



Functional Servicing Report

Chick-fil-A

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Functional Servicing Report

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Chick-fil-A Erin Mills

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1 Legal Notification

This Report was prepared by EXP Services Inc. for the account of Chick-fil-A.

Any use which a third party makes of the Report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

2 Introduction

EXP Inc. has been retained by Chick-fil-A to prepare a Functional Servicing Report (FSR) to assess the servicing requirements relating to the proposed development located at 5100 Erin Mills Parkway which is located in Mississauga, Ontario. For additional background information, please refer to **Appendix A, EXP Drawing A100**.

This Functional Servicing Report (FSR) identifies and presents the servicing requirements for the proposed project. This FSR includes municipal water, sanitary drainage, and stormwater management (SWM) services, prior to the detailed design being undertaken. The Report will outline the requirements for site servicing for the proposed development and determine the available existing and proposed municipal servicing for discharge of storm and sanitary flows and water servicing.

2.1 Site Description

2.1.1 Existing Site

The property under study is a 0.447 ha site located on the north corner of Eglinton Avenue W and Metcalfe Avenue in Mississauga, Ontario. The subject site is currently occupied by parking spaces and bounded by an existing parking lot and a restaurant to the north, Eglinton Avenue W to the east, and streets to the north and west.

The current site is occupied with a parking lot. See **Figure 1** for an aerial view of the existing site.



Figure 1: Existing Site

2.1.2 Proposed Site

The project entails the construction of a proposed Chick-fil-A accompanied by the necessary sidewalks, landscape areas, parking lot and drive aisles.

The proposed development involves the construction of a proposed Chick-fil-A at the center of the site and will consist of a 486 m² building, parking spaces, sidewalk, landscape areas, and drive thru. The existing infrastructure on the subject site will be demolished and modified to meet the requirements of the proposed development. The proposed building for the subject site will be serviced from the existing systems within the existing plaza which will consider demonstrating the use of services and capacity.

For more detailed information regarding the building and site location, please refer to the **EXP Drawing A100 - Site Plan** provided in **Appendix A**.

2.2 References

The following documents were referred to in the preparation of this report:

- Section 8 – Storm Drainage Design Requirements from The City of Mississauga (November 2020)
- Region of Peel Watermain Design Criteria (June 2010)
- Region of Peel Sanitary Sewer Design Criteria (March 2017)
- Region of Peel Linear Wastewater Standards (March 2023)
- Region of Peel Function Servicing Report (November 2009)
- MOE Design Guidelines for Sewage Works (2008)
- MTO Drainage Manual (1997)
- MOE Stormwater Management Planning and Design Manual (2003)
- Fire Underwriters Survey Water Supply for Public Fire Protection (2020)

3 Sanitary Sewer Servicing

3.1 Sanitary Sewer System

The proposed Chick-fil-A site at 5100 Erin Mills Parkway, Mississauga, Ontario will connect to the existing sanitary infrastructure within the existing commercial development. The sanitary sewage flow from the site will be directed to the existing sanitary system within the block by connecting with a proposed MH. The flow will be directed to the internal sanitary system of the existing commercial development through an existing sanitary MH situated west of the subject site. The inverts, size and slope of the existing sanitary service is to be confirmed on field by the contractor. The existing sanitary sewers, maintenance holes, as well as the proposed sanitary sewer arrangement for the Chick-fil-A Development and the existing sanitary sewers within the town centre development are shown on **EXP Drawing C200 – Site Servicing** and **Proctor & Redfern Drawing T-88-0360 – General Servicing Plan** in **Appendix B**.

For calculating the population increases for the site, the following Region of Peel standards for population densities and flow rates will be used, per the Linear Wastewater Standards from the Region of Peel (March 2023).

The infiltration factor is 0.26 L/s per hectare. Peaking factor is determined by the Harmon Formula and limited to a minimum of 2.0 and a maximum of 4.0 per region standards.

Sewage flows will be calculated based on use as a commercial site with an average design flow of **270/L/per/day** plus allowances for infiltration. Based on the site area of **0.450** hectares, the sanitary flow equates to **0.39 L/s**. The sanitary flows to the internal sanitary system were calculated as shown in the following Table 1 as per Peel guidelines. Detailed calculations are provided in **Appendix C**.

Table 1: Peak Sanitary Flow Comparison

| Scenario | Residential Flow (L/s) | Non-Residential Flow (L/s) | Infiltration Flow (L/s) | Total Flow (L/s) |
|------------------|------------------------|----------------------------|-------------------------|------------------|
| Pre-Development | 0.00 | 0.00 | 0.12 | 0.12 |
| Post-Development | 0.00 | 0.28 | 0.12 | 0.39 |

3.2 Proposed Sanitary Service

EXP proposes to service the proposed development with a proposed 150mm connection at 3.5% with a grease interceptor to the existing sanitary MH located northeast of the site. The setup will include venting. The proposed connection to the building will be 150mm at 1.5% slope. The sanitary service connection to the proposed building, will be designed to the Region of Peel Standards, as shown on **EXP Drawing C200 – Site Servicing Plan in Appendix B**.

4 Water Supply and Appurtenances

4.1 Existing Water Supply

According to the survey conducted by JD BARNES on July 7, 2025, there is an existing 150mm watermain and an existing 50mm water service located south and east of the proposed restaurant respectively. The existing watermain are shown on **EXP Drawing C200 – Site Servicing Plan in Appendix B**.

4.2 Proposed Water Demand

The unit rate and peaking factors of water consumption, minimum pipe size and allowable pressure in line were established from the Region of Peel Public Works Watermain Design Criteria (June 2010).

The pressures and volumes must be sufficient for peak hour conditions and under fire conditions as established by the Ontario Building Code. The minimal residual pressure under fire conditions is 140 kPa. (or 20.3 psi).

According to the MOE criteria, the allowable pressures are as follows:

| <i>Condition</i> | <i>Allowable Pressures (kPa)</i> | |
|-------------------------|----------------------------------|-------------|
| | <i>min.</i> | <i>max.</i> |
| 1) Min. Hour | 275 | 700 |
| 2) Peak Hour | 275 | 700 |
| 3) Peak Day + Fire Flow | 140 | 700 |

4.2.1.1 Fire Flow

The Required Fire Flow demand used in the model analysis has been determined using “Water Supply for Public Fire Protection” by the Fire Underwriters Survey. The calculations can be found in Appendix B of this report; as shown, the fire flow for the site is 183 L/s. The assumptions used for the calculations include:

- The building will be sprinklered and have a fully supervised fire protection system
- The buildings will use non-combustible construction.

- Occupancy is Care occupancies (limited combustible contents)
- Areas and exposure distances taken from plans provided by the architect.

4.2.2 Demand Requirements

It is proposed that the site will be serviced via a new 50mm diameter water service for domestic flow, connected into the existing 300mm water service as continuation located to the east of the existing store. The proposed water service contains a water valve located at the connection to the existing watermain.

Water demands for the proposed development were determined from the Region of Peel Water Design Guidelines; the design criteria is summarized in **Table 2**.

Table 2: Proposed Water Distribution Design Criteria

| | | |
|--|-------------------|----------------|
| Total Area | 0.447 | ha |
| Population | 22 | Persons |
| Commercial Average Daily Demand | 300 | L/Employee/day |
| Commercial Maximum Daily Demand | 1.4 * Average Day | - |
| Commercial Peak Hour Demand | 3.0 * Average Day | - |
| Chick-fil-A Hours Open Hours | 11 | Hours |

The total water demand for the site is estimated as the maximum daily water demand plus fire, resulting in a total demand of approximately $(0.23 \text{ l/s} + 83 \text{ l/s}) = \mathbf{83.23 \text{ L/s}}$. The total water demand was calculated in **Table 3**.

Table 3: Water Demand Calculations

| Demand Type | Total Demand (L/s) |
|---|--|
| Commercial Average Daily Demand | $((300 \text{ L/Employee/day} * 22 \text{ pers}) / 11 \text{ Hours}) = \mathbf{0.167 \text{ L/s}}$ |
| Commercial Maximum Daily Demand | 0.23L/s |
| Commercial Maximum Hourly Demand | 0.50 L/s |
| Fire Flow (FUS method) | 83 L/s |
| Maximum Daily Demand + Fire Flow | 83.23 L/s |

Fire protection of the proposed building will be via new fire hydrant located at the east side of the building.

Refer to the **EXP Drawing C200 – Site Servicing Plan** within **Appendix B**, showing the extent of proposed water servicing, to be installed.

4.3 Proposed Connection

As part of the proposed project, we plan to connect the new Chick-fil-A building to the existing water infrastructure. This connection will ensure that the building has access to the necessary water supply for its operations and can utilize the existing infrastructure efficiently. Currently, there is a 150mm PVC water service within the subject site. The proposed water service will be 50mm type K copper and will be connected to the existing water service. Timing of the Region of Peel Capital project will need to be coordinated with the Site Services Contractor for Chick-fil-A to ensure the new municipal watermain and service stub is in place prior to Chick-fil-A construction.

5 Stormwater Management

5.1 Pre-Development Hydrology

5.1.1 Existing Drainage

The subject site is currently occupied by landscape areas and parking spaces. In the predevelopment conditions, the catchment areas are divided into three as shown in **EXP Drawing C300 - Pre-Development Drainage Plan within Appendix B**. The subject site has an on-site catch basin on the east side, which capture drainage from the parking spaces and landscape areas. Area 102 and Area 103, which are outside of the catchment area of the catch basin, are draining towards streets on the west and south.

The existing storm sewer that drains this site is a private on site 250mm diameter STM, located north of the proposed site within the existing commercial development. According to **Proctor & Redfern Drawing T-88-0360 – General Servicing Plan in Appendix B.**, the site drains to the existing 825mm concrete storm sewer running along north boundary. The general servicing plan show that the existing storm is connected to the Erin Centre Boulevard storm sewer through 1350mm diameter storm sewer. The existing storm sewer system does not have any inlet control device and any treatment unit for the existing development

5.1.2 External Drainage

Based on the existing topography, there are no external drainage areas draining to the subject property. Refer to **EXP Drawing C300 - Pre-Development Drainage Plan within Appendix B**.

5.2 Stormwater Management Analysis

The storm drainage system for the Chick-fil-A site collects water through a series of catch basins, roof drains, and a catch basin manhole. The proposed Chick-fil-A development is situated on what is currently an existing parking lot. Although the area is mostly hard surface in its current state, the proposed development will have more hard surface areas than the existing. A 75mm diameter orifice plate will be placed to control the flow to have less flow than the allowable release rate. However, the existing site does not have any inlet control device. Having the orifice tube will enhance the stormwater management of the subject site.

Although the proposed restaurant development will have an increase in the total amount of stormwater runoff generated due to the increase in hard surface and additional controlled area, proposed upgrade on the stormwater system will provide better management. The areas that are contributing to the adjacent street will be reduced due to increased capture area. Please refer to the Post-Development Drainage plan, **EXP Drawing C400**, available in **Appendix B**.

The City of Mississauga rainfall IDF Parameters have been used for the storm analysis. These parameters were taken from City of Mississauga Development Requirements Section 8 – Storm Drainage Design Requirements dated November 2020. The rainfall intensity for the site was calculated using the following equation:

$$i = A \times (B + T_c) C$$

Where:

- i = Rainfall intensity (mm/hr)
- T_c = Time of Concentration (minutes)
- A, B and C are IDF parameters

Table 4: Rainfall IDF Parameters

| Storm Return Interval (yr) | A | B | C |
|----------------------------|------|------|------|
| 1: 2 | 610 | 4.60 | 0.78 |
| 1: 5 | 820 | 4.60 | 0.78 |
| 1: 10 | 1010 | 4.60 | 0.78 |
| 1: 25 | 1160 | 4.60 | 0.78 |
| 1: 50 | 1300 | 4.70 | 0.78 |
| 1: 100 | 1450 | 4.90 | 0.78 |

5.2.1 Analysis Methodology

Visual OTTHYMO v6 (VO) was used to calculate the predevelopment storm flow calculations and to determine the post development required storm detention volumes based on the required release rate. Visual OTTHYMO is a successful hydrologic management model that has been used for projects including Watershed Studies, Sub-watershed Studies, Master Drainage Plans, Functional Stormwater Management Plans, Site Plans, and Stormwater Management Pond Design. VO has been accepted by the Ministry of Environment, the Ministry of Natural Resources, the Ministry of Transportation, the Ministry of Municipal Affairs, the Association of Conservation Authorities of Ontario, and most municipal governments, as a valid hydrologic simulation model.

For drainage areas with significant imperviousness such as the allocated area, the “Standhyd” method is used to determine the effective rainfall in Otthymo. This method is used in urban watersheds to simulate runoff by calculating the effective rainfall over the pervious and impervious areas and then adding the resulting unit hydrographs. **Table 5** below summarized the allowable catchment characteristics refer to **EXP Drawing C300 and C400 within Appendix B**.

Table 5: Predevelopment Catchment Parameter

| Area ID | Ottymo Hydrograph No. | Area (ha) | Hydrograph Method | % Impervious | Imperviousness Directly Connected % | Loss Method for Pervious Area | CN for Pervious Area | Time to Peak (T _p) hr |
|------------------------|-----------------------|-----------|-------------------|--------------|-------------------------------------|-------------------------------|----------------------|-----------------------------------|
| Area 101 | 1 | 0.345 | STANHYD | 67 | 67 | SCS | 80 | - |
| Total Site | | 0.345 | | | | | | |
| Area 102 (To ROW W) | 2 | 0.061 | NasHyd | | | SCS | 80 | - |
| Area 103 (To ROW S) | 6 | 0.042 | STANHYD | 1 | 1 | SCS | 80 | - |

Table 6: Predevelopment Release Rate below presents a summary of the pre-development peak flows for all storm 100mm model output provided in Appendix D. The predevelopment release rate below includes Area 101.

Table 6: Predevelopment Release Rate

| Storm Event (yr) | Peak Flow (cms) | Peak Flow (l/s) |
|------------------|-----------------|-----------------|
| 2 Year | 0.057 | 57.0 |
| 5 Year | 0.076 | 76.0 |
| 10 Year | 0.101 | 101.0 |
| 25 Year | 0.120 | 120.0 |
| 50 Year | 0.138 | 138.0 |
| 100 Year | 0.156 | 156.0 |

5.3 Allowable Release Rate

The existing private on site 250mm diameter STM located north of the proposed restaurant has been designed to accommodate the stormwater flow from the subject site at a run-off co-efficient of 0.83.

Existing Contributing Drainage Area = 0.345 (Area 101)

% Imperviousness (Area 101) = 0.67

Proposed Contributing Drainage Area = 0.389 ha (Area 201)

Proposed Contributing Drainage Area (Uncontrolled to W) = 0.019 ha (Area 202)

Proposed Contributing Drainage Area (Uncontrolled to E) = 0.040 ha (Area 203)

% Imperviousness (Area 201) = 0.82

% Imperviousness (Area 202) = 0.00

% Imperviousness (Area 203) = 0.06

Due to grading modifications, a portion of the site that was previously landscaped and drained uncontrolled to the streets will now be captured by proposed storm structures within the proposed development. However, as shown in the storm calculations included in **Appendix E**, the overall flow from the subject site can be accommodated by the proposed and existing storm systems.

