FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

805 DUNDAS STREET EAST
CITY OF MISSISSAUGA

PREPARED FOR:
KJC PROPERTIES INC.
1940 ELLESMERE ROAD
TORONTO, ON M1H 2V7

DATE: JUNE 2023

PROJECT NO. 221285

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1.0 INTRODUCTION

The purpose of this report is to provide detailed design information related to the storm drainage and stormwater management (SWM) plan, sanitary and water servicing for the proposed development at 805 Dundas Street East, located at the northwest corner of the intersection of Dundas Street East and Haines Road. This report will demonstrate the stormwater management measures that will be undertaken to deal with water quantity and quality, the proposed sanitary and water servicing, as well as erosion and sediment control during construction.

1.1 Site Description

The site is located on the north side of Dundas Street East, at the northwest corner of the intersection of Dundas Street East and Haines Road and east of Cawthra Road. The total site area is 12,735m^2 and has existing single story commercial buildings that will be demolished. Refer to **Figure 1** for the site location.

A twelve-storey mixed-use development is proposed for the site, with two levels of underground parking as well as landscaping. The building will be mixed used and have main-floor commercial with residential above, as well as townhouse units along the north side of the site.

1.2 Background

Water and sanitary connections are proposed to meet the functional needs of the site and to meet the requirements of the Region of Peel. The SWM plan has been designed to meet the requirements of the City of Mississauga (The City) and Credit Valley Conservation (CVC). The following materials were referenced in the preparation of this report.

- The City of Mississauga Development Requirements Manual (DRM), updated and effective January 2020.
- The Stormwater Management Planning and Design Manual (MECP Guidelines), prepared by the Ministry of the Environment, March 2003.
- The Erosion & Sediment Control Guideline for Urban Construction, prepared by the Greater Golden Horseshoe Area Conservation Authorities (GGHA CA), December 2006.
- As-constructed plan and profile drawings for Dundas Street East, Haines Road and the storm sewer easement on site, provided by the City and Region.

The proposed SWM scheme has been prepared to meet the City's requirements. Refer to **Appendix A** for the background information.

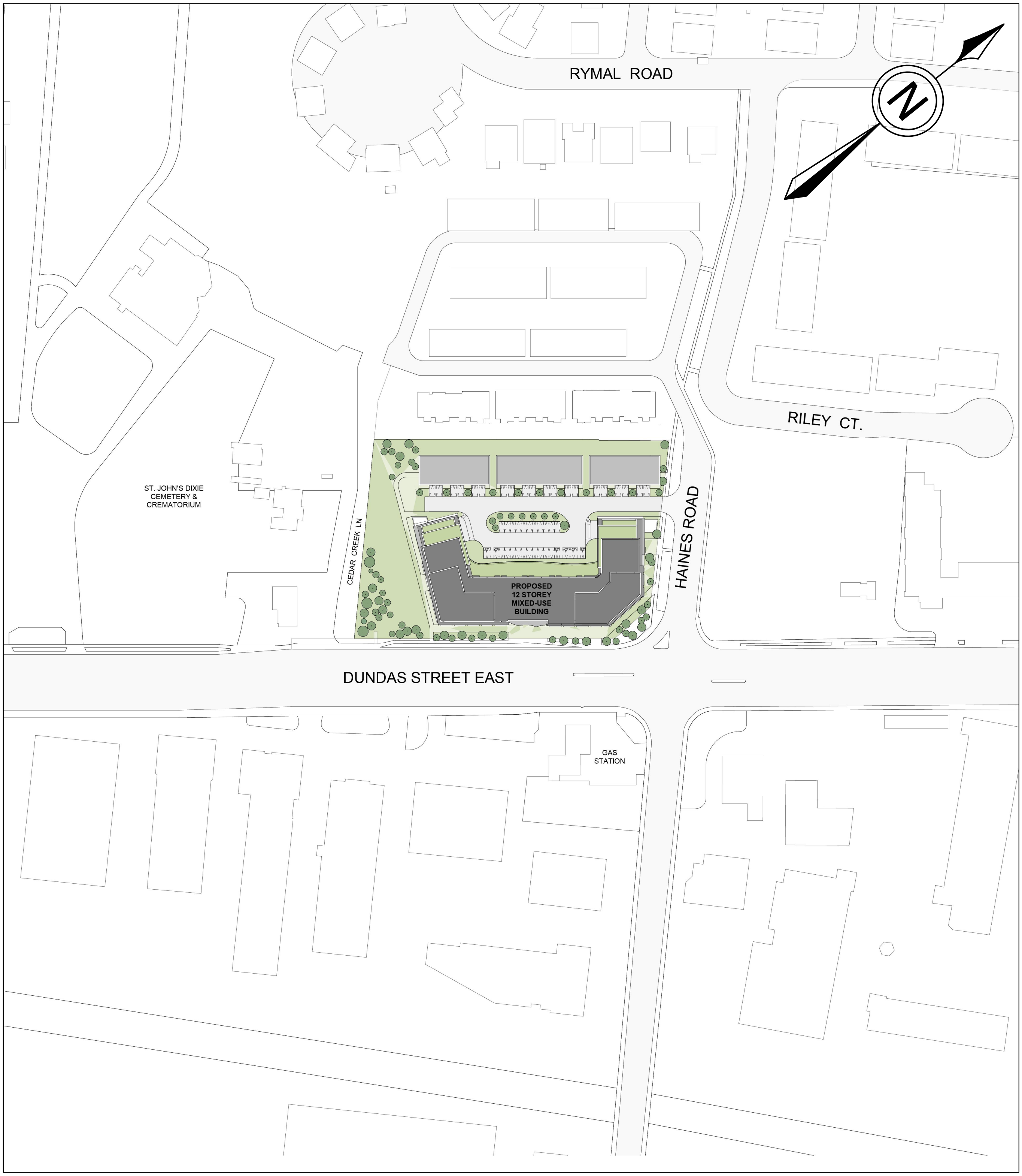

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FIGURE 1
805 DUNDAS STREET E.
SITE LOCATION PLAN

DATE: JUNE 2023 SCALE: N.T.S. PROJECT: 221285

2.0 DESIGN CRITERIA

The following design criteria have been followed in the preparation of the grading, servicing and Stormwater management on the site.

- The DRM requires retention of water on site, to the extent possible, to match pre-development runoff volumes. This requirement is typically achieved by retaining the runoff from a 5mm 24-hour storm on-site, which is equivalent to approximately 50 percent of the total average rainfall volume.
- Water quality controls are required to achieve enhanced water quality control, which requires an 80 percent total suspended solids (TSS) removal level.
- Quantity controls are based on CVC requirements for Serson Creek in Subwatershed 22. This requires the 100-year post development flows to be controlled to the 2-year predevelopment levels.
- Provide an erosion and sediment control plan following the Erosion & Sediment Control Guidelines for Urban Construction, prepared by Toronto and Region Conservation Authority (TRCA) in collaboration with the CVC, 2019.
- Confirm there is sufficient capacity within the existing water and wastewater systems to accommodate the proposed development.

The proposed design has been prepared following these criteria.

3.0 SITE DRAINAGE

All grading will be completed in a manner to satisfy the following goals:

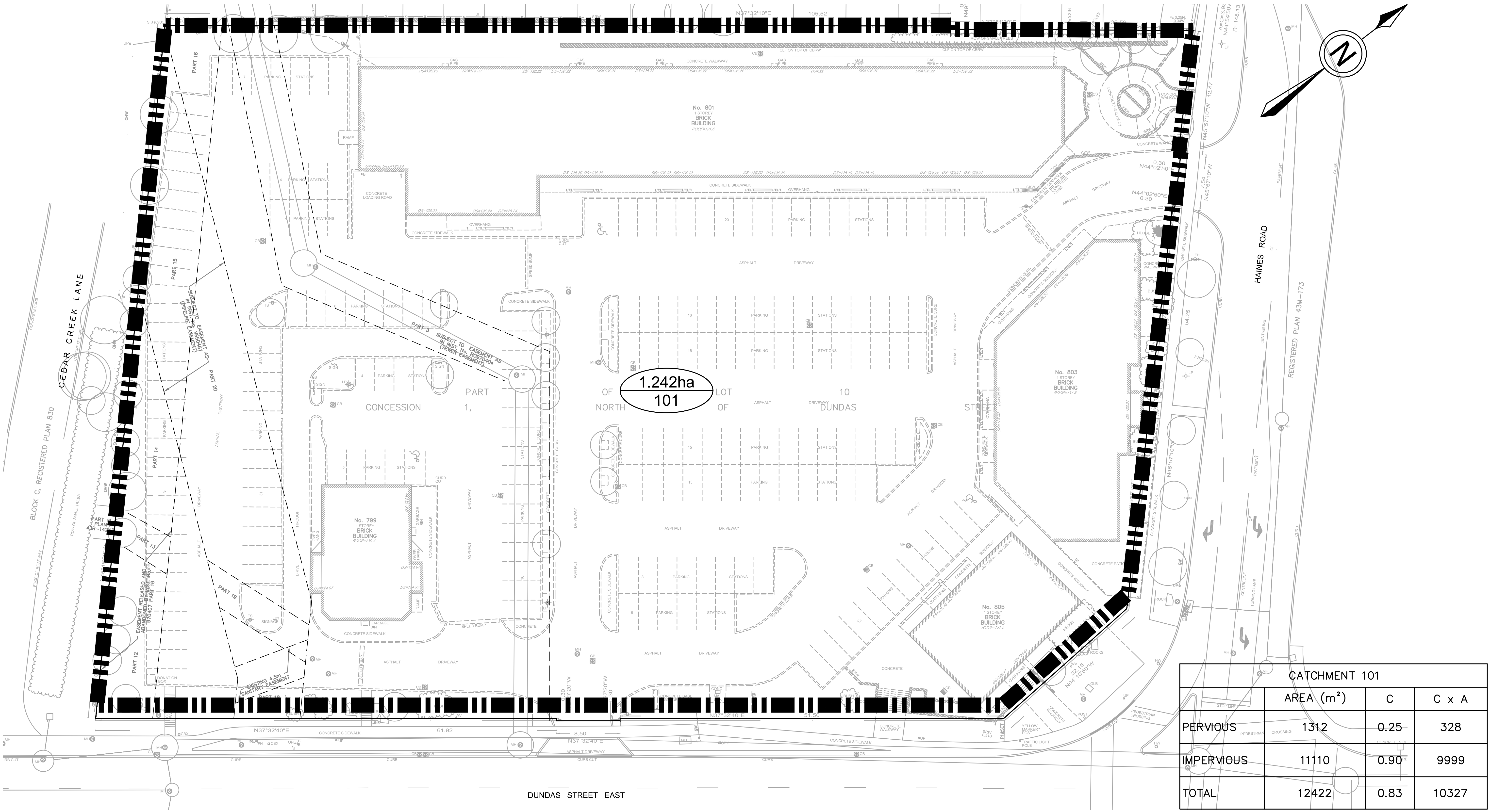
- Maintain sufficient sight lines and existing road gradients.
- Enable gravity servicing connections to the existing sewers on Dundas Street East.
- Not adversely impact adjacent private properties.
- Achieve stormwater management and environmental objectives required for the site.

