ Development Charges are subject to interest and indexing as per each agencies By-law.

Staff contact: Danielle Beck, Zoning Examiner, danielle.beck@burlington.ca

**Building Comments:**

- Exits shall comply with Div. B, 3.4. OBC 2012. Exits shall lead to an open public thoroughfare or an exterior open space protected from fire exposure from the building and having access to an open public thoroughfare.
- Area of unprotected openings and construction of exposing building face shall be designed per Div. B, 3.2.3. OBC 2012
- Exit stairs shall comply with Div. B, 3.4.3.2.(7) and articles 3.4.3.5. and 3.4.6.1. to 3.4.6.9.
- Proposed design shall comply with barrier-free design requirements, Div. B, 3.8.
- Area of rooms and window areas shall comply with Div. B, Part 9 per Div. B, 3.7.1.2.(1) and 3.7.2.1.(1)
- Public corridor shall comply with Div. B, 3.3.1.9.(9)
- Location and design of fire access route shall comply with Div. B, 3.2.5.5. and 3.2.5.6.
- Elevator car dimensions shall comply with Div. B, 3.5.4.1.

Staff contact: Ebtessam Mahrous, Building Architect, ebtessam.mahrous@burlington.ca

**Halton District School Board Comments:**

Students from this area are currently within the Tom Thomson PS, Tecumseh PS and Burlington Central HS catchments. Tom Thomson PS is above capacity.

Please be advised that the Halton District School Board has no objection to the proposed site plan application as submitted subject to the following conditions being completed prior to site plan approval.

1. The owner agrees to place the following notification in all offers of purchase and sale for all lots/units and in the City's subdivision agreement, to be registered on title:
    a) Prospective purchasers are advised that schools on sites designated for the Halton District School Board in the community are not guaranteed. Attendance at schools in the area is also not guaranteed. Pupils may be accommodated in temporary facilities and/or be directed to schools outside of the area.
    b) Prospective purchasers are advised that school busses will not enter cul- de-sacs and pick up points will be generally located on through streets convenient to the Halton Student Transportation Services. Additional pick up points will not be located within the subdivision until major construction activity has been completed.
2. The owner agrees to send a letter to all purchasers advising them of the above two statements to ensure they are aware of the availability of future school accommodation in their neighbourhood and school transportation.
3. That a copy of the approved sidewalk plan, prepared to the satisfaction of the City of Burlington be submitted to the Halton District School Board.

In addition, the following note should be included in the conditions:

Educational Development Charges are payable in accordance with the applicable Education Development Charge By-law and are required at the issuance of a building permit. Any building permits which are additional to the maximum unit yield which is specified by the Subdivision Agreement are subject to Education Development Charges prior to the issuance of a building permit, at the rate in effect at the date of issuance.

Staff contact: Michelle D'Aguiar, Senior Planner, daguiarm@hdsb.ca

Table A-4
Halton Region 2022 Development Charge Study
Housing occupancy Rates by Dwelling Type in New Units (PPU)[1]

| | Region Wide | Area Specific | |
|---|---|---|---|
| **Residential Unit Category** | **2022-2031** | **2022-2031 (Built Boundary)** | **2022-2031 (Greenfield)** |
| Single Family and Semi-Detached | 3.772 | 3.750 | 3.777 |
| Total Multiples [2] | | | |
| Multiples- Less Than 3 Bedrooms | *2.018* | *2.012* | *2.022* |
| Multiples - 3 or More Bedrooms | *3.054* | *3.044* | *3.059* |
| Total Apartments | | | |
| Apartments - Less than 2 Bedrooms | *1.356* | *1.355* | *1.359* |
| Apartments - 2 or More Bedrooms | *1.831* | *1.831* | *1.835* |
| Special Care or Special Need | 1.100 | 1.100 | 1.100 |

[1] Forecast occupancy rates (Persons Per Unit) by unit category and number of bedrooms are based on 2016 Statistics Canada custom tabulation provided by dwelling type and dwelling age.

[2] Multiples are defined as townhomes and apartments in duplexes.