The following **Table 7**: Post Development Catchment Characteristic summarises the parameters used in Visual Otthymo to model the post-development catchments. Note that Area 201 is controlled by an inlet control device has been modeled as one catchment for modelling purposes. Storm catchments for the proposed development and the existing condition are shown in **C400** in Appendix B. The Post Development Visual Otthymo Model Schematic is included in Appendix D. Note that due to increase in drainage captured area, the total area under the post development scenario is 0.038 ha larger than the predevelopment area. However, the allowable flow rate will be controlled to Pre-Development levels.

Table 7: Post Development Catchment Characteristic

| Area ID | Otthymo Hydrograph No. | Area (ha) | Hydrograph Method | % Impervious | Imperviousness Directly Connected % | Loss Method for Pervious Area | CN for Pervious Area | Time to Peak (T _p) hr |
|------------------------------|------------------------|--------------|-------------------|--------------|-------------------------------------|-------------------------------|----------------------|-----------------------------------|
| Area 201 & 202 | 1 | 0.088 | STANHYD | 0.97 | 0.97 | SCS | 80 | - |
| Area 205 | 4 | 0.046 | STANHYD | 0.99 | 0.99 | SCS | 99 | - |
| CONTROLLED TOTAL SITE | | 0.134 | | | | | | |
| Area 203 (Uncontrolled) | 12 | 0.069 | STANDHYD | 0.75 | 0.75 | SCS | 80 | |
| TOTAL SITE | | 0.203 | | | | | | |
| Area 204 & 206 (To ROW) | 9 | 0.048 | STANDHYD | 0.27 | 0.27 | SCS | 80 | |

The comparison between the pre-development release rate and post development release rates can be found in **Table 8**: Pre & Post Development Peak Flow. As shown, there is a negligible increase for the 2-year, 5-year, and 10-year storm events, but the remainder of the proposed storm flows are less than the pre-development flows.

Table 8: Pre & Post Development Peak Flow

| Storm Event (yr) | Pre-Dev. Peak Flow (cms) | Post-Dev. Peak Flow (cms) |
|------------------|--------------------------|---------------------------|
| 2 | 0.032 | 0.036 |
| 5 | 0.044 | 0.050 |
| 10 | 0.052 | 0.056 |
| 25 | 0.062 | 0.061 |
| 50 | 0.069 | 0.064 |
| 100 | 0.077 | 0.067 |
| 25mm 4hr | 0.020 | 0.023 |

While developing the proposed development, the stormwater system of the site will be upgraded, providing better stormwater management. The existing site does not have any inlet control device. The site has uncontrolled flow captured of 77.0 L/s (Area 101A & 101B) and uncontrolled flow to ROW of 13.0 L/s (Area 102 & 103) at 100-year. However, the proposed site will enhance the system by reducing the flow rates, having 67.0 L/s (Area 201, 202 & 205 with a 75mm orifice tube and Area 203) , from the site and uncontrolled 11.0 /s (Area 204 & 206) to ROW.

Although the proposed development will be primarily hard surface with an addition of controlled area, since the area is mostly hard surface in its current state, there will be a slight increase in storm runoff generated by the site. The uncontrolled area will be reduced from 0.085 ha to 0.051 ha, meaning that there will be more controlled area. By having a 75mm diameter orifice tube, there will be no negative impacts on the overall stormwater management systems. The existing drainage patterns at 1984 Baseline Road will be improved to self-contain the site. Furthermore, no additional flows will be directed to the existing municipal storm sewer systems beyond what they currently receive from the subject area.

For a detailed breakdown of the pre- and post-development run-off coefficient and storage, see calculations in **Appendix E**, as well as **Novatech Drawing 101075 – GP – General Plan of Services** within **Appendix B** for the downstream storm systems.

5.3.1 Post Development Storage Requirements

The following **Table 9: Storage Requirement Summary – Sewer and Surface** is a summary of the volume requirements for the minor and major storm events for the sewer system and surface storage. As shown, the volume provided exceeds the storage required. Please refer to Appendix E for Calculations and the Visual Otthymo output file in Appendix D for more information.

Table 9: Storage Requirement Summary – Sewer and Surface

| Storm Event | Storage Volume Provided (m ³) | Storage Volume Required (m ³) | Water Elevation (m) | Ponding Depth (m) |
|-------------|---|---|---------------------|-------------------|
| 2 yr | 25.32 | 7 | 85.98 | 0.00 |
| 5 yr | | 9 | 86.35 | 0.00 |
| 10 yr | | 11 | 86.41 | 0.06 |
| 25 yr | | 16 | 86.45 | 0.10 |
| 50 yr | | 1 | 86.47 | 0.12 |
| 100 yr | | 22 | 86.48 | 0.13 |
| 25mm 4hr | | 4 | 86.39 | 0.04 |

5.4 Stormwater Quantity Management

The existing system does not have any inlet control device nor control measure for quantity management. We are proposing new infrastructure to improve and control the post-development flows to avoid any negative impact.

Stormwater quantity will be controlled through the proposed ICD located at the downstream end of the private sewer system within the subject site before it releases to the private existing system. This approach ensures that post-development flows from the site that did not have any inlet control device are managed effectively and controlled to the acceptable allowable release rate for this commercial development.

5.5 Stormwater Quality Management

The stormwater quality control for the development will adhere to City of Mississauga’s stormwater management criteria:

- *Quality Control – Suspended Solids:*
 - a) *Provide enhanced level of protection for suspended soils removal through train treatment*
 - b) *Demonstrate ISO 14034 Environmental Technology Verification (ETV) protocol for sizing OGS units.*

This target will be achieved through the proposed stormwater management system. An oil grit separator, EFO4, will be installed for quality treatment to ensure compliance with the City of Mississauga’s standards.

The existing condition does not have any quality treatment unit. By having an EFO4 in the proposed development, the site will provide better and effective control, ensuring that the stormwater management system meets all required standards. The Area 201, 202, and 205 will be treated with the treatment unit. Since Area 203 will not be controlled as the current state, the area will be untreated. However, having the treatment unit will improve the stormwater quality management compared to the existing condition.

5.6 Storm Conveyance

Storm drainage for the subject site will be collected by a series catch basins, roof drains and catch basin manhole. Storm flows are then conveyed via the proposed storm sewer system to the existing private onsite storm sewer system.

The existing sewer connection is located at the south of the existing commercial building. The proposed grading will improve the existing drainage patterns to self-contain the site. As shown in the site grading and site servicing drawings located in **Appendix B** this site has been designed to integrate both minor and major storm systems. The overall site grading ensures that the existing drainage pattern on adjacent properties has not been altered and stormwater runoff from the subject development has been self-contained.

5.6.1 Minor System: Storm Sewer

The site has been graded to contain the stormwater from the site, and to direct it through a series of catch basins located throughout the site and roof water leaders on the building. These catch basins and roof drains flow into an underground storm sewer system (minor system). The underground storm sewer has been designed to accommodate the 5-year peak storm event based City of Mississauga's Intensity Duration Frequency (IDF) curve with Time of Concentration of (Tc) 10 minutes, using Rational Method. Storm sewer sizing and gradients will maintain a minimum velocity of 0.9 m/sec and maximum 3.0 m/sec. The detailed design of the minor system is provided in **Appendix E**.

5.6.2 Major System: Overland Flow

In the event of a major storm, defined as storms 100-year post-development peak flow rate leaving the site area to the 100-year pre-development peak flow rate, the outlet control provided in the system in the form of an Inlet Control Device will utilize the available storm sewer infrastructure by allowing the system to back up, thus providing the required storage. Outlet controls in the sewer system are designed to restrict the post-development flows exiting from the system to the 100-year predevelopment allowable release rate. Thus, effectively restricting the flows by detaining the water in the system to release it at an allowable release rate. This will ensure that it will not have any impact on downstream overland flow capacity, and the municipal sewers. The controlled release rates of stormwater are directed to a Stormceptor to ensure that runoff from the site is treated to the City of Mississauga water quality requirements before it is released from the site.

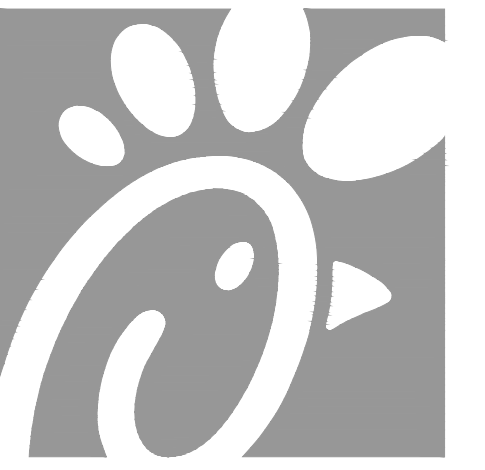
In events larger than the 100-year return storm, the site has been graded to include an overland flow route. This route allows the stormwater to overtop the local highpoints and flow overland and off-site existing commercial development, consistent with the existing overland flow route. The existing overland discharge point is towards Baseline Road. The major overland flow routes are shown on **EXP Drawing C300** and **C400** in **Appendix B**.

6 Conclusion

Implementation of the design outlined in this report will ensure that the site can be serviced and complies with the requirements of the reviewing authorities and is of acceptable quality both during and after construction. In summary:

- Type of development: Commercial Development
- The total development area is 0.250 ha.
- The site will discharge sanitary flows to the existing SAN MH situated south of the proposed restaurant. The proposed Wet Weather Sanitary Flow is 0.21 L/s.
- The proposed sanitary connection is 150mm diameter with slope of 2.0%.
- The average water daily demand is 0.18 L/s
- The maximum water daily demand: 0.27 L/s
- The maximum hourly daily demand: 0.32 L/s
- The required fire flow demand using the FUS Method is 100 L/s
- The combined flow of all four contributing fire hydrants is 158.3 L/s, which exceeds the required fire flow of 6,000 L/min (100 L/s).
- The total water demand for the site is estimated as the maximum day water demand plus fire, resulting in a total demand of approximately Maximum Daily Demand + Fire Flow= (0.27 l/s + 100 l/s) = 100.27 L/s.
- A 75mm orifice tube will be placed for quantity control, and the flow will be discharging to the private on-site storm sewers, while improving existing conditions.
- An EFO4 will be placed for quality treatment.

Appendix A
Site Plan

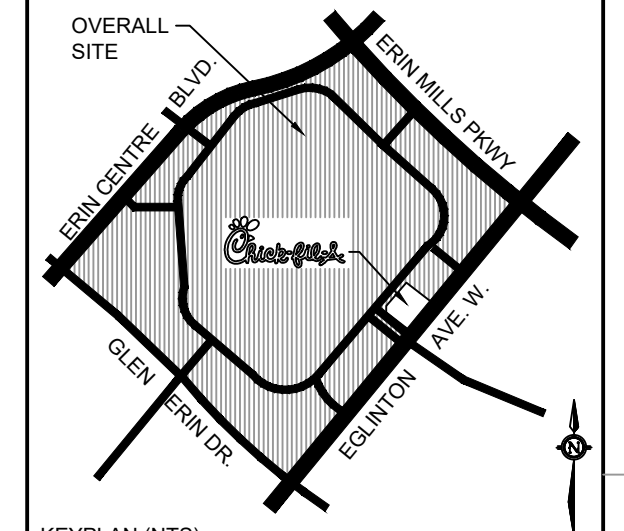


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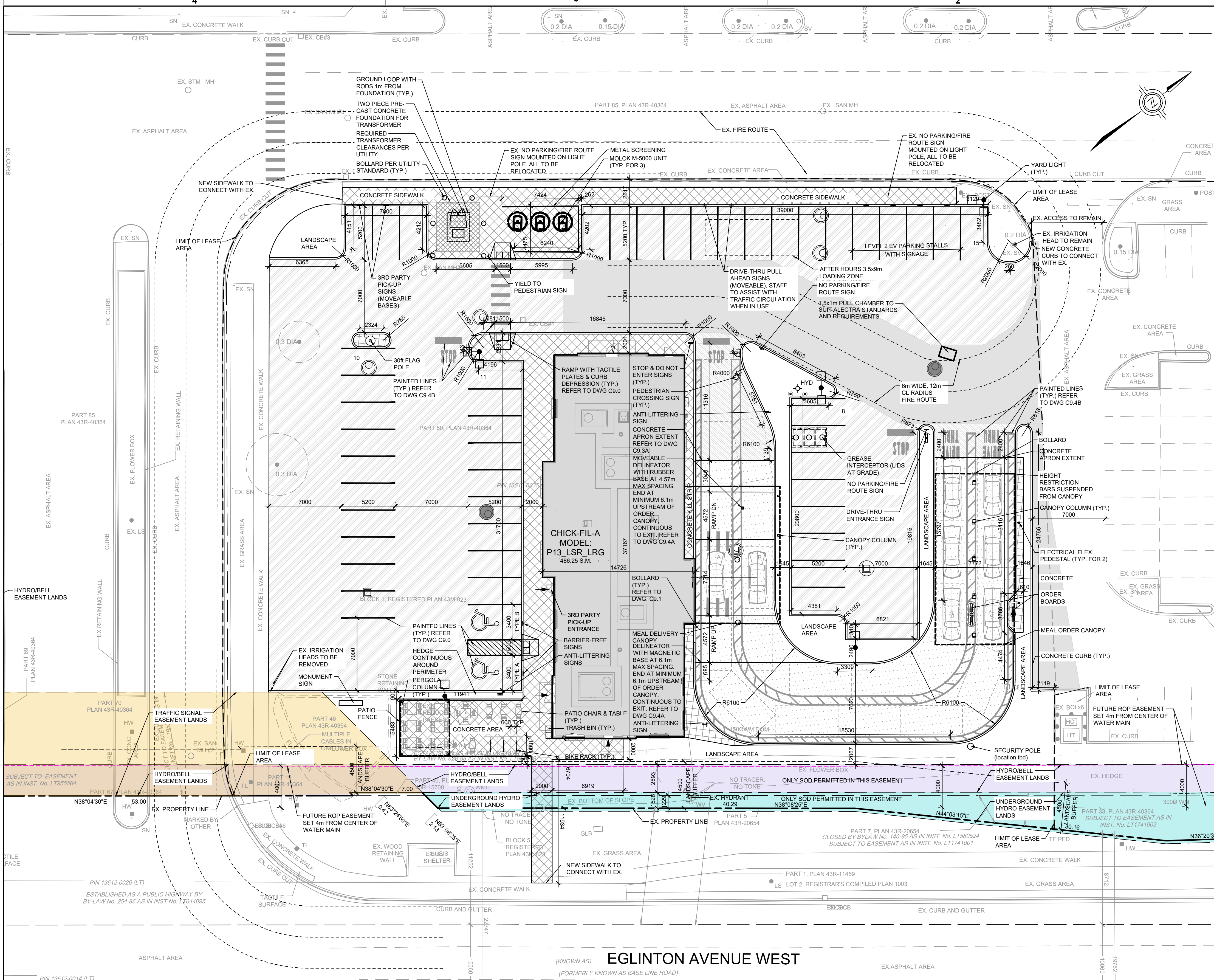
KEYPLAN (NTS)
 PART 80 PART 5 PLAN 43R-15700
 CITY OF MISSISSAUGA
 REGIONAL MUNICIPALITY OF PEEL