The proposed grading of the site has been designed to meet these requirements. Refer to **Drawing C100** for the proposed site grading design.

3.1 Existing Drainage

There is an existing 1650mm diameter storm sewer on Dundas Street East to the south of the site and an existing 600mm diameter storm sewer on Haines Road to the east of the site. There is also an existing 1500mm diameter storm sewer which crosses the western portion of the site in an easement before connecting to the storm sewer on Dundas Street East. The majority of the existing site is captured by a storm sewer network on site and drains towards Dundas Street East. Refer to **Figure 2** for the existing site drainage.

The design of the site is proposed to generally maintain the existing drainage patterns, and a connection to the Dundas Street East storm sewer is proposed at the southeast corner of the site.



CATCHMENT 101			
	AREA (m²)	C	C x A
PERVIOUS	1312	0.25	328
IMPERVIOUS	11110	0.90	9999
TOTAL	12422	0.83	10327

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LEGEND

1.242ha — CATCHMENT AREA (ha)
101 — CATCHMENT ID
DRAINAGE BOUNDARY

FIGURE 2
805 DUNDAS STREET EAST
EXISTING DRAINAGE PLAN

DATE: JUNE 2023 SCALE: 1:500 PROJECT: 221285

3.2 External Drainage

The surrounding area generally drains from north to south. Therefore, the development to the north was reviewed to determine if external drainage contributed from any portion of these lands to the subject site. Drainage and grading plans were requested from the City, however nothing was available for review. A site investigation was conducted, which determined that a swale is graded along the south property line for the development to the north, which captures all drainage and directs it mostly to the west. There is a catchbasin located at the end of the swale that will capture the flows. For flows exceeding the capacity of the catchbasin, the major overland system will convey the flows to the west and south towards the Cedar Creek Lane right-of-way and ditch. Therefore, no external drainage will be directed towards the subject site.

3.3 Proposed Drainage

The internal storm sewer system will be designed to collect drainage from the building for all rainfall events up to and including the 100-year design storm. The system will drain through the building to a cistern located on the basement level.

The controlled flow will be directed to the control MH at the southeast corner of the site. There is a small portion of the site, around the perimeter to the south and east, that will direct flows uncontrolled to the Dundas Street East right-of-way. Additionally, due to site constraints with existing easements, the proposed private park which consists of primarily landscaped area, will drain overland towards the west, where it will be captured by a ditch inlet catchbasin and be conveyed to the storm sewer on Dundas Street East. The controls on site are designed such that the overall release rate from the site meets the target flow, as required. This is outlined in **Section 4.3**.

In the event of system blockage or a storm exceeding the 100-year storm event, a major overland system has been provided, with a maximum ponding depth of 0.15m, which will direct drainage towards the Dundas Street East right-of-way.

The proposed servicing can be referenced on **Drawing C101**, and the grading design is shown on **Drawing C100.**

3.4 Existing Storm Sewer Realignment

There is an existing 1500mm diameter storm sewer that flows south within an easement on the western portion of the site. As part of the development, it is proposed to realign the storm sewer and associated easement.

It is proposed to design the new storm system to have equal or greater capacity than the existing system. The design and as-built drawings for the existing system were reviewed to confirm the capacity. The existing easement within the site contains three sections of 1500mm diameter site with design and as-built grades summarized in **Table 1** below.

Table 1. Existing Easement Pipes

Pipe Location	Pipe Diameter (mm)	Design Grade	As-Built Grade
HW-MH3	1500	1.50%	1.40%
MH3-MH2	1500	0.60%	0.55%
MH2-MH1	1500	1.00%	1.10%

As shown above, the critical pipe is installed at a grade of 0.55 percent; however, it was intended to be installed at a grade of 0.60 percent. Therefore, the grade of the realigned pipes will be a minimum of 0.60 percent to maintain existing conveyance capacity. The proposed pipe grades and sizes are summarized in **Table 2** below.

Table 2. Proposed Realigned Easement Pipes

Pipe Location	Pipe Diameter (mm)	Grade
MH3-MH4	1500	1.00%
MH4-MH5	1500	3.00%
MH5-MH6	1500	5.80%

Therefore, the critical grade of the realigned easement pipes is 1.00 percent which exceeds the previous critical design grade of 0.60 percent and the proposed easement will have increased capacity to convey existing external flows.

The proposed easement realignment can be referenced on **Drawing C102**.

3.5 Groundwater Discharge

The proposed building will be constructed watertight without a foundation drainage system. Therefore, no permanent dewatering is required and there will be no groundwater discharge to municipal infrastructure in the post development scenario.

4.0 STORMWATER MANAGEMENT PLAN

A stormwater management plan has been prepared for the site following the DRM and MECP Guidelines, to meet the stormwater management criteria for the site. Low-Impact Development (LID) techniques were investigated for the site, including the use of infiltration measures.

4.1 Water Balance

As per the DRM erosion design criteria, retention of runoff from a 5mm design storm on-site is required.

The required retention volume is 62.2m^3 (1.243ha x 5mm). A variety of options are discussed following that could potentially be used to meet the target storage volume.

Permeable Pavement – The surface area could be paved with Permeable Interlocking Concrete Pavers. These are pre-cast pavers that permit water to infiltrate between the paving stones into a clear stone storage reservoir. A permeable pavement with a stone reservoir could be considered a dry-well and, therefore, must be located a minimum of 5m from the building foundation, as per OBC requirements. Therefore, it is not feasible for the site.

Green Roof – Green roofs offer water resource benefits such as water quality, water balance and peak flow controls, in addition to other benefits including improved energy efficiency and reduced heat from the rooftop. However, a green roof is not proposed for the building.

Grassed Swales – Grassed swales are used to provide additional water quality controls for surface water, but in this case the impact would be negligible and not provide sufficient treatment given the limited landscaping proposed on the site. Therefore, this measure is not proposed for this development.

Bioretention – This is a facility that temporarily stores and infiltrates water. Quality treatment is provided by plant material and by filtration through the bed material which consists of a mixture of sand, fines and organic material. The roof drainage could outlet to a bioretention swale and stormwater from frequent storms be infiltrated. This is not proposed for this project given the limited landscaped area and large building footprint on site.

Infiltration Facility – Storage could be provided in an underground system surrounded by clear stone for infiltration. Storage is provided in both the chambers as well as in the voids within the clear stone, below the outlet invert of the system, so that the required retention volume will only discharge via infiltration. However, infiltration is not feasible for the site due to the minimum 5m separation from the building foundation required.

Rainwater Harvesting – Rainwater from frequent storm events can be captured and re-used on-site such as for landscape irrigation, cleaning, toilet flushing, or a variety of other options. This option will be pursued, as described below.

For storms up to the 100-year event, all drainage captured will be routed to the cistern. Retention will be provided below the outlet invert of the proposed cistern. The total required retention volume is approximately 62.2m^3. The lower 1.40m of the cistern will be available for retention storage. Based on a cistern footprint of 231m^2, approximately 323m^3 of retention storage is provided which exceeds the requirement of 62.2m^3. It is anticipated that this volume will be re-used on the site through landscape irrigation and other internal measures as feasible. Preliminary irrigation and water reuse calculations were prepared and details will be confirmed during the detailed design stage.

For irrigation the 5mm retention requirement is review on an annual basis. For rainfall distributions, it is generally accepted that the first 5mm of rainfall accounts for 50 percent of total rainfall on an annual basis. **Table 3** below summarizes the total annual capture from the proposed site, based on the average annual rainfall of 840mm. On an annual basis, 50 percent of total rainfall would represent 5,221m^3 (1.243ha x 840mm x 50 percent).

Table 3. Proposed Site Annual Capture from Initial Abstraction

Catchment	Area (m^2)	% of Total Area	IA (mm)	Annual Capture (%)	Annual Capture (m^3)
Flat Roof	5,300	42.6%	1.0	12%	534.2
Landscape & Planters	3,059	24.6%	5.0	50%	1,284.8
Driveway and Walkway	4,071	32.8%	1.0	12%	410.4
Total	12430	100%	2.0		2,229.4

As shown above, the site will capture the first 2.0mm of rainfall, or 2,229m^3 on an annual basis. Therefore, an additional 3.0mm of rainfall needs to be retained on an event basis, or 2,991m^3 (5,221m^3 – 2,229m^3).

The water balance requirements for this site will be satisfied through water reuse from a portion of the cistern that will not outlet to the municipal sewer system. Preliminary irrigation calculations have been prepared to determine if it is feasible to meet water balance targets via irrigation and reuse. **Tables 4** and **5** below detail the irrigation requirements for the proposed site.

Table 4. Irrigation Consumption Parameters

Landscape Type	Area (m^2)	Species Factor (K_s)	Density Factor (K_d)	Microclimate Factor (K_{mc})	Landscape Coefficient (K_L)	Irrigation Efficiency (IE)
Turfgrass	1,897	0.7	1	1	0.7	Drip
Mixed	1,162	0.5	1.1	1	0.55	Drip
Greenroof	0	0.7	1	1	0.7	Drip

Table 5. Total Water Applied (Irrigation)

Month	Evapotranspiration Rate (ET)	ET_L (Shrubs) (ET x K_L)	ET_L (Mixed) (ET x K_L)	ET_L (Green Roof) (ET x K_L)	Irrigation Efficiency (IE)	Total Water Applied (m^3)
April	56.6	39.6	31.1	39.6	0.9	123.7
May	101.6	71.1	55.9	71.1	0.9	222.0
June	124.9	87.4	68.7	87.4	0.9	273.0
July	138.2	96.7	76.0	96.7	0.9	302.0
August	110.4	77.3	60.7	77.3	0.9	241.3
September	71.6	50.1	39.4	50.1	0.9	156.5
October	62.9	44.0	34.6	44.0	0.9	137.5
Total						**1,456.1**

Through the irrigation of the landscaped areas listed in **Table 4**, a total of 1,456m^3 can be used each year during the warmer months (April-October).

Additional re-use will be provided by floor washing of the parking levels, as follows:

- Washing is only assumed for the drive aisles, which would be more frequently cleaned. The total drive aisle area for P1 and P2 is 6,033m^2.

- Typical washing would require a depth of 5mm over the drive aisle area.
- Typical washing would take place once every 72 hours.
- It is assumed that additional washing and water use would take place in winter months, however this has not been incorporated to be conservative.

Calculations were completed to determine if sufficient water would be captured by the cistern to satisfy the above water demands. The proposed cistern retention volume is 323m^3. This would result in an equivalent initial abstraction over the site of approximately 32mm. Therefore, over the year, the cistern will capture over 90 percent of the total rainfall. Using this value in conjunction with the runoff coefficient of the proposed site and monthly precipitation values, the total rainfall collected can be calculated. **Table 6** below summarizes the approximately amount of rainwater captured and remaining in the cistern at the end of every month.

Table 6. Total Water Collected

Month	Total Precipitation (mm)	Runoff Coefficient	Water Collected (%)	Rainwater Volume Collected (m^3)	Total Consumption (m^3)	Cistern Volume at End of Month (m^3)
January	61	0.80	90%	441.6	301.7	140.0
February	50			362.0	301.7	200.3
March	66			477.8	301.7	323.0
April	71			514.0	425.4	323.0
May	74			535.7	523.7	323.0
June	73			528.5	574.6	276.9
July	68			492.3	603.7	165.5
August	81			586.4	542.9	209.0
September	84			608.1	458.1	323.0
October	65			470.6	439.2	323.0
November	76			550.2	301.7	323.0
December	71			514.0	301.7	323.0
Total	840				**Yearly Deficit =**	0.0

There is an adequate supply of water throughout the year for the proposed water reuse demands. Therefore, irrigation and drive aisle washdown will require approximately 5,076m^3 on an annual basis, and there is sufficient rainwater harvesting to meet these demands. This exceeds the annual water balance requirement of 2,991m^3.

Refer to **Appendix B** for additional calculations.

Cistern Drawdown Considerations

As shown on **Table 3** the initial abstraction for the post development site will be 2.0mm. Therefore, to satisfy the 72-hour drawdown requirement for a total volume over the site of 5.0mm, an additional 3.0mm will be required to be used from the cistern over this period. Based on a site area of 1.243ha, approximately 37.3m^3 of runoff retained in the cistern will need to be used. On average via irrigation and indoor water reuse, 42.3m^3 will be used per 72-hour period. There will be slightly less than 37.3m^3 used during the winter months, however it is anticipated that the water quantity required to wash down drive aisles will increase during winter months. Therefore, there is sufficient water demand to use the retained water throughout the year.

4.2 Quality Control

Based on the DRM, the water quality criterion for this site is 80 percent average TSS removal from runoff originating onsite. The majority of the site is rooftop or landscaped which produces clean runoff. The split is approximately 73 percent areas producing clean runoff and 27 percent driveway or parking area.

The quality control requirements for the site can be addressed through a combination of the roof and other on-site landscape measures. Overall TSS removal capabilities are based on the following assumptions:

- Rooftop and terraces runoff is generally clean and credited with 80 percent TSS removal. Runoff from the roof and terraces will be routed to the proposed cistern.
- Landscaped areas provide significant infiltration and generally have a lower TSS loading compared to roadways, therefore landscape runoff is credited with 80 percent TSS removal.
- The driveway and parking areas as well as adjacent landscaped and walkway areas will be captured and routed to an OGS for treatment. The OGS will be located in the P1 level and is sized for 80 percent TSS removal. The OGS sizing is summarized on **Table 7** below.

Table 7. OGS Sizing

Catchment Area (ha)	Runoff Coefficient	Particle Size Distribution	OGS Model
0.33	0.90	Fine	CDS PMSU2015-4-C

The OGS will be located within the cistern and all flows from the driveway and parking lot areas will be routed towards the OGS and treated before discharging into the cistern. Therefore, all flows leaving the site will be credited with a minimum of 80 percent TSS removal.

The OGS sizing and details are provided in **Appendix C**.

4.3 Quantity Control

4.3.1 Target Release Rate

The existing site runoff coefficient is 0.82 to Dundas Street East. In order to comply with CVC requirements, the 100-year post development flows will be controlled to the 2-year predevelopment levels. In addition to this, to reduce the flows directed to municipal infrastructure the runoff coefficient used to calculate the pre-development flows will be limited to a maximum of 0.50 as per City Criteria.

Therefore, the post development flows will be less than the existing condition, as required. **Table 8** summarizes the target flows for the site.

Table 8. Target Flows

Existing Site (Storm Event)	Catchment Area (ha)	Runoff Coefficient	Target Flow Rate (L/s)
2 Year	1.243	0.50	103.4

The proposed design was completed to provide controls for all storm events up to the 100-year storm to meet the target flow rates from the site, as outlined following. Refer to **Appendix B** for the stormwater management calculations.

4.3.2 Quantity Control Measures

The following options were considered for quantity control on site:

Rooftop Storage – Controlled flow roof drains could be installed on the rooftop and water could be stored on the rooftops to attenuate peak flows. Rooftop storage is not counted for the quantity controls for the site, based on the proposed development with limited rooftop space available for ponding.

Underground Storage – A restrictor pipe would be provided at the site outlet; with surplus storage provided in the cistern.

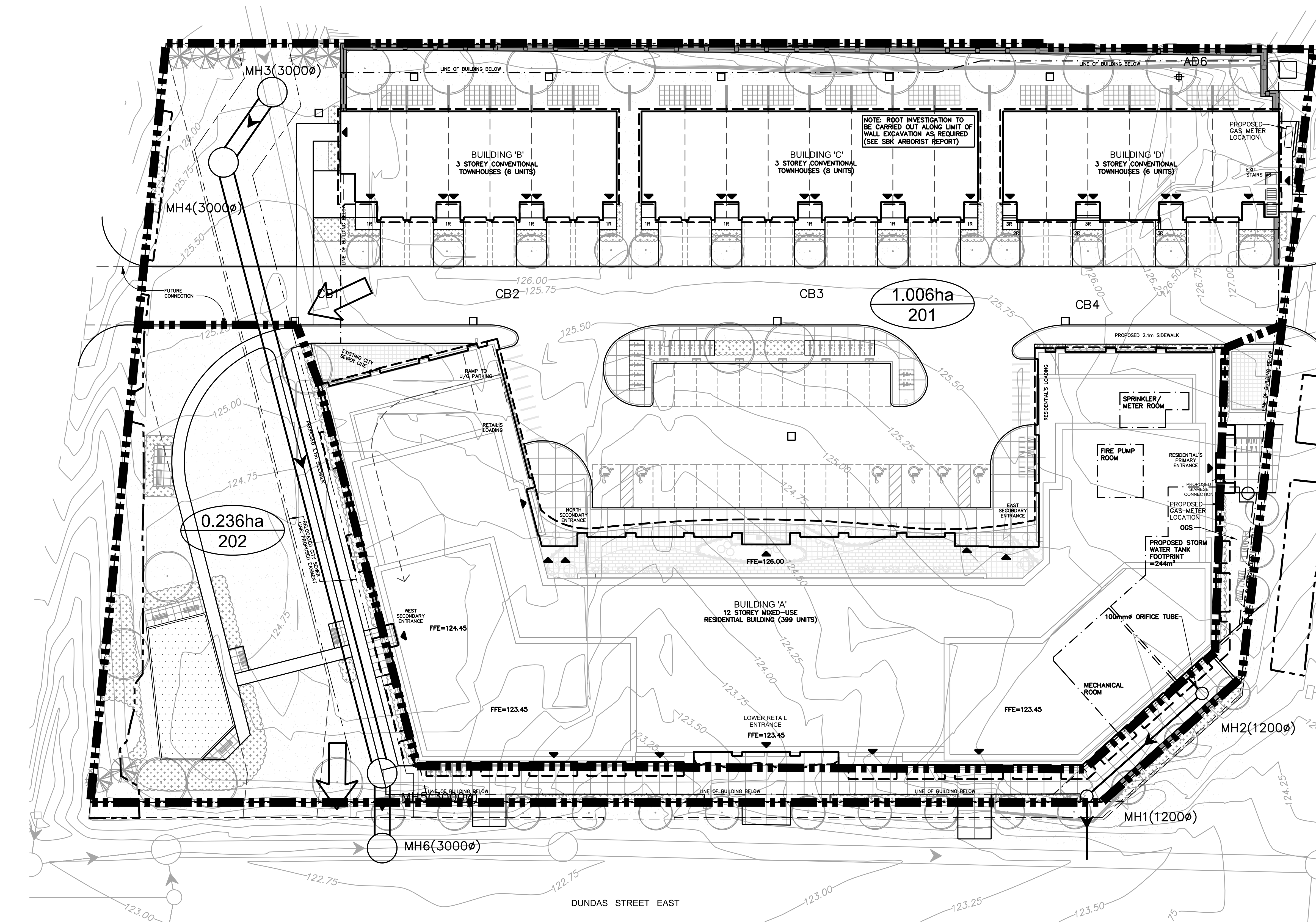
In order to meet the target release rates, cistern storage is proposed to provide quantity control for the proposed development, as follows.

Uncontrolled Site Drainage

As shown on **Figure 3**, the private park on the west side of the site as well as a small perimeter on the south and east side will drain uncontrolled towards the adjacent right-of-ways. The uncontrolled area is 0.24ha in size, with a 100-year runoff coefficient of 0.59. In the 100-year storm event, the total uncontrolled flow will be 54.8L/s. The remainder of the site will be over controlled to account for this uncontrolled drainage.

Controlled Site Drainage

In the 100-year event, the required storage volume to control the flows to meet the 103.4L/s target is approximately 428m^3. Given that pipes and structures would provide a negligible amount of storage, and surface storage cannot be utilized, the cistern would be needed to provide all of the required storage. Approximately 450m^3 (1.95m depth x 231m^2 footprint) of storage is estimated to be provided above the outlet of the proposed cistern – details will be finalized in the detailed design stage of the project.