| ITEM | QUANTITY |
|--------------------------------|----------|
| PATIO SEATS | 36 |
| DRIVE-THRU VEHICLES @ 3.0x6.0m | 17 |
| ENTRANCE TO PICK-UP POINT | 5 |
| PICK-UP POINT TO EXIT | 13 |
| ORDER POINT TO PICK-UP POINT | 22 |
| TOTAL STACK | 22 |
| TOTAL CHICK-FIL-A PARKING | 47 |

| DEVELOPMENT STATISTICS | | |
|--|---|--|
| SITE IS DESIGNATED MIXED USE AND LOCATED WITHIN THE CENTRAL ERIN MILLS MAJOR NODE. THE SITE IS ZONED GENERAL COMMERCIAL C3 | | |
| BUILDING TENURE: <21 YEARS | | |
| WIDTH OF LOT AT STREET LINE: ~640m | | |
| EXISTING CONDITION | REQUIREMENT ZONING BY-LAW | PROPOSED |
| EXISTING LOT AREA | | 486.25m ² |
| CFI GFA | | 0.1 |
| FSI | | 0.1 |
| MIN. FRONT YARD SETBACK | 4.5m | 6.70m |
| MIN. EXTERIOR SIDE YARD SETBACK | 4.5m | EXCEEDS 4.5m |
| MIN. INTERIOR SIDE YARD SETBACK | 4.5m | EXCEEDS 4.5m |
| MIN. REAR YARD SETBACK | 4.5m | EXCEEDS 4.5m |
| MAX. BUILDING HEIGHT - FLAT ROOF | 16.5m & 4 STOREYS | 6.4m & 1 STOREY |
| MIN. DEPTH OF LANDSCAPE BUFFER MEASURED FROM A LOT LINE THAT IS A STREET | 4.5m | 4.5m |
| SETBACK FROM MAIN ENTRANCE | LAST STACKED VEHICLE SPACE SHOULD BE 16.0m MIN. FROM THE DRIVEWAY MIDPOINT | ~29m |
| RESTAURANT STACKING | MIN. 3m WIDTH ABUTTING PARKING 1.2m LANDSCAPE BUFFER REQUIRED. MIN. 10 STACKING | STACKING 3.0x6.0m PARKING 22 TOTAL STACK |
| PAVED AREA (CONCRETE & ASPHALT AREAS) | 7.0m MIN. | 3,444.3m ² |

REFER TO DWG. A101 FOR ADDITIONAL STATISTICS

| LEGEND | |
|--------|--|
| AN | EX. ANCHOR |
| BOL | EX. BOLLARD |
| CB | EX. CONC. CURB |
| CJB | EX. CONC. CURB |
| GLB | EX. CONCRETE BOLLARD |
| HP | EX. HYDRO PUMP |
| HR | EX. HAND RAIL |
| HT | EX. HYDRO TRANSFORMER |
| HW | EX. HAND WELL |
| HW | EX. MANHOLE |
| OH | EX. OVERHANG |
| SN | EX. SIGN |
| SCB | EX. SIDE INLET CATCH BASIN |
| SV | EX. WATER SPRINKLER VALVE |
| TC | EX. TELEPHONE CHAMBER |
| TE PED | EX. TELEPHONE PEDESTAL |
| TJ | EX. TELEPHONE JUNCTION BOX |
| TL | EX. TELEPHONE JUNCTION BOX |
| TOS | EX. TOP OF SLOPE |
| WV | EX. WATER VALVE |
| --- | PROPERTY LINE |
| --- | EX. CONC. CURB |
| --- | EX. OVERHEAD HYDRO |
| --- | TRAFFIC SIGNAL EASEMENT LANDS L1955506 |
| --- | UNDERGROUND HYDRO EASEMENT LANDS L17141001 |
| --- | HYDROBELL EASEMENT LANDS L1955564 |
| --- | NEW CONC. CURB |
| --- | NEW CURB CUT/DEPRESSED CURB |
| --- | PUBLIC ACCESS ENTRANCE |
| --- | EMPLOYEE ACCESS POINTS |
| --- | NEW HYDRANT |
| --- | NEW YARD LIGHT |
| --- | HIGH ALBEDO COATED LIGHT DUTY ASPHALT |
| --- | LIGHT DUTY ASPHALT |
| --- | HEAVY DUTY CONCRETE |
| --- | LIGHT DUTY CONCRETE |
| --- | HEAVY DUTY ASPHALT |
| --- | STEEL BOLLARD (SEE DWG. C9.1 & C9.4B) |
| --- | MAGNETIC BOLLARD (SEE DWG. C9.4A&B) |
| --- | RUBBER BASE BOLLARD (SEE DWG. C9.4A&B) |
| --- | FUTURE LIMIT OF ROP WATER MAIN EASEMENT |



(A) PARTIAL SITE PLAN
 SCALE 1:200

- GENERAL NOTES:**
- DO NOT SCALE DRAWINGS
 - ALL ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
 - ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS NOTED OTHERWISE.
 - DRAWING PRODUCED FROM SURVEY BY J.D. BARNES LTD. DRAWING 25-12-117-00 DATED 2026-05-04.
 - ALL DIMENSIONS MUST BE VERIFIED BY THE GC PRIOR TO CONSTRUCTION. ANY DISCREPANCIES MUST BE BROUGHT TO THE ATTENTION OF CHICK-FIL-A'S REPRESENTATIVE.
 - ALL WORK IS TO BE COMPLETED AS PER PROVINCIAL AND LOCAL REGULATIONS.
 - DRAWINGS ARE TO BE USED IN CONJUNCTION WITH SPECIFICATIONS.
 - EVERYTHING TO BE CONSIDERED NEW UNLESS NOTED OTHERWISE.
 - MAKE GOOD ALL AREAS DISTURBED DURING CONSTRUCTION.
 - GC IS RESPONSIBLE FOR ALL LOCATES BEFORE CONSTRUCTION START.

- CITY NOTES:**
- THE FIRE ACCESS ROUTE WILL BE DESIGNED TO SUPPORT THE LOADS IMPOSED BY FIREFIGHTING EQUIPMENT.
 - THE FIRE ACCESS ROUTE WILL HAVE A CHANGE IN GRADIENT NOT MORE THAN 1 IN 12.5 OVER A MINIMUM DISTANCE OF 15m.

- CITY OF MISSISSAUGA ACCESSIBLE PARKING SIGN PER BY-LAW 10-2016 TO BE INSTALLED. REFER TO DRAWING C9.3A FOR DETAILS.
 - IF THE FINAL COURSE OF ASPHALT PAVING IS DELAYED, INSTALL A TEMPORARY LIFT OF ASPHALT AT RAMPS OR CURB CUTS TO PROVIDE BARRIER-FREE ACCESS.
 - ANTI-LITTERING SIGNS TO BE INSTALLED.
- CITY GENERAL NOTES:**
- I HEREBY CERTIFY THAT THIS DRAWING CONFIRMS IN ALL RESPECTS TO THE SITE DEVELOPMENT PLANS ARCHITECT OR ENGINEER'S SIGNATURE (IF APPLICABLE) AND PROFESSIONAL SEAL.
 - THE CITY OF MISSISSAUGA REQUIRES THAT ALL WORKING DRAWINGS SUBMITTED TO THE BUILDING DIVISION AS PART OF AN APPLICATION FOR THE ISSUANCE OF A BUILDING PERMIT SHALL BE CERTIFIED BY THE ARCHITECT OR ENGINEER AS BEING IN CONFORMITY WITH THE SITE DEVELOPMENT PLAN AS APPROVED BY THE CITY OF MISSISSAUGA.
 - ALL EXTERIOR LIGHTING WILL BE DIRECTED ONTO THE SITE AND WILL NOT INFRINGE UPON THE ADJACENT PROPERTIES.
 - ALL ROOFTOP MECHANICAL UNITS SHALL BE SCREENED FROM VIEW BY THE APPLICANT.
 - PARKING SPACES RESERVED FOR PEOPLE WITH DISABILITIES MUST BE IDENTIFIED BY A SIGN, INSTALLED AT THE APPLICANT'S EXPENSE, IN ACCORDANCE WITH THE BY-LAW REQUIREMENTS AND BUILDING CODE REQUIREMENTS.
 - THE APPLICANT WILL BE RESPONSIBLE FOR ENSURING THAT ALL PLANS CONFIRM TO TRANSPORT CANADA'S RESTRICTIONS.

- CANADA'S RESTRICTIONS.
- GRADES WILL BE MET WITH A 33% MAXIMUM SLOPE AT THE PROPERTY LINES AND WITHIN THE SITE.
- ALL DAMAGED AREAS ARE TO BE REINSTATED WITH TOPSOIL AND SOD PRIOR TO THE RELEASE OF SECURITIES.
- SIGNAGE SHOWN ON THE SITE DEVELOPMENT PLANS IS FOR INFORMATION PURPOSES ONLY. ALL SIGNS WILL BE SUBJECT TO THE PROVISIONS OF SIGN BY-LAW 0054-2002, AS AMENDED, AND A SEPARATE SIGN APPLICATION WILL BE REQUIRED THROUGH THE BUILDING DIVISION.
- ANY FENCING ADJACENT TO MUNICIPAL LANDS IS TO BE LOCATED 15 CM (6.0 IN.) INSIDE THE PROPERTY LINE.
- ONLY "SHIELDED" LIGHTING FIXTURES ARE PERMITTED FOR ALL DEVELOPMENT, EXCEPT FOR DETACHED AND SEMI-DETACHED DWELLINGS WITHIN 60 M (196.8 FT.) OF A RESIDENTIALLY ZONED PROPERTY AND MUST CONFIRM TO THE ENGINEER CERTIFIED LIGHTING PLAN.
- THE ENGINEER CERTIFIED LIGHTING PLAN MUST BE SIGNED BY THE CONSULTING ENGINEER.
- THE OWNER COVENANTS AND AGREES TO CONSTRUCT AND INSTALL "SHIELDED" LIGHTING FIXTURES ON THE SUBJECT LANDS, IN CONFORMITY WITH THE SITE PLAN AND ENGINEER CERTIFIED LIGHTING PLAN TO THE SATISFACTION OF THE CITY OF MISSISSAUGA.
- THE APPLICANT WILL BE RESPONSIBLE FOR ENSURING THAT ALL PLANS CONFIRM TO TRANSPORT CANADA'S RESTRICTIONS.
- THE STRUCTURAL DESIGN OF ANY RETAINING WALL OVER 0.6 M IN HEIGHT OR ANY RETAINING

- WALL LOCATED ON A PROPERTY LINE IS TO BE SHOWN ON THE SITE GRADING PLAN FOR THIS PROJECT AND IS TO BE APPROVED BY THE CONSULTING ENGINEER FOR THE PROJECT.
- CONTINUOUS 15 CM HIGH BARRIER TYPE POURED CONCRETE CURBING WILL BE PROVIDED BETWEEN ALL ASPHALT AND LANDSCAPED AREAS THROUGHOUT THE SITE.
- ALL UTILITY COMPANIES WILL BE NOTIFIED FOR LOCATES PRIOR TO THE INSTALLATION OF THE HOARDINGS THAT LIES WITHIN THE SITE AND WITHIN THE LIMITED OF THE CITY BOULEVARD AREA.
- ALL EXCESS EXCAVATED MATERIALS WILL BE REMOVED FROM THE SITE.
- THE APPLICANT WILL BE RESPONSIBLE FOR THE COST OF ANY UTILITIES RELOCATIONS NECESSITATED BY THE SITE PLAN.
- SHOULD THE INSTALLATION OF BELOW GROUND SERVICES REQUIRE HOARDING TO BE REMOVED, PLANNING AND BUILDING STAFF ARE TO BE CONTACTED PRIOR TO THE COMMENCEMENT OF SUCH WORK. SHOULD AN ALTERNATIVE SERVICE ROUTE NOT BE POSSIBLE, STAFF WILL INSPECT AND DOCUMENT THE CONDITION OF THE VEGETATION AND SERVICING INSTALLATION IN ORDER TO MINIMIZE DAMAGE TO THE VEGETATION.

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 2 March 2026

CHICK-FIL-A
 ERIN MILLS TOWN
 5100 Erin Mills Parkway
 Mississauga, ON

FSR#30088

BUILDING TYPE / SIZE: IP02
 RELEASE: XXXXXXXX

REVISION SCHEDULE

| NO. | DATE | DESCRIPTION |
|-----|------------|-------------|
| J | 2025-10-23 | FOR REVIEW |
| K | 2026-03-02 | FOR ZBA/SPA |

CITY # : PAM-25-93 REGION # : Cxx
 CONSULTANT PROJECT # : BRM002302042-L10
 PROJECT STATUS : ZBA/SPA
 DATE : MAY 2025
 DRAWN BY : T.M.