CATCHMENT 201			
	AREA (m²)	C	C x A
PERVIOUS	1898	0.25	475
IMPERVIOUS	2788	0.90	2509
ROOF	5369	0.90	4832
TOTAL	10055	0.78	7816

CATCHMENT 202			
	AREA (m²)	C	C x A
PERVIOUS	1626	0.25	407
IMPERVIOUS	739	0.90	665
TOTAL	2365	0.45	1072

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LEGEND

1.006ha — CATCHMENT AREA (ha)

201 — CATCHMENT ID

DRAINAGE BOUNDARY

FIGURE 3
805 DUNDAS STREET EAST
STORMWATER MANAGEMENT PLAN

DATE: JUNE 2023 SCALE: 1:500 PROJECT: 221285

The summary table below summarizes the proposed flows for the site outletting to the Dundas Street East storm sewer. The majority of flow is captured and routed through the building's mechanical drainage system to the cistern, so that the affected area is controlled to meet the target release rate. The flow will be controlled by a 100mm orifice tube at the downstream end of the cistern.

Table 9. Site Quantity Control – Drainage to Lakeshore Road East

Catchment Name	Area (ha)	Runoff Coefficient (C)	Storage Required (m^3)	Storage Provided (m^3)	100 Year Peak Flow (L/s)
Controlled Area (201)	1.006	1.00	428	450	38.3
Uncontrolled Area (202)	0.237	0.59	-		54.8
Total	**1.243**				93.1

Given the location of the cistern in the basement, it will be feasible to convey the controlled flows to the control MH by gravity. The details will be coordinated with the mechanical engineer in the detailed design stage of the project.

As shown, the proposed development flows for all the storm events meets the target flow, and the proposed flows will be conveyed underground for events up to the 100-year storm event. Detailed calculations can be referenced in **Appendix B**. Refer to **Drawing C101** for details of the proposed servicing for the site.

5.0 WASTEWATER

According to the As Constructed drawings for Dundas Street East and Haines Road provided by the City, there is a 250mm diameter sanitary sewer along Haines Road, and a 250mm diameter sanitary sewer on Dundas Street East located at the southwest corner of the property. There is an existing control MH at the property line, connected to the 250mm main sewer on Dundas Street East, that can service the development. It is proposed to re-use the existing 200mm diameter sanitary connection as well as the 200mm diameter crossing of the gas easement.

The anticipated flows from the proposed development have been estimated based on the proposed design, for use by the Region to review the receiving system. Detail of the proposed sanitary connection is shown on **Drawing C101**.

Based on the single use demand table included in **Appendix D**, the sanitary flow from the site is estimated to be 15.06L/s based on 1,142 (1,132 residential + 10 commercial) persons at the proposed site. The existing 200mm sanitary sewer service is capable of conveying this flow.

6.0 WATER DISTRIBUTION

According to the As Constructed drawings for Dundas Street East and Haines Road provided by the City, there is a 300mm diameter watermain located on the south side of the Dundas Street right-of-way and a 250mm diameter watermain located on the west side of Haines Road, adjacent to the site. It is proposed to connect to the 250mm diameter watermain located on Haines Road.

A fire flow test has been completed, with the results shown in **Appendix E**.

The following water usage parameters were used to determine the daily water demands for the proposed building as per Region Standards.

- Estimated population = 1,132 Residential and 10 Commercial
- Water Demand = 280 Liters/cap/day (Residential), 300 Liters/cap/day (ICI)
- Peak Hour Peaking Factor = 3.0 (Residential and ICI)
- Maximum Day Peaking Factor = 2.0 (Residential), 1.4 (ICI)
- Required minimum fire flow = Estimated using the Fire Underwriters Survey

Using the water usage parameters mentioned above, the maximum daily flows and peak hourly flows for the proposed building was determined, as shown in **Table 10** below.

Table 10. Water Demand Summary

Scenario	Bldg Demand (L/s)
Max Day	7.39
Peak Hour	11.11
Max Day with Fire Flow (Building A)	190.72
Max Day with Fire Flow (Building B)	290.72
Max Day with Fire Flow (Building C)	374.06
Max Day with Fire Flow (Building D)	290.72

* - Fire Flow for Building C.

Based on the hydrant flow test conducted by L&D Waterworks on August 12, 2022, the available fire flow at 20psi is approximately 413L/s (6,551gpm). Therefore, there is sufficient flow to service the site based on Region of Peel standards. The Single Use Demand Table can be referenced in **Appendix D**, while the FUS and hydrant flow test results can be seen in **Appendix E**.

7.0 EROSION AND SEDIMENT CONTROL

The erosion and sediment control plan will be prepared following the Erosion and Sediment Control Guidelines for Urban Construction (ESC Guidelines), prepared by The Greater Golden Horseshoe Area Conservation Authorities, December 2006. The plan will be designed to limit sediment and debris from leaving the site during all stages of construction.

The sediment control plan for this site will generally consist of the following:

- A sediment control fence will be installed along the perimeter of the site where the grade will direct flows off-site.
- Site access will be limited to one entrance per phase of construction. A gravel access pad will be installed for staging of construction material and vehicles.
- Any mud tracked from the site should be swept immediately and a sweeper truck should be used as necessary to remove any additional debris.
- Trucks leaving the site should be covered with tarpaulin.

- During dry weather, above freezing construction periods, dust control measures including wetting the site and egress points should be implemented on an as needed basis.
- Once the storm sewer system has been constructed, catchbasin sediment control and protection devices will be installed and maintained until the site is ready to be paved.

Erosion measures will be in place prior to any grading on the site. A program will be in place to monitor and maintain the erosion and sediment controls. The sediment controls will be inspected by the Site Engineer and contractor:

- Once every 7 days and/or
- Within 24 hours following any significant rainfall event or snowmelt.

The inspection frequency can be extended to monthly inspections if there is no construction activity on-site. A detailed erosion and sediment control plan will be completed as part of the SPA submission.

8.0 CONCLUSIONS

The stormwater management design for the site has been designed to meet the criteria outlined by the City and the MECP Guidelines. The plan will consist of the following:

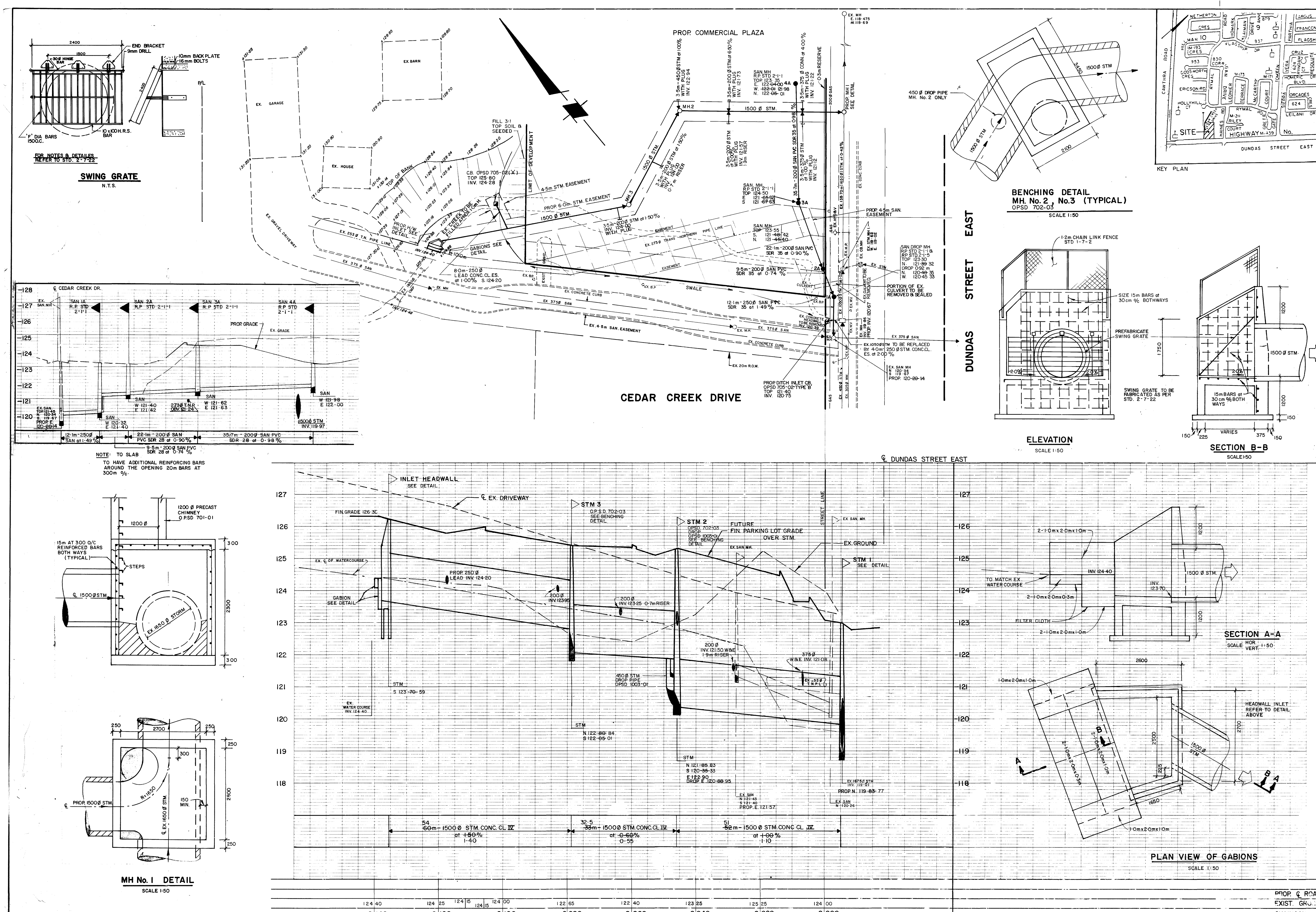
- The water balance targets for the proposed development will be achieved through the proposed landscape areas and proposed water re-use from the proposed cistern. Best efforts will be made to meet the City's requirements.
- The quality control requirements for the site can be addressed through a combination of an OGS unit and other on-site landscape measures, which meets the City standard for 80 percent overall TSS removal.
- Peak flows for storms up to the 100-year event will be controlled on site to meet the 2-year predevelopment targets with a Runoff Coefficient of 0.5.   The proposed development will not have an adverse impact on the existing storm sewer system downstream of the site.
- Sanitary drainage will be conveyed to the existing 250mm diameter sanitary sewer on Dundas Street East, as per the Region requirements.
- Internal water distribution mains will be connected to the existing watermain located on Haines Road. A hydrant flow test has been completed and the existing system provides sufficient flows to meet the requirements of the proposed development.

Therefore, based on the information provided herein, the stormwater management and site servicing requirements for the Zoning By-law Amendment have been provided.

HUSSON

APPENDIX A

SWM BACKGROUND



REVISIONS

DATE	DETAILS	INIT.
OCT. 21 1986	REVISION ON STM. LOCATION	D.W.
NOV. 27 1986	REVISED STM. SEWER & EASEMENT AS PER CITYS	
	COMMENTS	D.W.
JULY 12/91	AS CONSTRUCTED	AB

UNLESS OTHERWISE NOTED ON DRAWING

1. STANDARD CITY OF MISSISSAUGA DRAWINGS AND REGION OF PEEL DRAWINGS TO BE CONSTITUTED AS PART OF THIS CONTRACT.
2. ALL DIMENSIONS TO BE CHECKED AND VERIFIED ON THE SITE AND ANY DISCREPANCIES REPORTED TO THE ENGINEER.
3. ANY UTILITY RELOCATIONS REQUIRED DUE TO THE DEVELOPMENT OF THE SUBJECT LANDS, TO BE UNDERTAKEN AT THE EXPENSE OF THE DEVELOPER.
4. BLASTING WILL NOT BE ALLOWED UNLESS AUTHORIZED BY THE CITY OF MISSISSAUGA ENGINEERING DEPARTMENT.

SEWERS

1. SEPARATE TRENCH SPACING - 3·0m CENTRE TO CENTRE.
2. BEDDING TO BE TYPE 'B' AS PER STD. 2-1-31.
3. STANDARD RUBBER GASKET JOINTS TO BE USED THROUGHOUT STORM SEWER SYSTEM AND PREMIUM RUBBER GASKETS THROUGHT SANITARY SEWER SYSTEM.
4. TRENCH WIDTH AT TOP OF PIPE AS PER STD. 2-1-31.
5. THE CONTRACTOR TO BE RESPONSIBLE FOR SUPPLYING EXTRA BEDDING AND/OR STRONGER PIPE IF ACTUAL TRENCH WIDTH EXCEEDS THE DESIGN WIDTH
6. VITRIFIED CLAY PIPES SHALL BE EXTRA STRENGTH WITH FLEX-LOX II JOINTS OR C.S.A. SPECIFICATION A-60-1, 1976 ES OR LATEST AMENDMENT, UNLESS OTHERWISE NOTED.
7. ASBESTOS CEMENT PIPES SHALL BE EQUAL TO A.S.T.M. SPECIFICATIONS C-428-76 CL. 2400 OR LATEST AMENDMENTS, UNLESS OTHERWISE NOTED
8. CONCRETE PIPES SMALLER THAN 450 Ø SHALL BE C-14-E.S. CONCRETE PIPES LARGER THAN OR 450 Ø SHALL BE C-76-CL. III UNLESS OTHERWISE NOTED.
9. P.V.C. SDR 35 PIPE SHALL BE EQUAL TO ASTM SPECS D-3034 OR LATEST AMENDMENT.

CATCHBASINS

1. SINGLE PRECAST AS PER O.P.S.D. 705·02
   DOUBLE PRECAST AS PER O.P.S.D. 705·01 AND
   INLET CATCHBASIN AS PER O.P.S.D. 705·02
2. FRAME AND GRATE AS PER O.P.S.D. 400·02
   INLET CATCHBASIN FRAME AND GRATE AS PER O.P.S.D. 403·01
3. CATCHBASIN LEADS: SINGLE - 250 Ø MIN. CONC. E.S. OR P.V.C. SDR 35
   DOUBLE - 300 Ø MIN. CONC. E.S. OR P.V.C. SDR 35
4. CONNECTIONS TO MAIN SEWER AS PER STD. 2-9-4

WATERMAINS

1. WATERMAINS 150 Ø to 300 Ø TO BE DUCTILE IRON A.N.S. CLASS 52. CEMENT LINED WITH TYTON JOINTS UNLESS OTHERWISE NOTED. MIN. COVER : 1·70m AT ℄ OF PAVEMENT.
2. WATERMAINS TO HAVE 2·5m MIN. HORIZONTAL CLEARANCE FROM SEWERS, WATER SERVICES TO HAVE 1·50m MIN. HORIZONTAL CLEARANCE FROM ALL OTHER UTILITIES.
3. WHERE WATERMAINS PASS OVER OR UNDER SEWERS A MIN. CLEARANCE OF 0·5m IS REQUIRED.
4. WHERE WATERMAINS PASS OVER UTILITIES OTHER THAN SEWERS A MIN CLEARANCE OF 0·15m IS REQUIRED AND WHERE PASSING UNDER THE MIN. CLEARANCE TO BE 0·30m.
5. HYDRANTS TO BE INSTALLED 2·5m MIN. EITHER SIDE OF LOT LINE.
6. NO WATERMAIN TO BE LAID ON FILL UNTIL THE FILL DENSITY TEST REPORTS HAVE BEEN SUBMITTED TO, AND APPROVED BY THE REGION.
7. PRIOR TO LAYING OF WATERMAIN FILL TO BE PLACED 0·61m MIN. ABOVE TOP OF WATERMAIN GRADE AND 3·05m MIN EITHER SIDE OF WATERMAIN COMPACTED TO MIN. 95% STANDARD PROCTOR IN 0·305m LIFTS.
8. TEST SHALL BE TAKEN ALONG THE ℄ OF THE WATERMAIN AND 1·52m EITHER SIDE OF WATERMAIN AT INTERVALS OF 30·50m MAX. AND AT EACH 0·61m LIFTS.
9. ALL TEES, HORIZOTAL BENDS, HYDRANTS AND BRANCH VALVES IN FILL AREAS TO BE TIED WITH THE RODS IN ADDITION TO CONCRETE BLOCKING.
10. P.V.C. WATERMAIN TO BE A.W.W.A C-900 CL. 150 WITH PUSH-ON TYPE JOINT UNLESS OTHERWISE NOTED
11. HYDRANTS TO BE PUMPER NOZZLE OUTLET.

~~HOUSE CONNECTIONS~~

1. ~~SANITARY - [illegible] DOUBLE MIN 130 Ø ASBESTOS CEMENT OR [illegible] CLAY OR P.V.C. SDR 28 [illegible] SEWER TO BE MADE WITH [illegible] MANUFACTURED TEE OR WYE, WHERE APPLICABLE AS PER STD. [illegible] NON-WHITE.~~
2. ~~STORM - SINGLE: MIN 130 Ø CONC. [illegible] DOUBLE: MIN. 150 Ø CONC. CLES OR P.V.C SDR 28 CONNECT[illegible] SEWERS 450Ø AND LESS TO [illegible] MANUFACTURED TEE OR WYE [illegible]ABLE. AS PER STD 2-9-2 TO BE COLOUR CODED [illegible]~~
3. ~~[illegible] TYPE 'K' COPPER PIPE, LOCATION AS PER STDS. 2-8-1, 2-8-2, 2-8-[illegible] AND R.P. STD 1-7-1.~~

SANITARY SEWERS

1. BEDDING TO BE TYPE 'B' AS PER STD. 2-1-31.
2. STANDARD RUBBER GASKET JOINTS TO BE USED THROUGHOUT STORM SEWER SYSTEM AND PREMIUM RUBBER GASKETS THROUGHOUT SANITARY SEWER SYSTEM.
3. THE CONTRACTOR TO BE RESPONSIBLE FOR SUPPLYING EXTRA BEDDING AND/OR STRONGER PIPE IF ACTUAL TRENCH WIDTH EXCEEDS THE DESIGN WIDTH.
4. PIPES TO HAVE TYPE 'AAA' BEDDING FROM MANHOLE TO FIRST JOINT.
5. THE CONTRACTOR. VARY THAT THE P.V.C PIPE DEFLECTION DOES NOT EXCEED 5 PERCENT

ROADS

1. ALL FILL WITHIN ROAD ALLOWANCE TO BE COMPACTED TO MIN. 95% STANDARD PROCTOR DENSITY THE SUITABILITY AND COMPACTION OF ALL FILL MATERIALS ARE TO BE CONFIRMED BY A RECOGNIZED SOIL CONSULTANT TO THE CITY ENGINEER PRIOR TO THE INSTALLATION OF ANY ROAD BASE MATERIALS.
2. THE SUITABILITY AND COMPACTION OF ALL FILL MATERIALS IS TO BE CONFIRMED BY A RECOGNIZED SOIL CONSULTANT TO THE CITY'S ENGINEER PRIOR TO THE INSTALLATION OF ANY ROAD BASE MATERIALS.
3. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES PRIOR TO AND DURING CONSTRUCTION LOCATION OF EXISTING UTILITIES TO BE VERIFIED IN THE FIELD.
4. SNOWFENCE SHALL BE ERECTED PRIOR TO ANY GRADING OR CONSTRUCTION AND SHALL REMAIN IN PLACE AND IN GOOD REPAIR THROUGHOUT THE CONSTRUCTION AND GRADING PHASES.
5. ALL CONNECTIONS WITH PAVED PORTION OF ANY EXISTING ROAD TO BE BACKFILLED WITH GRANULAR MATERIAL OR LATEST REGION OF PEEL AND CITY OF MISSISSAUGA SPECIFICATIONS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY
6. CURBS AS PER STD 1-5-6.
7. SUBDRAINS UNDERNEATH ALL CURBS STD. 1-12-1.

FINAL SUBMISSION FEB 2 1987

BENCH MARK

● B.M. No. 889 ELEV. 122·865

DESCRIPTION. On the N. face at the E. corner of a concrete headwall on N. side of Dundas Street, 7·62 m E. of Cedar Creek Drive.

DWG. NO. **85-M90-3**

REGISTERED PROFESSIONAL ENGINEER — ROMAN T. KERKUSZ — PROVINCE OF ONTARIO

DESIGNED BY ___ CHKD. ___ APPROVED BY ___

SKIRA & ASSOCIATES LTD.
CONSULTING ENGINEERS
262 Burnhamthorpe Road West, Mississauga, Ontario L5B 2C2

JORDON ENTERPRISES INC.
OZ / 68 / 85

CITY FILE 16 121 85068 REGION FILE No. 86-0530

CITY OF MISSISSAUGA
ENGINEERING AND WORKS DEPARTMENT

C-23393

STORM EASEMENT

STN. 0+000 TO STN 0+100

SCALE HOR. 1:500 VERT. 1:50	AREA Z-20	PROJECT No. 85-M9
DRAWN BY P.J.S.	CHECKED BY Z.S	PLAN No.
DATE JANUARY 1987	SHEET OF	C-23393

C-23[illegible]

HUSSON

APPENDIX B

SWM CALCULATIONS

Rational Method Calc.