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 SHEET
 SITE PLAN

SHEET NUMBER
A100

Appendix B
Engineering Drawings



Chick-fil-A

Chick-fil-A
5200 Buffington Road
Atlanta, Georgia 30349-2998

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Brampton, ON L7L 4V1
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www.exp.com

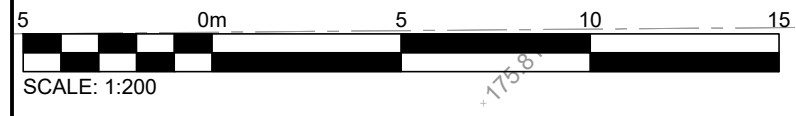
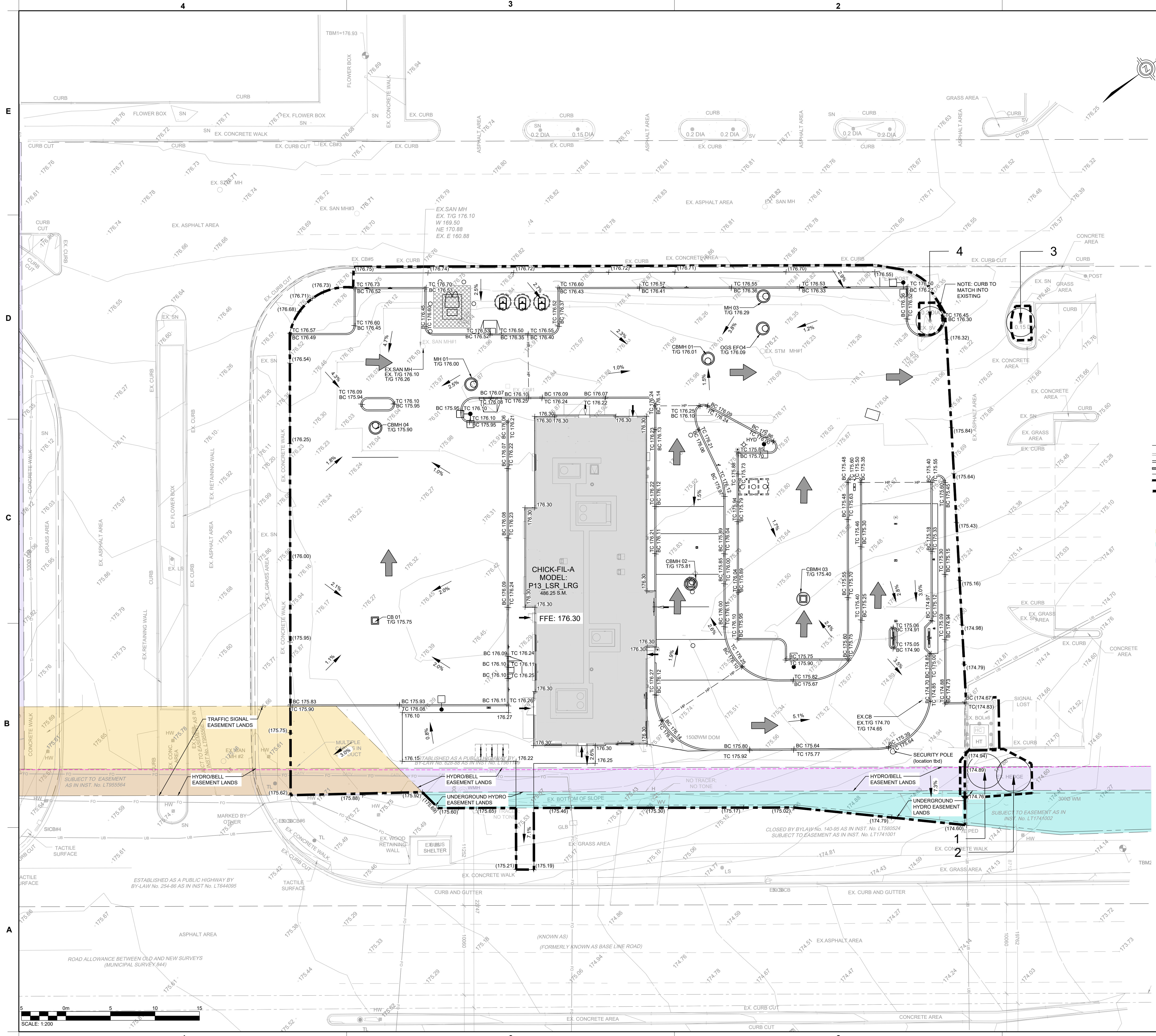


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- INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •



LEGEND:

- × TC 250.00 TOP OF CURB ELEVATION
- × BC 250.00 BOTTOM OF ELEVATION
- × 250.00 PROPOSED ELEVATION
- × 250.00 EXISTING ELEVATION
- × 250.00 PROPOSED ELEVATION
- × (250.00) PROPOSED ELEVATION (MATCH EX)
- PROPERTY LINE
- 2.0% SLOPE
- ▲ MAIN ENTRANCE
- ▲ SECONDARY ENTRANCE
- NEW STORM CB
- NEW STORM CBMH
- EX. STORM MH
- EX. SANITARY MH
- HP HIGH POINT
- EX. CONC. CURB
- NEW CONC. CURB
- NEW CURB CUT/DEPRESSED CURB
- PROP. SWALE
- PROP. LIMIT OF DEVELOPMENT
- TREE PROTECTION FENCE
- OVERLAND FLOW DIRECTION
- EXISTING TREES
- TRAFFIC SIGNAL EASEMENT LANDS LT95566
- UNDERGROUND HYDRO EASEMENT LANDS LT1741001
- HYDROBELL EASEMENT LANDS LT955664
- FUTURE LIMIT OF ROP WATER MAIN EASEMENT



CHICK-FIL-A CENTRE ERIN MILLS TOWN

5100 Erin Mills Parkway
Mississauga, ON

FSR#30088

BUILDING TYPE / SIZE: IP02
RELEASE: XXXXXXXX

REVISION SCHEDULE

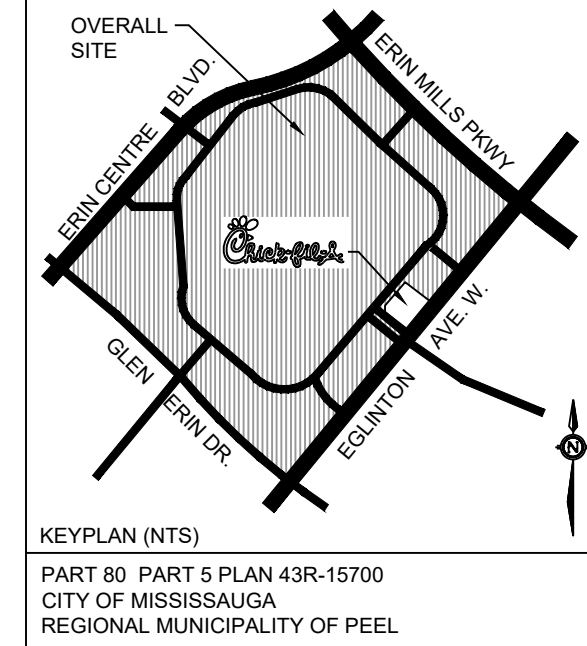
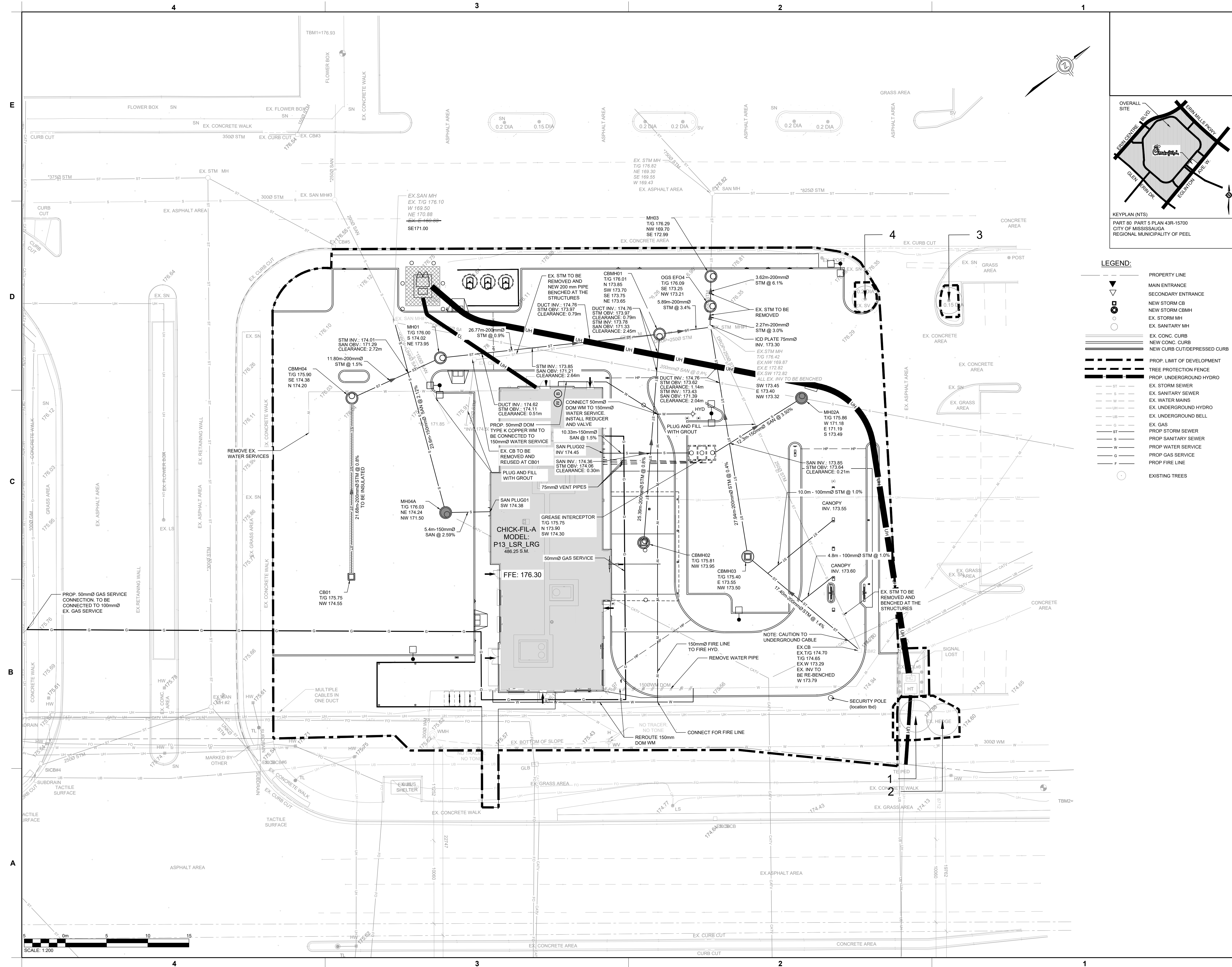
| NO. | DATE | DESCRIPTION |
|-----|------------|--------------------|
| A | 2025-06-06 | FOR REVIEW |
| B | 2025-01-07 | FOR REVIEW |
| C | 2026-03-02 | ZBA/SPA SUBMISSION |

CITY # PAM 25-63 REGION # Cxx
CONSULTANT PROJECT # BRM0023002042-U0
PROJECT STATUS ZBA/SPA
DATE MARCH 2026
DRAWN BY J.K.

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SHEET GRADING PLAN

SHEET NUMBER C100

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2 March 2026



LEGEND:

| | |
|---|-----------------------------|
| — | PROPERTY LINE |
| ▲ | MAIN ENTRANCE |
| ▼ | SECONDARY ENTRANCE |
| ○ | NEW STORM CB |
| ○ | NEW STORM CBMH |
| ○ | EX. STORM MH |
| ○ | EX. SANITARY MH |
| — | EX. CONC. CURB |
| — | NEW CONC. CURB |
| — | NEW CURB CUT/DEPRESSED CURB |
| — | PROP. LIMIT OF DEVELOPMENT |
| — | TREE PROTECTION FENCE |
| — | PROP. UNDERGROUND HYDRO |
| — | EX. STORM SEWER |
| — | EX. SANITARY SEWER |
| — | EX. WATER MAINS |
| — | EX. UNDERGROUND HYDRO |
| — | EX. UNDERGROUND BELL |
| — | EX. GAS |
| — | PROP. STORM SEWER |
| — | PROP. SANITARY SEWER |
| — | PROP. WATER SERVICE |
| — | PROP. GAS SERVICE |
| — | PROP. FIRE LINE |
| ○ | EXISTING TREES |



Chick-fil-A

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CHICK-FIL-A

ERIN MILLS TOWN CENTRE

5100 Erin Mills Parkway
 Mississauga, ON

FSR#30088

BUILDING TYPE / SIZE: IP02
 RELEASE: XXXXXXXXX

REVISION SCHEDULE

| NO. | DATE | DESCRIPTION |
|-----|------------|--------------------|
| A | 2025-06-06 | FOR REVIEW |
| B | 2025-01-07 | FOR REVIEW |
| C | 2026-03-02 | ZBA/SPA SUBMISSION |

PROJECT INFORMATION

| | | | |
|----------------------|------------------|----------|-----|
| CITY # | PAM 25-03 | REGION # | Cox |
| CONSULTANT PROJECT # | BRM0023002042-L0 | | |
| PROJECT STATUS | ZBA/SPA | | |
| DATE | MARCH 2026 | | |
| DRAWN BY | J.K. | | |

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SHEET
 SERVICING PLAN

SHEET NUMBER
C200

Issued for ZBA/SPA



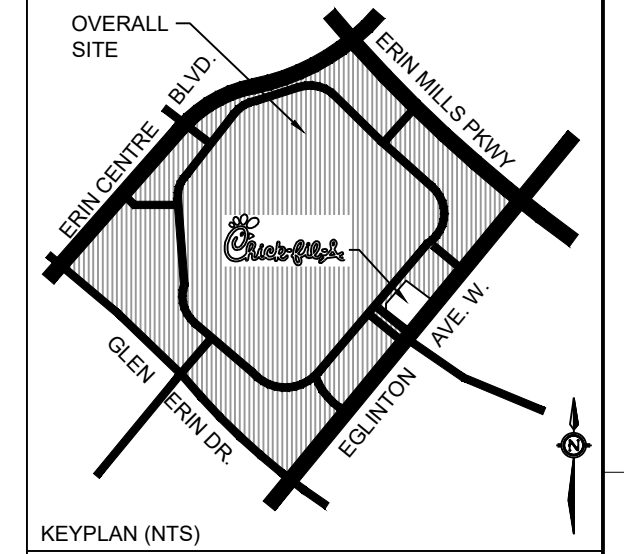
Chick-fil-A

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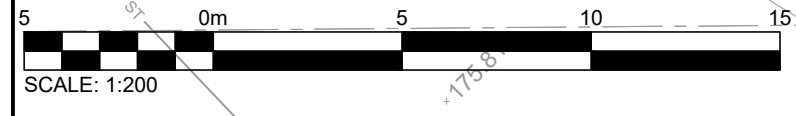
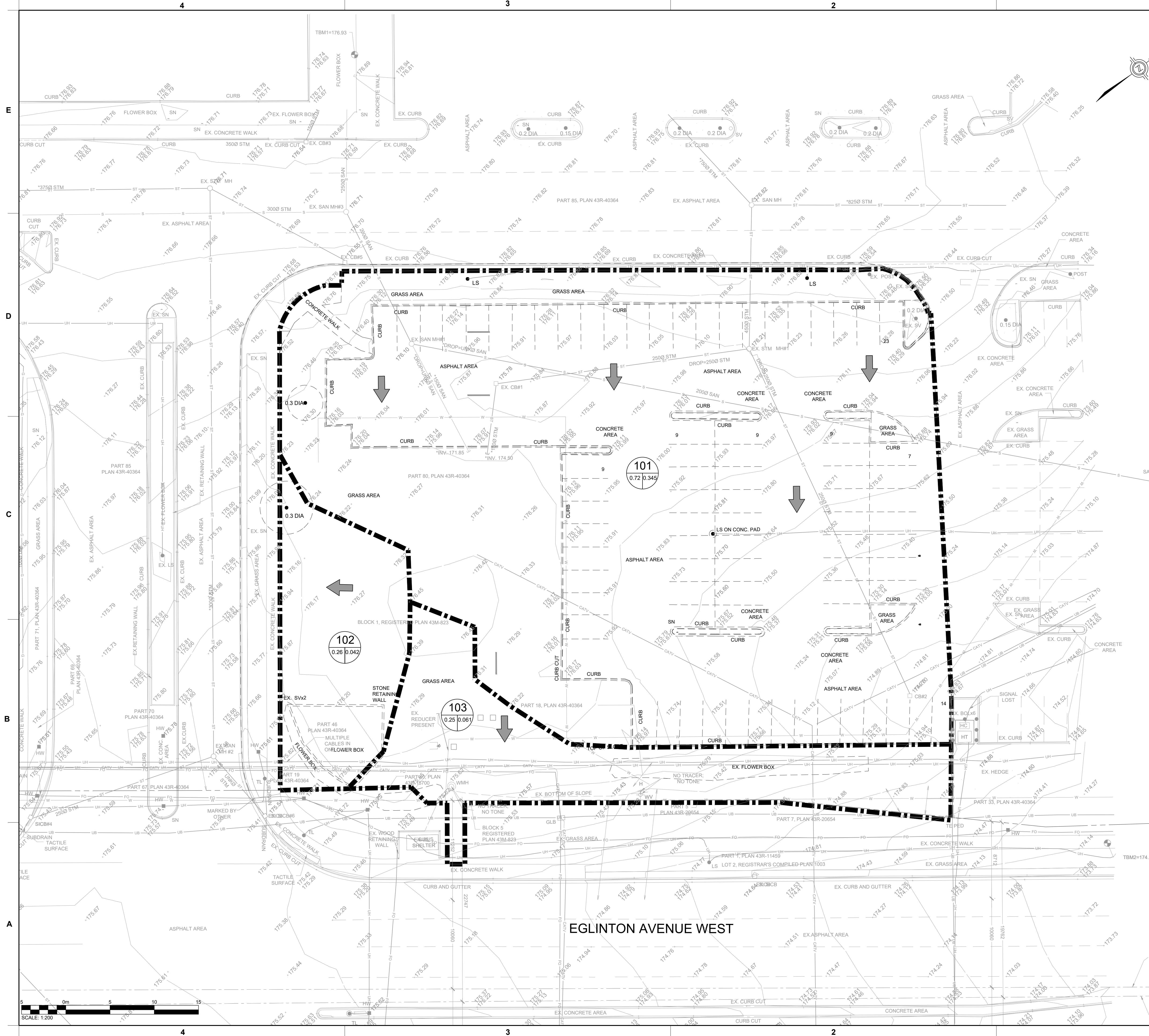