Project:	805 Dundas Street East
Project No.:	221285
Municipality:	City of Mississauga
Scenario	Existing Development

Catchment 101

	2 Year	5 Year	25 Year	100 Year
Runoff Coefficient (C) =	0.50	0.50	0.50	0.50
Area (A) =	1.243	1.243	1.243	1.243
A:	610	820	1160	1450
B:	4.6	4.6	4.6	4.9
C:	0.78	0.78	0.78	0.78
Tc:	15.000	15.000	15.000	15.000
Intensity (I) mm/hr =	59.9	80.5	113.9	140.7
Peak Flow (Q) L/s =	103.4	139.0	196.6	242.9

Catchment 101

Surface	Area	C	CxA
Pavement	0.818	0.90	0.74
Building	0.293	0.90	0.26
Landscape	0.132	0.25	0.03
	1.243	0.83	1.03
Imperviousness	89%		

Rational Method Calc.

Project:	805 Dundas Street East
Project No.:	221285
Municipality:	City of Mississauga
Scenario	Post Development

Catchment 202 - Uncontrolled

	2 Year	5 Year	25 Year	100 Year
Runoff Coefficient (C) =	0.47	0.47	0.47	0.59
Area (A) =	0.237	0.237	0.237	0.237
A:	610	820	1160	1450
B:	4.6	4.6	4.6	4.9
C:	0.78	0.78	0.78	0.78
Tc:	15.000	15.000	15.000	15.000
Intensity (I) mm/hr =	59.9	80.5	113.9	140.7
Peak Flow (Q) L/s =	18.7	25.1	35.5	54.8

Catchment 201

Surface	Area	C	CxA
Pavement	0.3402	0.90	0.3062
Building	0.5152	0.90	0.4637
Landscape	0.1501	0.25	0.0375
	1.0055	0.80	0.8074
Imperviousness	85%		

100-Year Runoff Coefficient (1.25 factor)= 1.00

Catchment 202

Surface	Area	C	CxA
Pavement	0.0669	0.90	0.06
Building	0.0148	0.90	0.01
Landscape	0.1548	0.25	0.04
	0.2365	0.47	0.11
Imperviousness	35%		

100-Year Runoff Coefficient (1.25 factor)= 0.59

Modified Rational Method

Project:	805 Dundas Street E
Project No.:	221285
Municipality:	City of Mississauga

Catchment 201

Area:	1.0055 ha	Rainfall $I=A*(T+B)^C$		
Runoff Coefficient:	1.00	A:	1450	
		B:	4.9	
Target Flow:	0.038 m^3/s	C:	-0.78	
Storage Required	428.2 m3			

Initial Time 10 min Increment 5 min

Time (min)	Intensity (mm/hr)	Peak Flow (m^3/s)	Runoff Volume (m^3)	Discharge Volume (m^3)	Storage Volume (m^3)
10	176.3	0.494	296.57	22.99	273.6
15	140.7	0.394	354.97	34.48	320.5
20	118.1	0.331	397.38	45.98	351.4
25	102.4	0.287	430.65	57.47	373.2
30	90.8	0.254	458.06	68.97	389.1
35	81.8	0.229	481.41	80.46	400.9
40	74.6	0.209	501.78	91.96	409.8
45	68.7	0.193	519.88	103.45	416.4
50	63.8	0.179	536.18	114.95	421.2
55	59.6	0.167	551.03	126.44	424.6
60	56.0	0.157	564.69	137.93	426.8
65	52.8	0.148	577.34	149.43	427.9
70	50.0	0.140	589.13	160.92	428.2
75	47.6	0.133	600.18	172.42	427.8
80	45.4	0.127	610.59	183.91	426.7
85	43.4	0.122	620.43	195.41	425.0
90	41.6	0.117	629.77	206.90	422.9
95	40.0	0.112	638.66	218.40	420.3
100	38.5	0.108	647.15	229.89	417.3
105	37.1	0.104	655.27	241.39	413.9
110	35.8	0.100	663.06	252.88	410.2
115	34.7	0.097	670.54	264.38	406.2
120	33.6	0.094	677.75	275.87	401.9
125	32.6	0.091	684.70	287.36	397.3

Orifice Flow Calculation

Pipe Diameter	100 mm
Area	0.008 m^2
Maximum WL	122.90 m
Invert	121.05 m
Head (h)	1.80 m
Co-efficient	0.82
Flow (Q)	$Q=CA(2gh)^{0.5}$
	0.0383 m^3/s

Active Storage:	428 m^3
Footprint:	231 m^2
Depth Above Outlet	1.85 m

Controlled Orifice	0.0383 m^3/s
Uncontrolled Area (202)	0.0548 m^3/s
Total Peak Flow	0.0931 m^3/s
Target	0.103 m^3/s
Difference	0.010 m^3/s

Storage Required:	428 m^3
Storage Provided:	450 m^3

On-Site Irrigation Calculations

Project: 805 Dundas Street East
Project No.: 221285
Municipality: City of Mississauga

Site Area = **12430.0 m2**
Total Annual Rainfall= **840 mm**
50% Capture= **5220.6 m3**

Catchment	Area (m^2)	% of Total Area	IA (mm)	Annual Capture (%)	Annual Capture (m^3)
Flat Roof	5300	42.6%	1.0	12%	534.2
Landscape & Planters	3059	24.6%	5.0	50%	1284.8
Driveway and Walkway	4071	32.8%	1.0	12%	410.4
Total	**12430**	**100%**	**2.0**		**2229.4**

Equivalent IA Provided = **2.0** mm
Total required to be captured by cistern for reuse = **2991.22** m3

On-Site Irrigation Calculations

Project: 805 Dundas Street East
Project No.: 221285
Municipality: City of Mississauga

Catchment Area = 12,430 m2

Irrigation Factors

Landscape Type	Area [m²]	Species Factor [Ks]	Density Factor [Kd]	Microclimate Factor [Kmc]	KL	IE
Turfgrass	1897	0.7	1	1	0.7	Drip
Mixed	1162	0.5	1.1	1	0.55	Drip
Greenroof	0	0.7	1	1	0.7	Drip

Total Water Applied - Irrigation

Month	ET	ETL Shrubs	ETL Mixed	ETL Turfgrass	IE	Total Water Use [m3]
January						
February						
March						
April	56.6	39.6	31.1	39.6	0.9	123.7
May	101.6	71.1	55.9	71.1	0.9	222.0
June	124.9	87.4	68.7	87.4	0.9	273.0
July	138.2	96.7	76.0	96.7	0.9	302.0
August	110.4	77.3	60.7	77.3	0.9	241.3
September	71.6	50.1	39.4	50.1	0.9	156.5
October	62.9	44.0	34.6	44.0	0.9	137.5
November						
December						
Total						**1456.1**

On-Site Water Reuse Calculations

Project:	805 Dundas Street East
Project No.:	221285
Municipality:	City of Mississauga

Catchment Area (A) =	10,055	m2	
Runoff Coefficient (C) =	0.80		
Cistern Volume =	323	m3	
Cistern as rainfall depth	32.1	mm	= A / V
% Total Collection	90%		From Figure 1A in WWFM Guildelines.
Car washing frequency =	0	time(s) per car per week	
Walkway/Driveway Area =	0	m2	
Drive Aisle Area =	6033	m2	
Total Parking Area =	0	m2	

Water Reuse Consumption

Water Use	Frequency [per month]	3/4" Hose Discharge Rate [L/min]	Duration [min]	Depth of Water Used [mm]	Total Monthly Water Usage [L]	Total Monthly Water Usage [m3]
Vehicle Wash (Indoor)	0	19	10	-	0	0.00
Walkway Wash (Outdoor)	0	-	-	5	0	0
Drive Aisle Wash (Indoor)	10	-	-	5	301650	301.65

Total Water Applied / **Total Water Collected**

Month	(1) Irrigation[1] [per month]	(2) Indoor Wash [per month]	(3) Outdoor Wash [per month]	(4) = (1)+(2)+(3) Total Consumption [per month]	(5) Monthly Precip. mm	(6) % of Total Collection	(7) = (5)x(6)xCxA Rainwater Volume [m3]	(8) See notes. Vol Remaining [m3]
January	0	301.7		301.7	61.0		441.6	140.0
February	0	301.7		301.7	50.0		362.0	200.3
March	0	301.7		301.7	66.0		477.8	323.0
April	123.7	301.7	0	425.4	71.0		514.0	323.0
May	222.0	301.7	0	523.7	74.0		535.7	323.0
June	273.0	301.7	0	574.6	73.0	90%	528.5	276.9
July	302.0	301.7	0	603.7	68.0		492.3	165.5
August	241.3	301.7	0	542.9	81.0		586.4	209.0
September	156.5	301.7	0	458.1	84.0		608.1	323.0
October	137.5	301.7		439.2	65.0		470.6	323.0
November	0	301.7		301.7	76.0		550.2	323.0
December	0	301.7		301.7	71.0		514.0	323.0
Total	1456.1	3619.8		**5075.9**	**840.0**		**Yearly Deficit=**	**0.0**

Total Yearly Water Demand =	5075.9	m3
Total Yearly Supply Deficit =	0.0	m3
Total Water Consumption =	**5075.9**	m3
Water Balance Requirement =	**2991.2**	m3

Notes:

(1) From "On-Site Irrigation Calculations" table.
(5) From "Canadian Climate Normals 1981-2010 Station Data"
(6) From Figure 1A in WWFM Guildelines. 90% of annual rainfall comes from storms less than 25mm.
(8) = Volume remaining from previous month + surplus/deficit from previous month. Volume cannot be greater than the cistern volume.
Total Water Consumption = Total Yearly Demand - Total Yearly Supply Deficit.
Total Water Consumption per 72 hours = Total Water Consumption per 3 days based on a 365 day year
Total Water Consumption per 72 hours = 41.72

APPENDIX C

OGS SIZING AND SPECIFICATIONS

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD BASED ON A FINE PARTICLE SIZE DISTRIBUTION

Project Name:	805 Dundas Street E	**Engineer:**	**Husson**
Location:	Mississauga, ON	**Contact:**	M. Plewes, P.Eng.
OGS #:	OGS	**Report Date:**	29-Sep-22