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- INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •



LEGEND:

- PROPERTY LINE
- - - EX. CONC. CURB
- /// CATCHMENT I.D.
- xx|xx RUN-OFF COEFFICIENT | AREA (ha)
- ← OVERLAND FLOW DIRECTION
- STORM SEWER CATCHMENT BOUNDARY
- ▲ MAIN ENTRANCE
- ▼ SECONDARY ENTRANCE
- NEW STORM CS
- NEW STORM CBMH
- EX. STORM MH
- EX. SANITARY MH
- EX. CONC. CURB
- NEW CONC. CURB
- NEW CURB CUT/DEPRESSED CURB
- PROP. LIMIT OF DEVELOPMENT
- TREE PROTECTION FENCE
- PROP. UNDERGROUND HYDRO
- EX. STORM SEWER
- EX. SANITARY SEWER
- EX. WATER MAINS
- EX. UNDERGROUND HYDRO
- EX. UNDERGROUND BELL
- EX. GAS
- PROP. STORM SEWER
- PROP. SANITARY SEWER
- PROP. WATER SERVICE
- PROP. GAS SERVICE
- PROP. FIRE LINE



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2 March 2026

CHICK-FIL-A

ERIN MILLS TOWN CENTRE

5100 Erin Mills Parkway
Mississauga, ON

FSR#30088

BUILDING TYPE / SIZE: IP02
RELEASE: XXXXXXXX

| REVISION SCHEDULE | | |
|-------------------|------------|--------------------|
| NO. | DATE | DESCRIPTION |
| A | 2025-06-06 | FOR REVIEW |
| B | 2025-01-07 | FOR REVIEW |
| C | 2026-03-02 | ZBA/SPA SUBMISSION |

| | | | |
|----------------------|------------------|----------|-----|
| CITY # | PAM 25-03 | REGION # | Cox |
| CONSULTANT PROJECT # | BRM0023002042-U0 | | |
| PROJECT STATUS | ZBA/SPA | | |
| DATE | MARCH 2026 | | |
| DRAWN BY | J.K. | | |

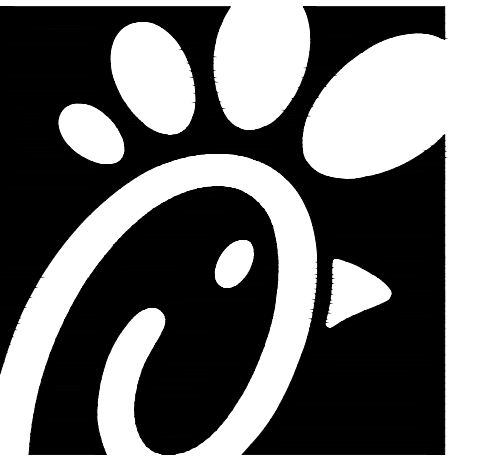
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SHEET
PREDEVELOPMENT
DRAINAGE PLAN

SHEET NUMBER

C300

Issued for ZBA/SPA



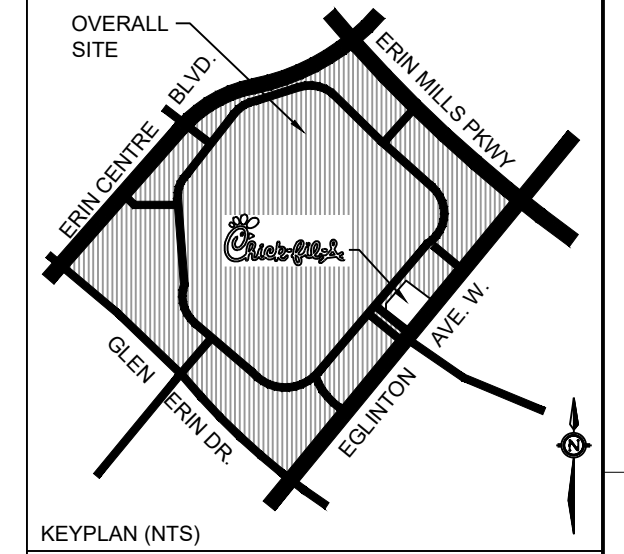
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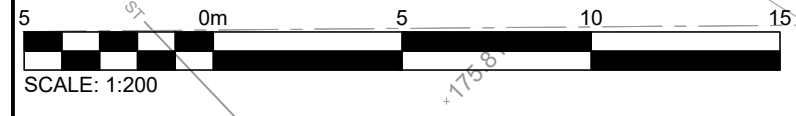
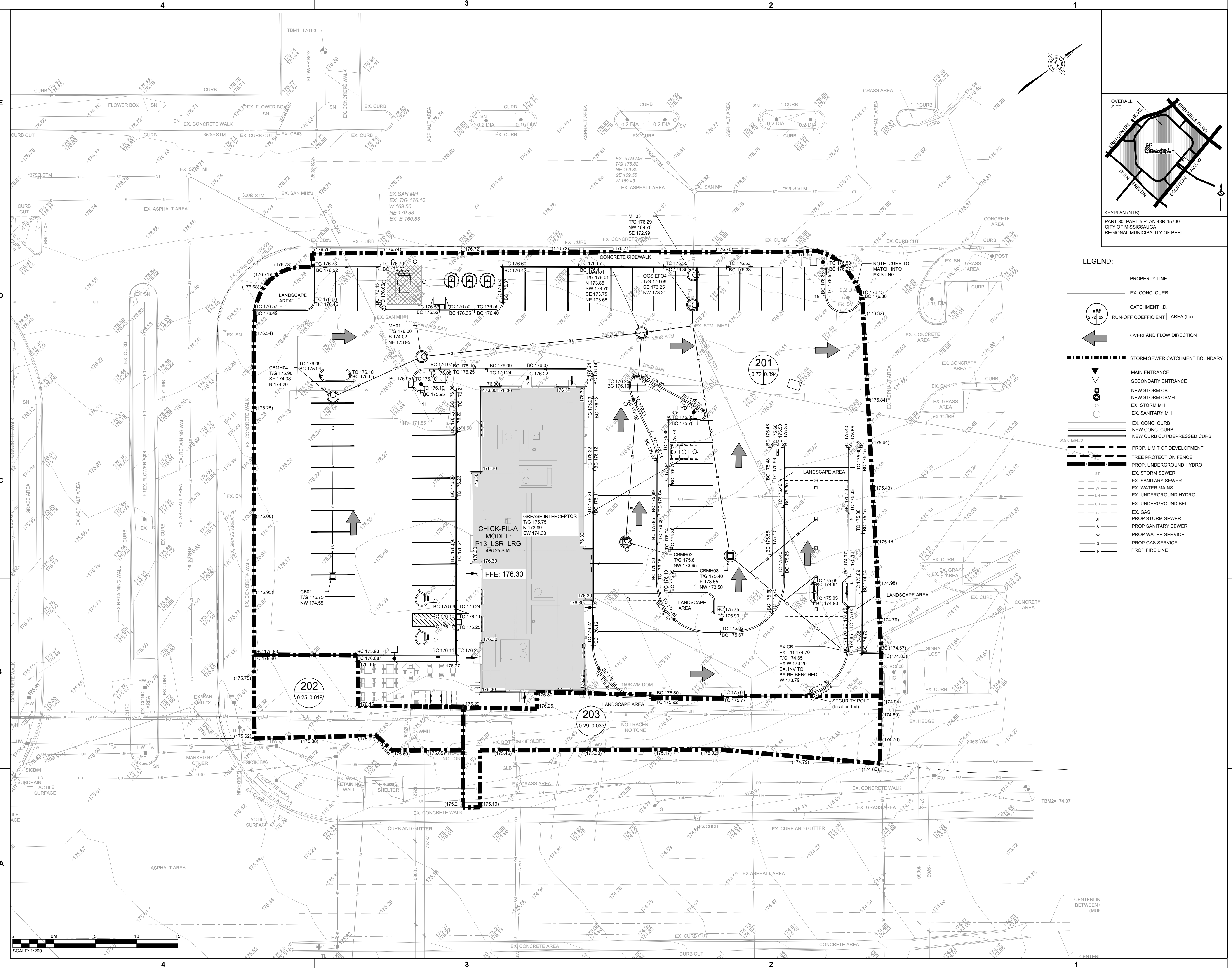
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- INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •



KEYPLAN (NTS)
PART 80 PART 5 PLAN 43R-15700
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

LEGEND:

- PROPERTY LINE
- EX. CONC. CURB
- CATCHMENT I.D.
- RUN-OFF COEFFICIENT | AREA (ha)
- OVERLAND FLOW DIRECTION
- STORM SEWER CATCHMENT BOUNDARY
- MAIN ENTRANCE
- SECONDARY ENTRANCE
- NEW STORM CB
- NEW STORM CBMH
- EX. STORM MH
- EX. SANITARY MH
- EX. CONC. CURB
- NEW CONC. CURB
- NEW CURB CUT/DEPRESSED CURB
- PROP. LIMIT OF DEVELOPMENT
- TREE PROTECTION FENCE
- PROP. UNDERGROUND HYDRO
- EX. STORM SEWER
- EX. SANITARY SEWER
- EX. WATER MAINS
- EX. UNDERGROUND HYDRO
- EX. UNDERGROUND BELL
- EX. GAS
- PROP. STORM SEWER
- PROP. SANITARY SEWER
- PROP. WATER SERVICE
- PROP. GAS SERVICE
- PROP. FIRE LINE



SCALE: 1:200

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27 February 2026

CHICK-FIL-A CENTRE ERIN MILLS TOWN

5100 Erin Mills Parkway
Mississauga, ON

FSR#30088

BUILDING TYPE / SIZE: IP02
RELEASE: XXXXXXXX

| REVISION SCHEDULE | | |
|-------------------|------------|--------------------|
| NO. | DATE | DESCRIPTION |
| A | 2025-06-06 | FOR REVIEW |
| B | 2025-01-07 | FOR REVIEW |
| C | 2026-03-02 | ZBA/SPA SUBMISSION |

| | | | |
|----------------------|-------------------|----------|-----|
| CITY # | PAM 25-03 | REGION # | Cox |
| CONSULTANT PROJECT # | BRM0023002042-LU0 | | |
| PROJECT STATUS | ZBA/SPA | | |
| DATE | MARCH 2026 | | |
| DRAWN BY | J.K. | | |

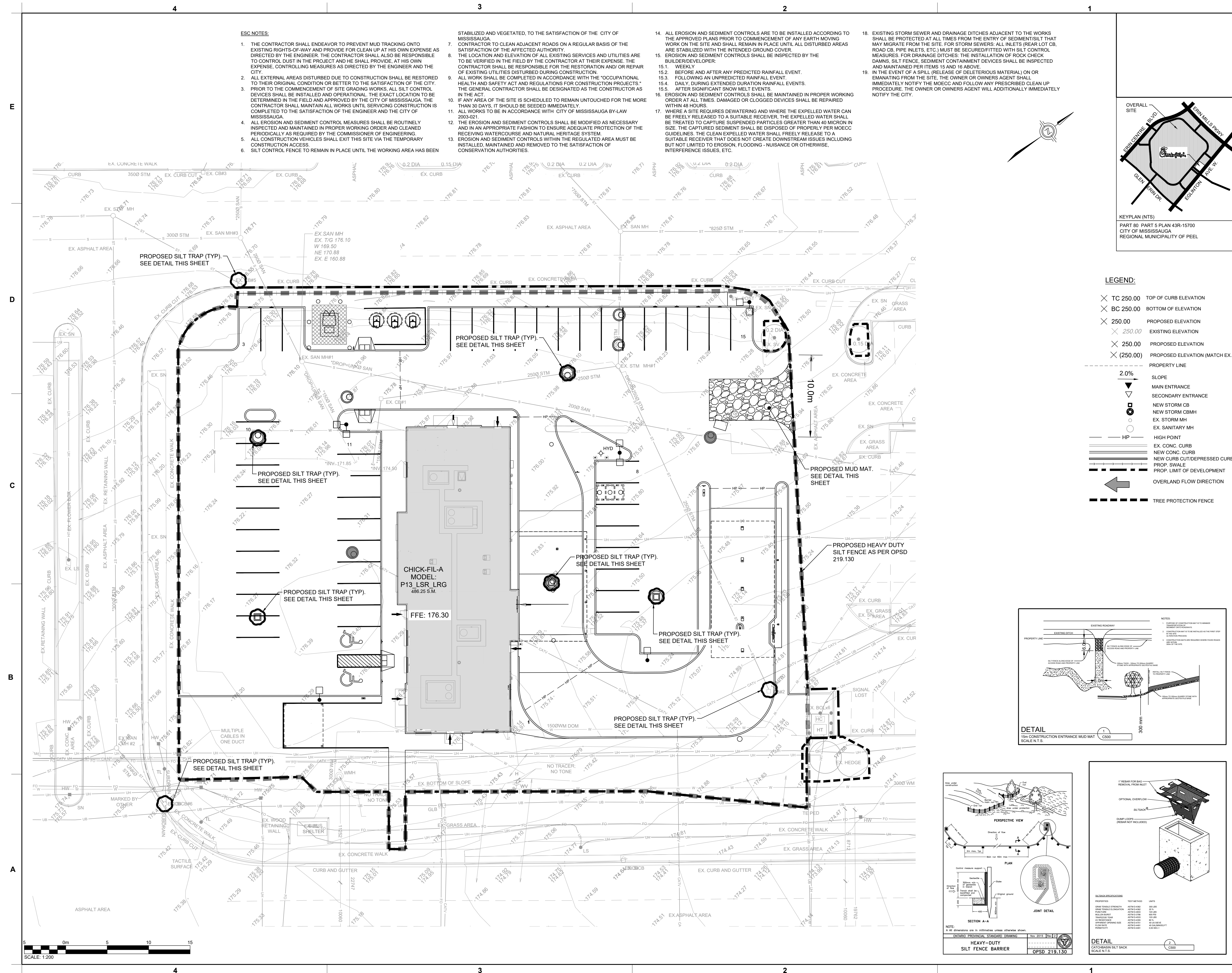
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SHEET
POST DEVELOPMENT
DRAINAGE PLAN