Area	0.33	ha	**Rainfall Station #**	204	
Weighted C	0.9		**Particle Size Distribution**	FINE	
CDS Model	2015-4		**CDS Treatment Capacity**	20	l/s

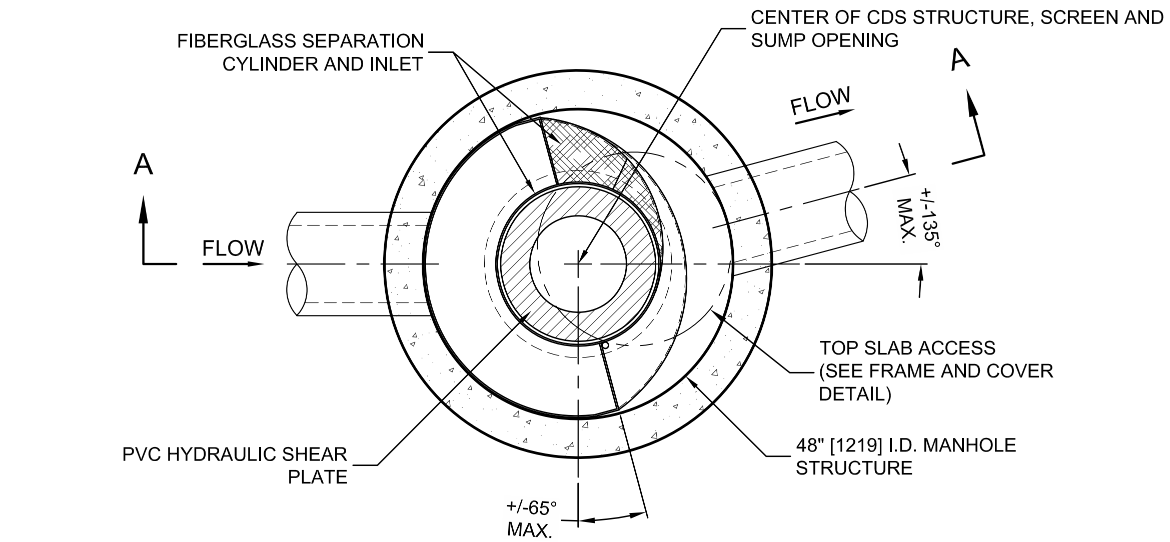
Rainfall Intensity[1] (mm/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (l/s)	Treated Flowrate (l/s)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
0.5	9.4%	9.4%	0.4	0.4	2.1	98.3	9.3
1.0	11.0%	20.4%	0.8	0.8	4.2	97.7	10.7
1.5	10.1%	30.5%	1.2	1.2	6.2	97.1	9.8
2.0	9.6%	40.1%	1.7	1.7	8.3	96.5	9.3
2.5	7.9%	48.0%	2.1	2.1	10.4	95.9	7.6
3.0	6.4%	54.4%	2.5	2.5	12.5	95.3	6.1
3.5	4.4%	58.8%	2.9	2.9	14.6	94.7	4.1
4.0	4.2%	63.0%	3.3	3.3	16.7	94.1	4.0
4.5	3.7%	66.7%	3.7	3.7	18.7	93.5	3.5
5.0	3.3%	70.0%	4.1	4.1	20.8	92.9	3.1
6.0	5.6%	75.6%	5.0	5.0	25.0	91.7	5.1
7.0	4.0%	79.6%	5.8	5.8	29.2	90.5	3.7
8.0	3.5%	83.1%	6.6	6.6	33.3	89.3	3.1
9.0	2.2%	85.3%	7.4	7.4	37.5	88.1	1.9
10.0	1.7%	87.0%	8.3	8.3	41.6	86.9	1.4
15.0	6.3%	93.3%	12.4	12.4	62.5	80.9	5.1
20.0	2.3%	95.6%	16.5	16.5	83.3	75.0	1.7
25.0	1.8%	97.3%	20.6	19.8	100.0	67.4	1.2
30.0	0.8%	98.2%	24.8	19.8	100.0	56.2	0.5
35.0	0.9%	99.0%	28.9	19.8	100.0	48.2	0.4
40.0	0.3%	99.3%	33.0	19.8	100.0	42.1	0.1
45.0	0.5%	99.8%	37.2	19.8	100.0	37.5	0.2
50.0	0.2%	100.0%	41.3	19.8	100.0	33.7	0.1
							91.9

Removal Efficiency Adjustment[2] = 6.5%

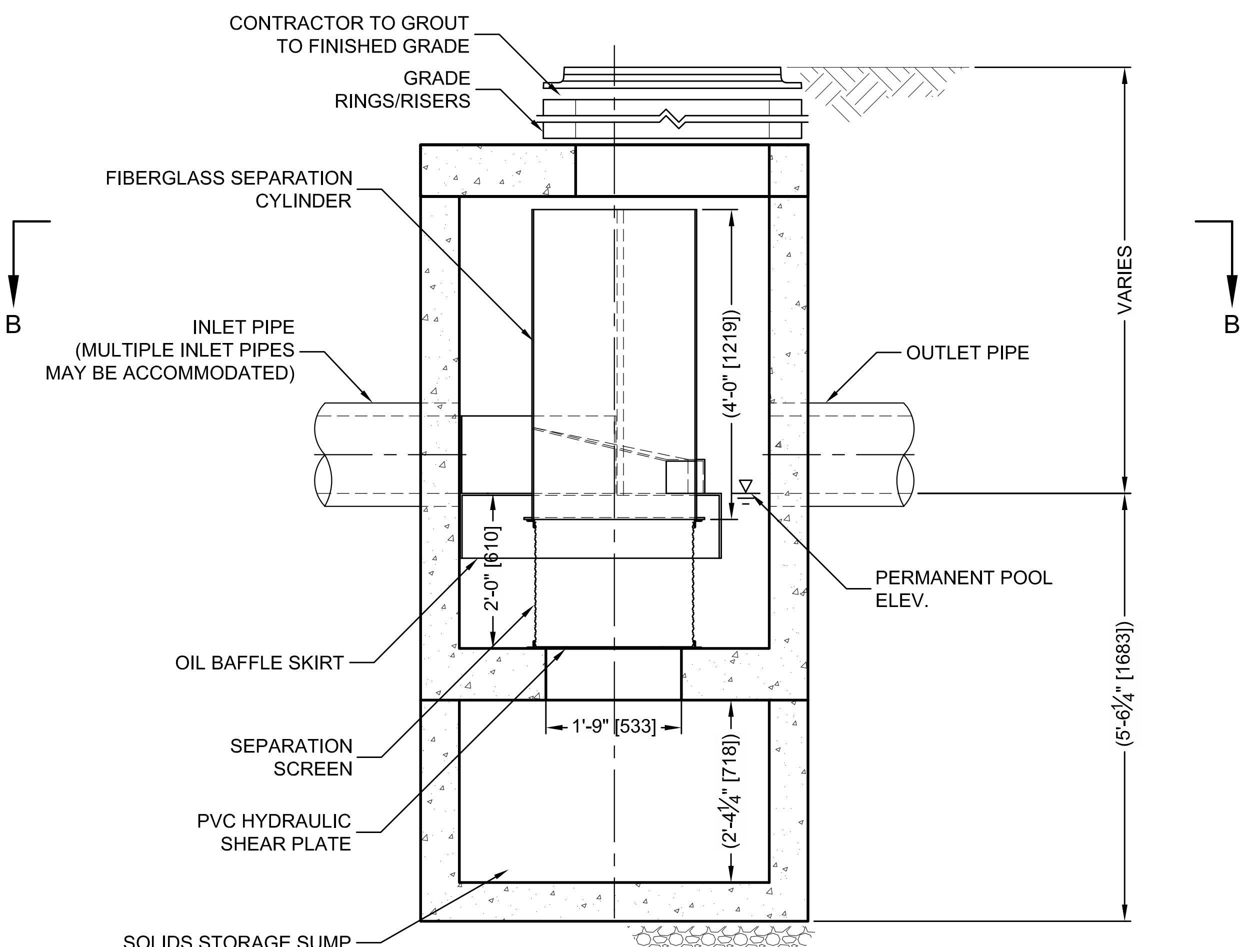
Predicted Net Annual Load Removal Efficiency = 85.4%

Predicted % Annual Rainfall Treated = 99.1%

1 - Based on 44 years of hourly rainfall data from Canadian Station 6158733, Toronto ON (Airport)
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.
3 - CDS Efficiency based on testing conducted at the University of Central Florida
4 - CDS design flowrate and scaling based on standard manufacturer model & product specifications



PLAN VIEW B-B
N.T.S.



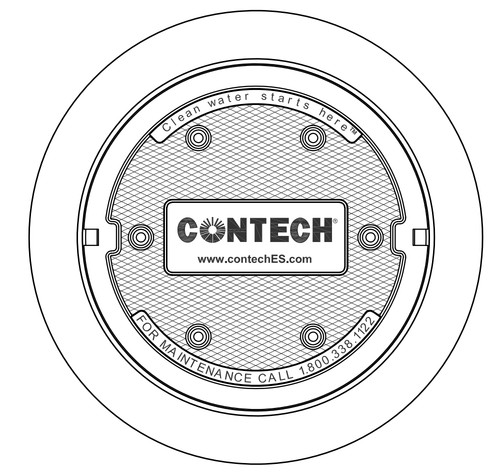
ELEVATION A-A
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS PMSU2015-4-C DESIGN NOTES

THE STANDARD CDS PMSU2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
CUSTOMIZABLE SUMP DEPTH AVAILABLE
ANTI-FLOTATION DESIGN AVAILABLE UPON REQUEST



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
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CDS PMSU2015-4-C INLINE CDS STANDARD DETAIL

APPENDIX D

DEMAND TABLE

Connection Single Use Demand Table

WATER CONNECTION

Connection point [3]	250mm Watermain on Haines Road		
Pressure zone of connection point			
Total equivalent population to be serviced [1]		1,132 persons	
Total lands to be serviced		1.243ha	
Hydrant flow test		Completed August 12, 2022.	
Hydrant flow test location		First Hydrant North of Dundas St E on Haines Road.	
	Pressure (kPa)	Flow (in l/s)	Time
Minimum water pressure	255	128.8	10:30am
Maximum water pressure	345	74.8	10:30am

No.	Water demands		
	Demand type	**Demand**	**Units**
1	Average day flow	3.70	l/s
2	Maximum day flow	7.39	l/s
3	Peak hour flow	11.11	l/s
4	Fire flow [2]	370.4	l/s
Analysis			
5	Maximum day plus fire flow	377.8	l/s

WASTEWATER CONNECTION

Connection point [4]		EX MH 1A
Total equivalent population to be serviced [1]		1,132 persons
Total lands to be serviced		1.243ha
6	Wastewater sewer effluent (in l/s)	15.06 l/s

[1] The calculations should be based on the development estimated population (employment or residential).