SHEET NUMBER

C400

Issued for ZBA/SPA



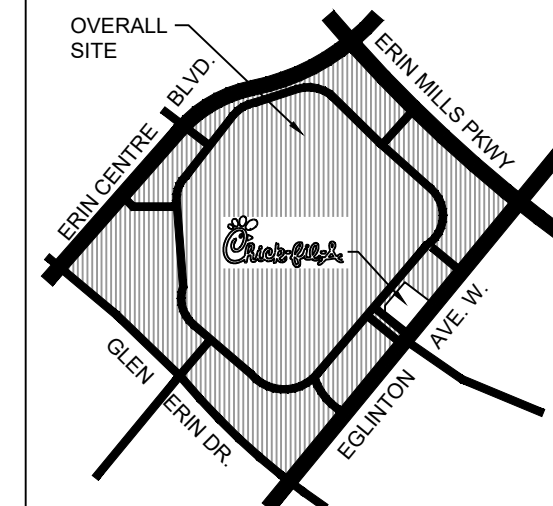
ESC NOTES:

1. THE CONTRACTOR SHALL ENDEAVOR TO PREVENT MUD TRACKING ONTO EXISTING RIGHTS-OF-WAY AND PROVIDE FOR CLEAN UP AT HIS OWN EXPENSE AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE TO CONTROL DUST IN THE PROJECT AND HE SHALL PROVIDE, AT HIS OWN EXPENSE, CONTROLLING MEASURES AS DIRECTED BY THE ENGINEER AND THE CITY.
2. ALL EXTERNAL AREAS DISTURBED DUE TO CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE CITY.
3. PRIOR TO THE COMMENCEMENT OF SITE GRADING WORKS, ALL SILT CONTROL DEVICES SHALL BE INSTALLED AND OPERATIONAL. THE EXACT LOCATION TO BE DETERMINED IN THE FIELD AND APPROVED BY THE CITY OF MISSISSAUGA. THE CONTRACTOR SHALL MAINTAIN ALL WORKS UNTIL SERVICING CONSTRUCTION IS COMPLETED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF MISSISSAUGA.
4. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ROUTINELY INSPECTED AND MAINTAINED IN PROPER WORKING ORDER AND CLEANED PERIODICALLY AS REQUIRED BY THE COMMISSIONER OF ENGINEERING.
5. ALL CONSTRUCTION VEHICLES SHALL EXIT THIS SITE VIA THE TEMPORARY CONSTRUCTION ACCESS.
6. SILT CONTROL FENCE TO REMAIN IN PLACE UNTIL THE WORKING AREA HAS BEEN

7. STABILIZED AND VEGETATED, TO THE SATISFACTION OF THE CITY OF MISSISSAUGA.
8. CONTRACTOR TO CLEAN ADJACENT ROADS ON A REGULAR BASIS OF THE SATISFACTION OF THE AFFECTED AUTHORITY.
9. THE LOCATION AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES ARE TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR AT THEIR EXPENSE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE RESTORATION AND/OR REPAIR OF EXISTING UTILITIES DISTURBED DURING CONSTRUCTION.
10. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS." THE GENERAL CONTRACTOR SHALL BE DESIGNATED AS THE CONSTRUCTOR AS IN THE ACT.
11. IF ANY AREA OF THE SITE IS SCHEDULED TO REMAIN UNTOUCHED FOR THE MORE THAN 30 DAYS, IT SHOULD BE SEEDED IMMEDIATELY.
12. ALL WORKS TO BE IN ACCORDANCE WITH CITY OF MISSISSAUGA-BY-LAW 2003-021.
13. THE EROSION AND SEDIMENT CONTROLS SHALL BE MODIFIED AS NECESSARY AND IN AN APPROPRIATE FASHION TO ENSURE ADEQUATE PROTECTION OF THE RECEIVING WATERCOURSE AND NATURAL HERITAGE SYSTEM.
14. EROSION AND SEDIMENT CONTROLS WITHIN THE REGULATED AREA MUST BE INSTALLED, MAINTAINED AND REMOVED TO THE SATISFACTION OF CONSERVATION AUTHORITIES.

15. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED ACCORDING TO THE APPROVED PLANS PRIOR TO COMMENCEMENT OF ANY EARTH MOVING WORK ON THE SITE AND SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS ARE STABILIZED WITH THE INTENDED GROUND COVER.
16. EROSION AND SEDIMENT CONTROLS SHALL BE INSPECTED BY THE BUILDER/DEVELOPER.
 - 15.1. WEEKLY
 - 15.2. BEFORE AND AFTER ANY PREDICTED RAINFALL EVENT.
 - 15.3. FOLLOWING AN UNPREDICTED RAINFALL EVENT.
 - 15.4. DAILY, DURING EXTENDED DURATION RAINFALL EVENTS.
 - 15.5. AFTER SIGNIFICANT SNOW MELT EVENTS.
17. EROSION AND SEDIMENT CONTROLS SHALL BE MAINTAINED IN PROPER WORKING ORDER AT ALL TIMES. DAMAGED OR CLOGGED DEVICES SHALL BE REPAIRED WITHIN 48 HOURS.
18. WHERE A SITE REQUIRES DEWATERING AND WHERE THE EXPELLED WATER CAN BE FREELY RELEASED TO A SUITABLE RECEIVER, THE EXPELLED WATER SHALL BE TREATED TO CAPTURE SUSPENDED PARTICLES GREATER THAN 40 MICRON IN SIZE. THE CAPTURED SEDIMENT SHALL BE DISPOSED OF PROPERLY PER MOECC GUIDELINES. THE CLEAN EXPELLED WATER SHALL FREELY BE RELEASE TO A SUITABLE RECEIVER THAT DOES NOT CREATE DOWNSTREAM ISSUES INCLUDING BUT NOT LIMITED TO EROSION, FLOODING - NUISANCE OR OTHERWISE, INTERFERENCE ISSUES, ETC.

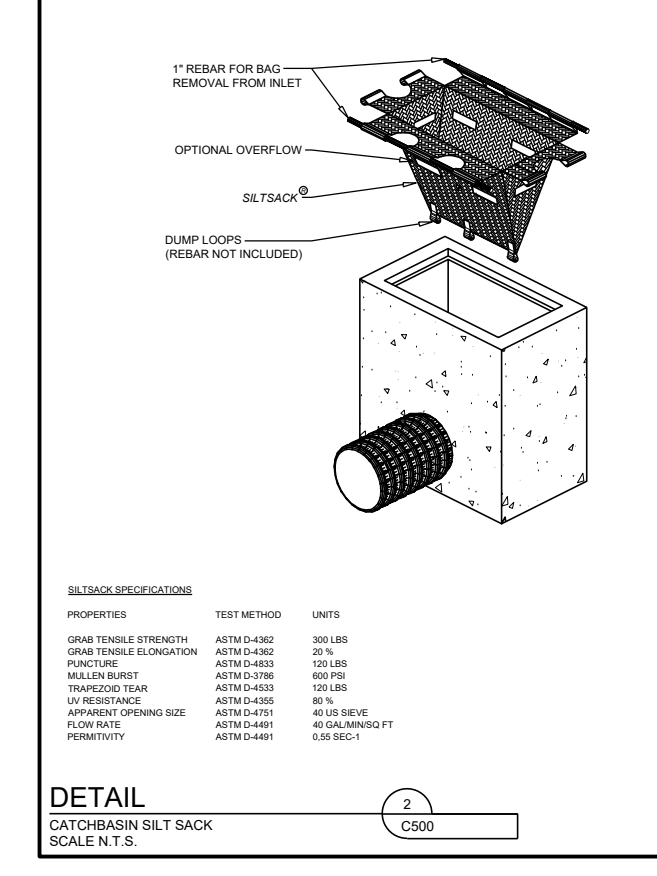
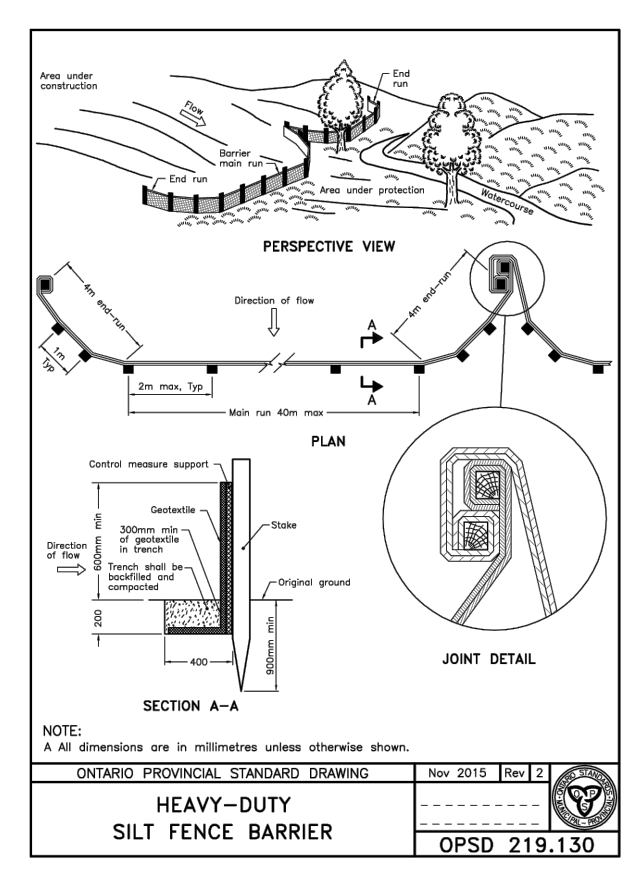
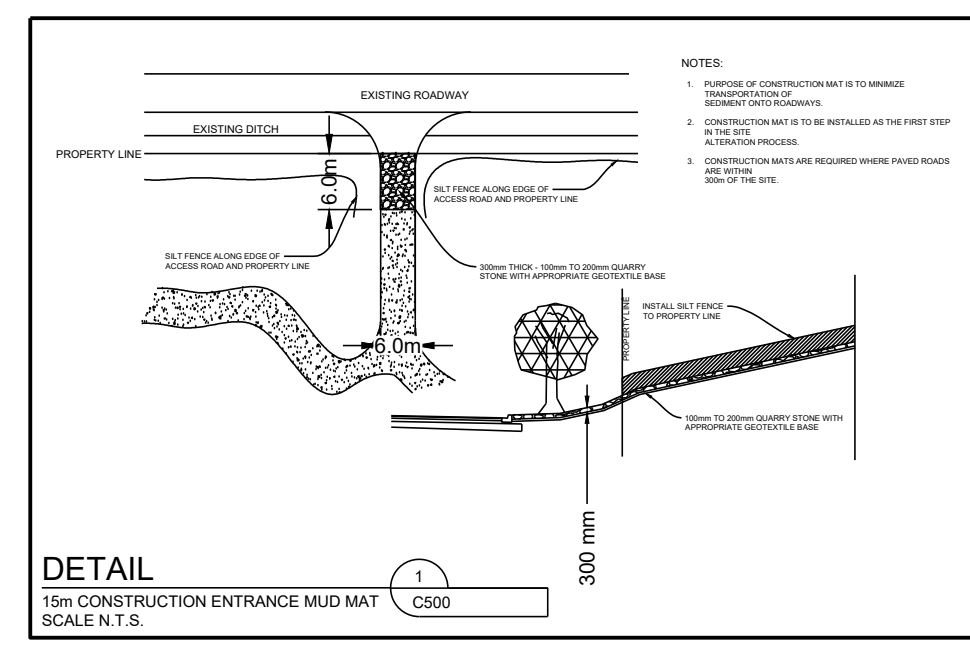
19. EXISTING STORM SEWER AND DRAINAGE DITCHES ADJACENT TO THE WORKS SHALL BE PROTECTED AT ALL TIMES FROM THE ENTRY OF SEDIMENT/SILT THAT MAY MIGRATE FROM THE SITE. FOR STORM SEWERS: ALL INLETS (REAR LOT CB, ROAD CB, PIPE INLETS, ETC) MUST BE SECURED/FITTED WITH SILT CONTROL MEASURES. FOR DRAINAGE DITCHES: THE INSTALLATION OF ROCK CHECK DAMS, SILT FENCE, SEDIMENT CONTAINMENT DEVICES SHALL BE INSTALLED AND MAINTAINED PER ITEMS 15 AND 16 ABOVE.
20. IN THE EVENT OF A SPILL (RELEASE OF DELETERIOUS MATERIAL) OR EMANATING FROM THE SITE, THE OWNER OR OWNERS AGENT SHALL IMMEDIATELY NOTIFY THE MOECC AND FOLLOW ANY PRESCRIBED CLEAN UP PROCEDURE. THE OWNER OR OWNERS AGENT WILL ADDITIONALLY IMMEDIATELY NOTIFY THE CITY.



KEYPLAN (NTS)
PART 80 PART 5 PLAN 43R-15700
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

LEGEND:

| | |
|-------------|-------------------------------|
| ✗ TC 250.00 | TOP OF CURB ELEVATION |
| ✗ BC 250.00 | BOTTOM OF ELEVATION |
| ✗ 250.00 | PROPOSED ELEVATION |
| ✗ 250.00 | EXISTING ELEVATION |
| ✗ 250.00 | PROPOSED ELEVATION |
| ✗ (250.00) | PROPOSED ELEVATION (MATCH EX) |
| --- | PROPERTY LINE |
| 2.0% | SLOPE |
| ▲ | MAIN ENTRANCE |
| ▼ | SECONDARY ENTRANCE |
| ■ | NEW STORM CB |
| □ | NEW STORM CBMH |
| ○ | EX. STORM MH |
| ○ | EX. SANITARY MH |
| HP | HIGH POINT |
| --- | EX. CONC. CURB |
| --- | NEW CONC. CURB |
| --- | NEW CURB CUT/DEPRESSED CURB |
| --- | PROP. SWALE |
| --- | PROP. LIMIT OF DEVELOPMENT |
| ← | OVERLAND FLOW DIRECTION |
| --- | TREE PROTECTION FENCE |



Issued for ZBA/SPA

CHICK-FIL-A ERIN MILLS TOWN CENTRE

5100 Erin Mills Parkway
Mississauga, ON

FSR#30088

BUILDING TYPE / SIZE: IP02
RELEASE: XXXXXXXX

REVISION SCHEDULE

| NO. | DATE | DESCRIPTION |
|-----|------------|--------------------|
| A | 2025-06-06 | FOR REVIEW |
| B | 2025-01-07 | FOR REVIEW |
| C | 2026-03-02 | ZBA/SPA SUBMISSION |

CITY # PAM 25-03 REGION # Cox
CONSULTANT PROJECT # BRM0023002042-U0
PROJECT STATUS ZBA/SPA
DATE MARCH 2025
DRAWN BY J.K.

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SHEET
EROSION AND SEDIMENT
CONTROL PLAN

SHEET NUMBER
C500



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- BUILDINGS • EARTH & ENVIRONMENT • ENERGY •
- INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

GENERAL NOTES:

- BASE INFORMATION WAS DERIVED FROM TOPOGRAPHIC SURVEY AND SITE SERVICING & GRADING PLAN COMPLETED BY J.D. BARNES LIMITED, DATED JULY, 07, 2025.
- ALL WORKS AND MATERIALS SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF MISSISSAUGA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), WHERE APPLICABLE.
- THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE THE LOCATION AND STATUS OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION OF PLANT AND EQUIPMENT FROM DAMAGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
- THE CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF EXISTING SERVICES PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL CONFIRM LOCATIONS AND ELEVATIONS OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY BE DAMAGED OR CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES, INTERPRETATIONS, CHANGES AND ADDITIONS TO THESE DRAWINGS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER, WHEN NOTED AND BEFORE PROCEEDING WITH CONSTRUCTION WORKS. DO NOT CONTINUE CONSTRUCTION IN AREAS WHERE DISCREPANCIES APPEAR UNTIL SUCH DISCREPANCIES HAVE BEEN RESOLVED.
- ALL ELEVATIONS UTILIZE METRIC UNITS. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED. ALL DRAWINGS SHOULD NOT BE SCALED BY THE CONTRACTOR. ANY MISSING OR QUESTIONABLE DIMENSIONS ARE TO BE CONFIRMED WITH THE ENGINEER IN WRITING.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND BEAR COST OF THE SAME.
- ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION, BACKFILL AND REINSTATEMENT OF ALL AREAS DISTURBED DURING CONSTRUCTION TO THE SATISFACTION OF THE ENGINEER, THE CITY OF MISSISSAUGA AND THE AUTHORITY HAVING JURISDICTION.
- ANY AREAS BEYOND THE LIMIT OF THE SITE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE CONTRACTOR'S EXPENSE.
- THE CONTRACTOR SHALL COMPLY WITH THE CITY OF MISSISSAUGA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING ON CITY STREETS. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO THE M.T.O. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST AMENDMENT).
- THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
- THERE WILL BE NO SUBSTITUTION OF MATERIALS UNLESS WRITTEN APPROVAL BY THE ENGINEER HAS BEEN OBTAINED.
- EXCESS EXCAVATED MATERIAL SHALL BE REMOVED FROM THE SITE AND DISPOSED AS PER REGULATIONS.
- THE SITE LAYOUT IS THE RESPONSIBILITY OF THE CONTRACTOR. AS-BUILT SITE SERVICING & GRADING DRAWINGS SHALL BE MAINTAINED ON SITE BY THE CONTRACTOR.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL BEDDING OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH, AS SPECIFIED BY OPSD, IS EXCEEDED.
- ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH ENGINEER AND THE CITY OF MISSISSAUGA PRIOR TO ANY TREE CUTTING.
- ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT. THE GRANULAR BASE COURSES AND ASPHALT LAYERS SHALL BE STEPPED AS PER DETAIL ON THIS DRAWING.
- THE CONTRACTOR SHALL APPRAISE HIS/HER SELF OF ALL SURFACE AND SUBSURFACE CONDITIONS TO BE ENCOUNTERED AND SHALL CARRY OUT THEIR OWN TEST PITS AS REQUIRED TO MAKE THEIR OWN INDEPENDENT ASSESSMENT OF GROUND CONDITIONS. THE CONTRACTOR SHALL NOT MAKE ANY CLAIM FOR ANY EXTRA COST DUE TO ANY SUCH GROUND CONDITIONS VARYING FROM THOSE ANTICIPATED BY THE CONTRACTOR.
- DO NOT CONSTRUCT USING DRAWINGS THAT ARE NOT MARKED "ISSUED FOR CONSTRUCTION".
- CIVIL DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL, LANDSCAPE AND LEGAL DRAWINGS.

SANITARY SEWER NOTES

- ALL SANITARY SEWER MATERIALS AND INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF MISSISSAUGA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
- ALL SANITARY SEWERS SHALL BE PVC SDR 35, IPEX "RING-TITE" (OR EQUIVALENT), AS PER CSA STANDARD B182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE NOTED.
- SANITARY SEWER TRENCH AND BEDDING SHALL BE AS PER CITY OF MISSISSAUGA STANDARD DWG. NO. 2-3-1 AND 2-3-2.
- ALL SANITARY LATERALS ARE TO BE PVC SDR 28, IPEX "RING-TITE" (OR EQUIVALENT), ANY COLOR EXCEPT WHITE AND MARKED WITH A 50MM X 100MM WOODEN MARKER, EXTENDING FROM THE INVERT TO 1.0 M ABOVE GRADE PAINTED RED.
- SEWER BEDDING AS PER CITY STANDARD 2-3-1 AND 2-3-2. GRANULAR 'A' BEDDING TO BE INCREASED TO 300MM WHERE SEWERS ARE BELOW THE GROUNDWATER TABLE.
- SANITARY SEWER MANHOLES SHALL BE BENCHES AS PER OPSD 701.021. SAFETY PLATFORMS SHALL BE AS PER OPSD 404.02. DROP STRUCTURES SHALL BE IN ACCORDANCE WITH CITY OF MISSISSAUGA SPECIFICATIONS AND OPSD 1003.01.
- THE CONTRACTOR SHALL CONDUCT INFILTRATION/EXFILTRATION (AS PER CURRENT OPSS) TESTING ON ALL NEWLY INSTALLED SANITARY SEWERS. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWER INSTALLATION AND VIEWED BY THE ENGINEER.
- THE CONTRACTOR SHALL CONDUCT CCTV INSPECTION OF ALL NEWLY INSTALLED SANITARY SEWERS AND EXISTING SEWERS CONNECTED TO. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWERS ARE INSTALLED.
- ALL SERVICE CONNECTIONS TO BE CONSTRUCTED AS PER OPSD 1006.02, CITY OF MISSISSAUGA STANDARD DWG. NO. 2-4-0 AND 2-4-3.
- THE CONTRACTOR SHALL CONSTRUCT FLEXIBLE SANITARY SEWERS IN ACCORDANCE WITH OPSD 802.010 AND 802.013. DURING CONSTRUCTION, THE CONTRACTOR SHALL PROTECT THE PIPES FROM HEAVY CONSTRUCTION EQUIPMENT. BEDDING AND BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 95% SPMD.
- MINIMUM SOIL COVER TO BE 2.5M TO PROTECT SEWERS FROM FROST DAMAGE. IN AREAS WHERE ADEQUATE FROST COVER CANNOT BE ACHIEVED, EQUIVALENT THERMAL INSULATION TO BE INSTALLED AS PER OPSD 514.010.

STORM SEWER NOTES

- ALL STORM SEWER MATERIALS AND INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF MISSISSAUGA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
- ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2 (LATEST AMENDMENT). ALL NON-REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.1 (LATEST AMENDMENT). PIPE SHALL BE JOINED WITH STD. RUBBER GASKETS AS PER CSA A257.3 (LATEST AMENDMENT).
- ALL MAIN STORM SEWERS SHALL BE PVC SDR 35 APPROVED PER C.S.A. B182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE SPECIFIED.
- THE CONTRACTOR SHALL CONSTRUCT FLEXIBLE STORM SEWERS IN ACCORDANCE WITH OPSD 802.010 AND 802.013. RIGID STORM PIPE SHALL BE CONSTRUCTED IN ACCORDANCE WITH OPSD 802.030. DURING CONSTRUCTION THE CONTRACTOR SHALL PROTECT THE PIPES FROM HEAVY CONSTRUCTION EQUIPMENT. BEDDING AND BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 95% SPMD.
- SEWER BEDDING AS PER CITY STANDARD DRAWINGS 2112.040 AND STANDARD NO. 2112.110.
- ALL STORM LATERALS SHALL BE PVC SDR 28, WHITE IN COLOR AND MARKED WITH A 50MM X 100MM WOODEN MARKER EXTENDING FROM THE INVERT TO 1.0M ABOVE GRADE PAINTED GREEN.
- ALL SERVICE CONNECTIONS TO BE CONSTRUCTED AS PER OPSD 1006.02.
- MINIMUM SOIL COVER TO BE 1.2 M TO PROTECT SEWERS FROM FROST DAMAGE. IN AREAS WHERE ADEQUATE FROST COVER CANNOT BE ACHIEVED, EQUIVALENT THERMAL INSULATION TO BE INSTALLED AS PER OPSD 514.010.
- STORM MANHOLE FRAME AND COVERS SHALL BE AS PER OPSD 701.010, AND CBS SHALL BE AS PER OPSD 705.010.
- SAFETY PLATFORMS SHALL BE IN ACCORDANCE WITH OPSD 404.02.
- STORM SEWER MANHOLES SERVING LOCAL SEWERS LESS THAN 900MM SHALL BE CONSTRUCTED WITH A 300MM SUMP. FOR STORM SEWERS 900MM AND OVER USE BENCHING IN ACCORDANCE WITH OPSD 701.021.
- CATCH BASIN LEADS SHALL BE 250mmØ (MIN), 1.0% SLOPE (MIN), UNLESS OTHERWISE NOTED.
- ALL CATCHBASINS AND CATCHBASIN MANHOLES SHALL HAVE SUMPS WITH 300mm DEPTH, UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL ENSURE THAT CATCH BASINS ARE INSTALLED AT THE LOW POINT OF SAG CURB WORKS.
- THE STORM SEWER CLASSES HAVE BEEN DESIGNED BASED ON BEDDING CONDITIONS SPECIFIED. WHERE THE SPECIFIED TRENCH WIDTH IS EXCEEDED, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE ADDITIONAL BEDDING, A DIFFERENT TYPE OF BEDDING OR A HIGHER PIPE STRENGTH AT HIS OWN EXPENSE AND SHALL ALSO BE RESPONSIBLE FOR EXTRA TEMPORARY AND/OR PERMANENT REPAIRS MADE NECESSARY BY THE WIDENED TRENCH.
- THE CONTRACTOR SHALL CONDUCT CCTV INSPECTION OF ALL NEWLY INSTALLED STORM SEWERS AND EXISTING SEWERS CONNECTED TO. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWERS INSTALLED.

WATERMAIN NOTES

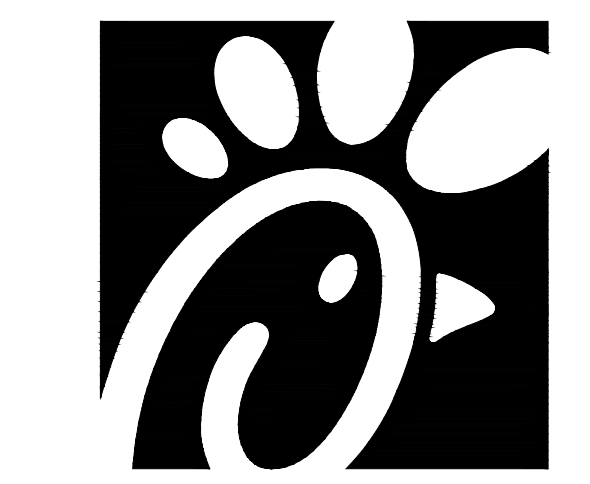
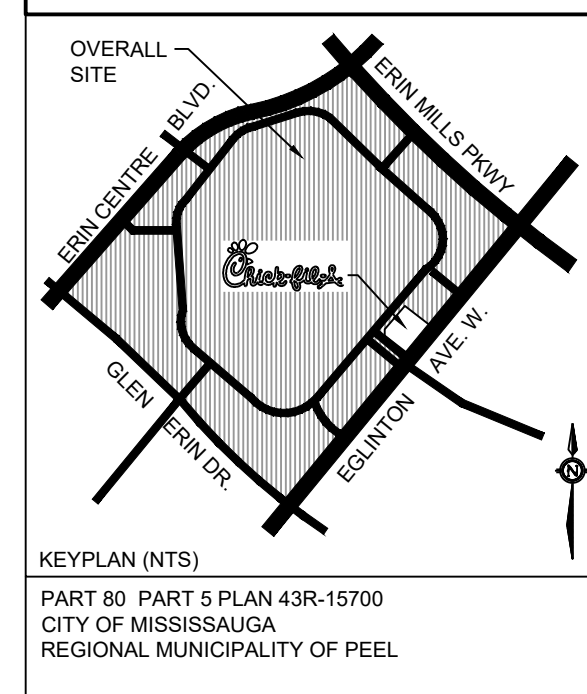
- ALL WATERMAIN MATERIALS AND INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF MISSISSAUGA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
- NO WORK SHALL COMMENCE UNLESS A CITY WATER WORKS INSPECTOR IS ON SITE. WATERMAIN CONNECTIONS BY CITY OF MISSISSAUGA FORCES WITH ALL EXCAVATION BACKFILL AND ROAD REINSTATEMENT BY CONTRACTOR.
- ALL PVC WATERMANS SHALL BE EQUAL TO AWWA C-900 CLASS 150, SDR 18, OR APPROVED EQUAL.
- WATERMANS TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARD DWG. NO. 1-5-1, UNLESS OTHERWISE SPECIFIED.
- VALVE BOXES SHALL BE INSTALLED AS PER CITY OF MISSISSAUGA STANDARD DWG. NO. 1-3-8.
- ALL FIRE HYDRANTS TO BE INSTALLED AND LOCATED AS PER CITY OF MISSISSAUGA STANDARD DWG. NO. 1-6-1 AND 1-6-3.
- ALL WATERMANS TO BE INSTALLED AT MINIMUM COVER OF 1.7M.
- THRUST BLOCKS AND RESTRAINT AS PER CITY OF MISSISSAUGA STANDARD DWG. NO. 1-5-9.
- IF WATERMAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.
- DISINFECTION AND TESTING OF WATERMAIN TO BE IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARDS.
- WATER METERS TO BE INSTALLED AS PER 1-4-3 FOR WATER SERVICES.
- THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS AND BLOW-OFFS AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
- WHERE THE SEPARATION BETWEEN SERVICES AND MANHOLES IS LESS THAN 1.7M, WATER SERVICES ARE TO BE INSULATED AS PER CITY OF MISSISSAUGA STANDARD DWG. NO. 1-5-8.
- AS PER CITY GUIDELINE, THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER / UTILITY IS 0.30M FOR CROSSING OVER THE SEWER. FOR CROSSING UNDER SEWER, THE MINIMUM VERTICAL CLEARANCE IS 0.50M AS PER CITY STD. FOR CROSSING UNDER SEWER, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING SO THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.