[2] Please reference the Fire Underwriters Survey Document

[3] Please specify the connection point ID

[4] Please specify the connection point (wastewater line or manhole ID)
Also, the "total equivalent popopulation to be serviced" and the "total lands to be serviced" should reference the connection point. (The FSR should contain one copy of Site Servicing Plan)

Please include the graphs associated with the hydrant flow test information table
Please provide Professional Engineer's signature and stamp on the demand table
All required calculations must be submitted with the demand table submission.

APPENDIX E

WATER DEMAND CALCULATIONS

Fire Flow Requirements

Project:	805 Dundas Street East
Project No.:	221285
Municipality:	City of Mississauga
Building :	A

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 1999 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)		The required fire flow in litres per minute.	
Maximum Floor Area (A) =	4345	m2	If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors.	
		3rd Floor		2932.76 m2
		2nd Floor		2759.77 m2
		4th Floor		2887.52 m2
Coefficient (C) =	0.8		Coefficient related to the type of construction. = 1.5 for wood frame construction (structure essentially all combustible). = 1.0 for ordinary construction (brick or other masonry walls, combustible floor = 0.8 for non-combustible construction (unprotected metal structural) = 0.6 for fire-resistive construction (fullyprotected frame,floors, roof).	
F =	11700	L/min.		

STEP 2
Determine the increase or decrease for occupancy.

	0%		Reduction for Low Hazard Occupancy (Dwellings).	
Decrease	0	L/min.		

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	30%		30% for sprinklered as per NFPA 13.	
Decrease	3510	L/min.	50% for fully automatic sprinkler.	

STEP 4
Determine the total increase for exposures. 0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	15%			14
East	0%			70
South	5%			45
West	0%			48
	20.0%		Maximum exposure increase is 75%.	
Increase	2340	L/min.		

STEP 5
Determine the minimum required fire flow.

F =	**11,000**	**L/min.**	**Round to the nearest 1000L/min.**	
QR =	6551	USGPM	**Flow Test Results**	
	24,797	**L/min.**		

Fire Flow Requirements

Project:	805 Dundas Street East
Project No.:	221285
Municipality:	City of Mississauga
Building :	B

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 1999 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)		The required fire flow in litres per minute.
Maximum Floor Area (A) =	1122	m2	If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors.
Coefficient (C) =	1.5		Coefficient related to the type of construction. = 1.5 for wood frame construction (structure essentially all combustible). = 1.0 for ordinary construction (brick or other masonry walls, combustible floor = 0.8 for non-combustible construction (unprotected metal structural) = 0.6 for fire-resistive construction (fullyprotected frame,floors, roof).
F =	11100	L/min.	

STEP 2
Determine the increase or decrease for occupancy.

	0%		Reduction for Low Hazard Occupancy (Dwellings).
Decrease	0	L/min.	

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	0%		30% for sprinklered as per NFPA 13.
Decrease	0	L/min.	50% for fully automatic sprinkler.

STEP 4
Determine the total increase for exposures. 0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	15%			16
East	25%			3
South	15%			15
West	0%			50
	55.0%		Maximum exposure increase is 75%.	
Increase	6105	L/min.		

STEP 5
Determine the minimum required fire flow.

F =	**17,000**	**L/min.**	**Round to the nearest 1000L/min.**
QR =	6551	USGPM	**Flow Test Results**
	24,797	**L/min.**	

Fire Flow Requirements

Project:	805 Dundas Street East
Project No.:	221285
Municipality:	City of Mississauga
Building :	C

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW

(as per the Water Supply for Public Fire Protection 1999 manual by the Fire Underwriters Survey)

STEP 1

Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)	The required fire flow in litres per minute.
Maximum Floor Area (A) =	1378 m2	If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors.
Coefficient (C) =	1.5	Coefficient related to the type of construction. = 1.5 for wood frame construction (structure essentially all combustible). = 1.0 for ordinary construction (brick or other masonry walls, combustible floor = 0.8 for non-combustible construction (unprotected metal structural) = 0.6 for fire-resistive construction (fullyprotected frame,floors, roof).
F =	12300 L/min.	

STEP 2

Determine the increase or decrease for occupancy.

	0%	Reduction for Low Hazard Occupancy (Dwellings).
Decrease	0 L/min.	

STEP 3

Determine the decrease, if any, for automatic sprinkler protection.

	0%	30% for sprinklered as per NFPA 13.
Decrease	0 L/min.	50% for fully automatic sprinkler.

STEP 4

Determine the total increase for exposures. 0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	15%		16
East	25%		3
South	10%		21
West	25%		3
	75.0%	Maximum exposure increase is 75%.	
Increase	9225 L/min.		

STEP 5

Determine the minimum required fire flow.

F =	**22,000 L/min.**	**Round to the nearest 1000L/min.**
QR =	6551 USGPM	**Flow Test Results**
	24,797 L/min.	

Fire Flow Requirements

Project:	805 Dundas Street East
Project No.:	221285
Municipality:	City of Mississauga
Building :	D

Commercial/Office Building

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 1999 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)		The required fire flow in litres per minute.
Maximum Floor Area (A) =	1126	m2	If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors.
Coefficient (C) =	1.5		Coefficient related to the type of construction. = 1.5 for wood frame construction (structure essentially all combustible). = 1.0 for ordinary construction (brick or other masonry walls, combustible floor = 0.8 for non-combustible construction (unprotected metal structural) = 0.6 for fire-resistive construction (fullyprotected frame,floors, roof).
F =	11100	L/min.	

STEP 2
Determine the increase or decrease for occupancy.

	0%		Reduction for Low Hazard Occupancy (Dwellings).
Decrease	0	L/min.	

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	0%		30% for sprinklered as per NFPA 13.
Decrease	0	L/min.	50% for fully automatic sprinkler.

STEP 4
Determine the total increase for exposures. 0 -3m (25%), 3-10m (20%), 10-20m (15%), 20-30m (10%), 30-45m (5%)

North	15%			16
East	0%			50
South	15%			15
West	25%			3
	55.0%		Maximum exposure increase is 75%.	
Increase	6105	L/min.		

STEP 5
Determine the minimum required fire flow.

F =	**17,000**	**L/min.**	**Round to the nearest 1000L/min.**
QR =	6551	USGPM	**Flow Test Results**
	24,797	**L/min.**	

HUSSON

Hydrant Flow Test Report

SITE NAME:		TEST DATE:	
SITE ADDRESS / MUNICIPALITY:	**805 Dundas Street East Mississauga, On**		Aug 12,2022
TEST HYDRANT LOCATION :	**1st Fire Hydrant North of Dundas Street East on Haines Road**		
BASE HYDRANT LOCATION:	**Front of #805 Dundas Street East**	TEST TIME:	10:30AM
TEST BY:	Luzia Wood		

TEST DATA

FLOW HYDRANT — Pipe Diam. (in / mm) 250mm P.V.C.

	PITOT 1	**PITOT 2**
SIZE OPENING (inches):	2.5	2.5
COEFFICIENT (**note 1**):	0.90	0.90
PITOT READING (psi):	50	37 / 37
FLOW (usgpm):	**1186**	**2041**

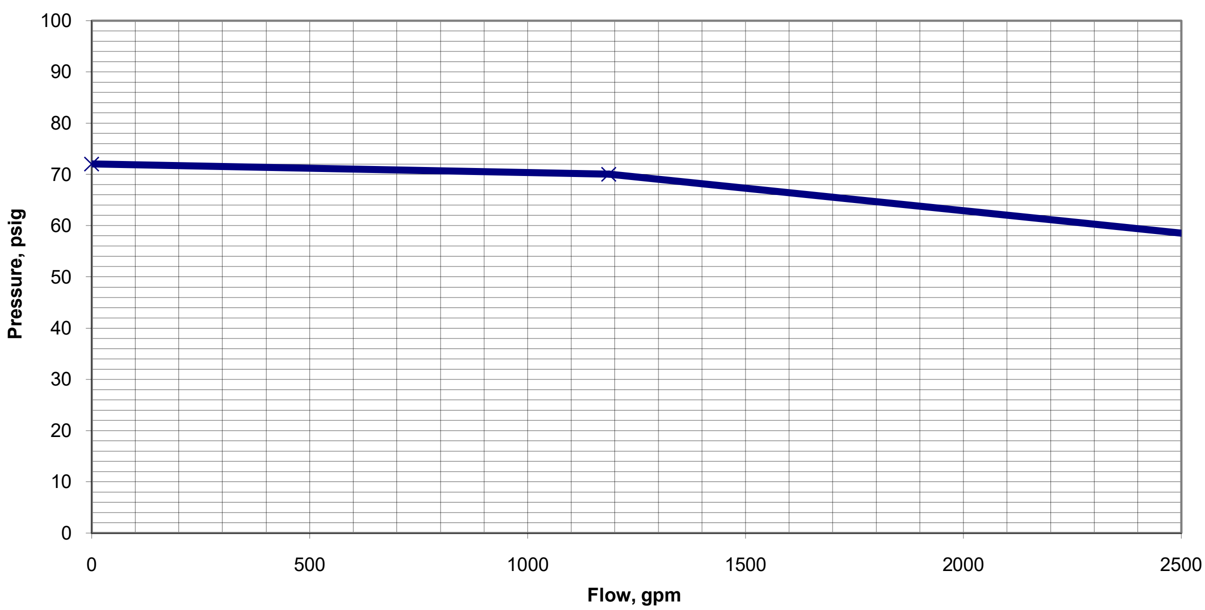
THEORETICAL FLOW @ 20 PSI	6892

BASE HYDRANT — Pipe Diam. (in / mm) 300mm P.V.C.

STATIC READING (psi):	72	RESIDUAL 1 (psi):	70	RESIDUAL 2 (psi):	66

REMARKS:

NOTE 1 : Conversion factor of .90 used for flow calculation based on rounded and flush internal nozzle configuration. No appreciable difference in pipe invert between flow and base hydrants.



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