ROADWAY SPECIFICATIONS

- ALL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
- CONCRETE CURB SHALL BE IN ACCORDANCE WITH OPSD, AS NOTED. PROVISION SHALL BE MADE FOR CURB DEPRESSIONS AT SIDEWALKS AND DRIVEWAYS.
- PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARD DRAWING 2220010 AND OPSD 509.010, OPSS 310.
- GRANULAR "A" SHALL BE PLACED TO A MINIMUM THICKNESS OF 300MM AROUND ALL STRUCTURES WITHIN PAVEMENT AREA.
- ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO A MINIMUM OF 98% STANDARD PROCTOR DENSITY.
- ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS & NECESSARY REPAIRS HAVE BEEN CARRIED OUT TO THE SATISFACTION OF THE ENGINEER.
- SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 300MM LIFTS.

REGION OF PEEL SITE SERVICING NOTES:

- PUBLIC AND PRIVATE SERVICES, APPURTENANCES, MATERIALS AND CONSTRUCTION METHODS MUST COMPLY WITH THE MOST CURRENT REGION OF PEEL STANDARDS AND SPECIFICATIONS, THE LOCAL MUNICIPALITY'S REQUIREMENTS FOR THE ONTARIO BUILDING CODE AND ONTARIO PROVINCIAL STANDARDS.
- ALL WORKS SHALL ADHERE TO ALL APPLICABLE LEGISLATION, INCLUDING REGIONAL BY-LAWS.
- WATERMAIN AND /OR WATER SERVICE MATERIALS 100 mm (4") AND LARGER MUST BE PVC DR18 CONSTRUCTED AS PER AWWA C900-16, SIZE 50 mm (2") AND SMALLER MUST BE POLYETHYLENE CONSTRUCTED AS PER AWWA C901 AND CSA B.137.10.
- WATERMANS AND /OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7 m (5'6") WITH A MINIMUM HORIZONTAL SPACING OF 1.2 m (4') FROM THEMSELVES AND ALL OTHER UTILITIES.
- PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED WITH AT LEAST A 50 mm (2") OUTLET ON 100 mm (4") AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE LINE. THEY MUST ALSO BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES, FLUSHING OUTLET TO BE 100 mm (4") DIAMETER MINIMUM ON A HYDRANT.
- ALL CURB STOPS TO BE 3.0 m (10') OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED.
- HYDRANT AND VALVE SET TO REGION STANDARD 1-6-1 DIMENSION A AND B, 0.7 m (2') AND 0.9 m (3') AND TO HAVE PUMPER NOZZLE.
- WATERMANS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED SITE PLAN. COPY OF GRADE SHEET MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK, WHERE REQUESTED BY INSPECTOR.
- WATERMANS MUST HAVE A MINIMUM VERTICAL CLEARANCE OF 0.3 m (12") OVER / 0.5 m (20") UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
- ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
- ALL LIVE TAPPING AND OPERATION OF REGION WATER VALVES SHALL BE ARRANGED THROUGH THE REGIONAL INSPECTOR ASSIGNED OR BY CONTACTING THE OPERATIONS AND MAINTENANCE DIVISION.
- LOCATION OF ALL EXISTING UTILITIES IN THE FIELD TO BE ESTABLISHED BY THE CONTRACTOR.
- THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING OF ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THEIR WORK. WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RESULTING FROM DAMAGE TO SAME.
- THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES PRIOR TO CROSSING SUCH UTILITIES, FOR THE PURPOSE OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF THE CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.
- ALL PROPOSED WATER PIPING MUST BE ISOLATED THROUGH A TEMPORARY CONNECTION THAT SHALL INCLUDE AN APPROPRIATE CROSS-CONNECTION CONTROL DEVICE, CONSISTENT WITH THE DEGREE OF HAZARD, FOR BACKFLOW PREVENTION OF THE ACTIVE DISTRIBUTION SYSTEM, CONFORMING TO REGION OF PEEL STANDARDS 1-7-7 OR 1-7-8.
- ALL WATER METERS MUST BE INSTALLED IN HEATED AND ACCESSIBLE SPACE.



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- INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

CHICK-FIL-A
ERIN MILLS TOWN
CENTRE
5100 Erin Mills Parkway
Mississauga, ON

FSR#30088

BUILDING TYPE / SIZE: IP02
RELEASE: XXXXXXXX

| REVISION SCHEDULE | | |
|-------------------|------------|--------------------|
| NO. | DATE | DESCRIPTION |
| A | 2025-06-06 | FOR REVIEW |
| B | 2025-01-07 | FOR REVIEW |
| C | 2026-03-02 | ZBA/SPA SUBMISSION |

CITY # PAM 26-83 REGION # Cxx
CONSULTANT PROJECT # BRM0023002042-U0
PROJECT STATUS ZBA/SPA
DATE MARCH 2026
DRAWN BY J.K.

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SHEET
NOTES AND DETAIL

SHEET NUMBER
C600

E:\BRM\BRM-230202042-U0160 Execution\65 Drawings\01-30088-C600-RA.dwg
18 February 2026

Appendix C
Calculations



Required Fire Flow Calculation

F = 220 x C x √A L/min *FUS Water Supply for Public Fire Protection, 2020*

F = Required Fire Flow
 C = Construction Type Coefficient
 A = Total Above-Ground Floor Area (m²)

1 Estimate of Fire Flow (Baseline)

| | |
|-------------------|------------|
| OBC Occupancy | Commercial |
| Number of Storeys | 1 |

| Level | Area (m ²) |
|-------|------------------------|
| 1 | 486 |

Construction Class

| | |
|--------------------|-----------------|
| Construction Class | Non Combustible |
| Coefficient | 0.8 |

Total Effective Area of Building

A = 486 m²

Fire Flow

F = 220 * 0.8 * √464
 F = 3791

F = 4000 L/min *rounded to nearest 1000L/min, must be >2000 L/min*

2 Occupancy Charge

| | |
|----------|--------------|
| Contents | Free Burning |
| Charge | 0.15 |

O = F * Occupancy Charge
 O = 4000 * 0.15

O = 600 L/min *no rounding*

3 Automatic Sprinkler Reduction

| | | | |
|-------------------------|----|----|----|
| NFPA Sprinkler Standard | No | 0% | 0% |
| Standard Water Supply | No | 0% | |
| Fully Supervised System | No | 0% | |

S = F * Sprinkler Reduction
 S = 4000 * 0%

S = 0 L/min *no rounding*

4 Exposure Increase

| Direction | Distance (m) | Length-height factor | Type | Charge | TOTAL | |
|-----------|--------------|----------------------|------|--------|-------|-------------|
| North | >30 | - | - | 0% | 0% | Residential |
| East | >30 | - | - | 0% | | Ex Church |
| South | >30 | - | - | 0% | | Ex Bld |
| West | >30 | - | - | 0% | | Residential |

max 75%

E = F * Exposure Charge
 E = 4000 * 0%

E = 0 L/min *no rounding*

H Adjusted Fire Flow

Fa = F + O + E + S
 Fa = 4000 + 600 + 0 + 0
 Fa = 4600 L/min

Fa = 5000 L/min *rounded to nearest 1000L/min*

| | | |
|---------------------------|-------------|-------|
| REQUIRED FIRE FLOW | 5000 | L/min |
| | 83 | L/s |
| | 1321 | usgm |

Existing Sanitary Calculations - Subject Site

Sanitary Service Design Basis

Design Basis

| | | | | |
|--------------------|-------|----------------------|-------------------|----------------------------------|
| Avg. Flow Rate | 270 | L/cap/day | (Non-Residential) | |
| Peak Hourly Factor | | Per Harmon Formula | | $PF=1 + (14/(4+(P/1000)^{1/2}))$ |
| Population Density | 50 | people/ha | | $2 \leq PF \leq 4$ |
| Infiltration | 0.26 | L/s/ha | | |
| Area | 0.447 | ha | | |
| Population Density | 0.00 | pers/ha (Commercial) | | |
| Population | 0 | persons | | |

Flow Calculation

$$PF= 1 + (14/(4+(P/1000)^{1/2}))$$

$$PF= 1 + (14/(4+(0/1000)^{1/2}))$$

$$PF= 4.50$$

$$PF= 4.00 \text{ maximum}$$

$$Q_{ici} = PF * p * q_{res}$$

$$Q_{ici} = 4.00 * 0 * 270$$

$$Q_{ici} = 0.00 \text{ L/s}$$

$$Q_{inf} = A * i$$

$$0.447 * 0.26$$

$$0.12 \text{ L/s}$$

Total Flow= average daily dry weather flow x peaking factor+ infiltration allowance

$$Q_{tot} = Q_{res} + Q_{ici} + Q_{inf}$$

$$0.00 + 0.00 + 0.12$$

$$0.12 \text{ L/s}$$

Proposed Sanitary Calculations

Sanitary Service Design Basis

Design Basis

| | | | | |
|--------------------|-------|----------------------|-------------------|----------------------------------|
| Avg. Flow Rate | 270 | L/cap/day | (Non-Residential) | |
| Peak Hourly Factor | | Per Harmon Formula | | $PF=1 + (14/(4+(P/1000)^{1/2}))$ |
| Population Density | 50 | people/ha | | $2 \leq PF \leq 4$ |
| Infiltration | 0.26 | L/s/ha | | |
| Area | 0.447 | ha | | |
| Population Density | 50.00 | pers/ha (Commercial) | | |
| Population | 22 | persons | | |

Flow Calculation

$$PF= 1 + (14/(4+(P/1000)^{1/2}))$$

$$PF= 1 + (14/(4+(22/1000)^{1/2}))$$

$$PF= 4.37$$

$$PF= 4.00 \text{ maximum}$$

$$Q_{ici} = PF * p * q_{res}$$

$$Q_{ici} = 4.00 * 22 * 270$$

$$Q_{ici} = 0.28 \text{ L/s}$$

$$Q_{inf} = A * i$$

$$0.447 * 0.26$$

$$0.12 \text{ L/s}$$

Total Flow= average daily dry weather flow x peaking factor+ infiltration allowance

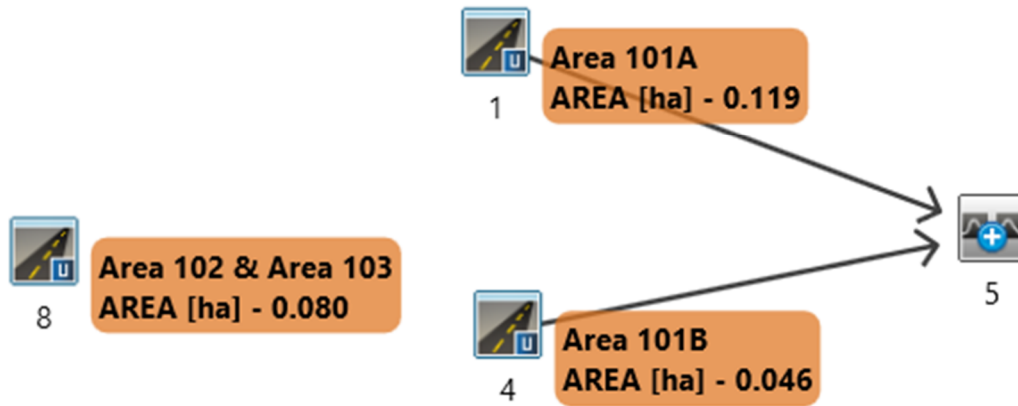
$$Q_{tot} = Q_{res} + Q_{ici} + Q_{inf}$$

$$0.00 + 0.28 + 0.12$$

$$0.39 \text{ L/s}$$

Appendix D
Visual Otthymo Model

Pre-Development VOH Model Schematic



```

=====
V V I SSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y Y M M O O
OOO T T H H Y Y M M OOO

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```

***** D E T A I L E D O U T P U T *****

```

Input filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
Output filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
87a1-436c-84fa-29e684f29ce0\df4f0f28-bffb-49f2-8753-d499fadd72bb\scenar
Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
87a1-436c-84fa-29e684f29ce0\df4f0f28-bffb-49f2-8753-d499fadd72bb\scenar

```

```

DATE: 09/22/2025 TIME: 02:22:21
USER:

```

COMMENTS: _____

```

*****
** SIMULATION : 002yr 4hr 10min Chicago Copy **
*****

```

```

CHICAGO STORM IDF curve parameters: A= 732.951
Ptotal= 33.89 mm B= 6.200
C= 0.810
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

```

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|------|-------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.00 | 0.00 | 2.05 | 1.00 | 18.21 | 2.00 | 5.10 | 3.00 |
| 2.46 | 0.17 | 2.37 | 1.17 | 76.80 | 2.17 | 4.29 | 3.17 |
| 2.28 | 0.33 | 2.81 | 1.33 | 24.08 | 2.33 | 3.72 | 3.33 |
| 2.12 | 0.50 | 3.50 | 1.50 | 12.36 | 2.50 | 3.29 | 3.50 |
| 1.99 | 0.67 | 4.69 | 1.67 | 8.32 | 2.67 | 2.95 | 3.67 |
| 1.87 | 0.83 | 7.31 | 1.83 | 6.30 | 2.83 | 2.68 | 3.83 |

```

CALIB STANDHYD ( 0001) Area (ha)= 0.12
ID= 1 DT= 5.0 min Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

```

| | IMPERVIOUS | PERVIOUS (i) |
|---------------|------------|--------------|
| Surface Area | (ha)= 0.11 | 0.01 |
| Dep. Storage | (mm)= 1.00 | 5.00 |
| Average Slope | (%)= 1.00 | 2.00 |
| Length | (m)= 28.17 | 40.00 |
| Mannings n | = 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|-------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.083 | 0.083 | 2.05 | 1.083 | 18.21 | 2.083 | 5.10 | 3.08 |
| 2.46 | 0.167 | 2.05 | 1.167 | 18.21 | 2.167 | 5.10 | 3.17 |
| 2.46 | 0.250 | 2.37 | 1.250 | 76.80 | 2.250 | 4.29 | 3.25 |
| 2.28 | 0.333 | 2.37 | 1.333 | 76.80 | 2.333 | 4.29 | 3.33 |
| 2.28 | 0.417 | 2.81 | 1.417 | 24.08 | 2.417 | 3.72 | 3.42 |
| 2.12 | 0.500 | 2.81 | 1.500 | 24.08 | 2.500 | 3.72 | 3.50 |

| | | | | | | | |
|------|-------|------|-------|-------|-------|------|------|
| 1.99 | 0.583 | 3.50 | 1.583 | 12.36 | 2.583 | 3.29 | 3.58 |
| 1.99 | 0.667 | 3.50 | 1.667 | 12.36 | 2.667 | 3.29 | 3.67 |
| 1.87 | 0.750 | 4.69 | 1.750 | 8.32 | 2.750 | 2.95 | 3.75 |
| 1.87 | 0.833 | 4.69 | 1.833 | 8.32 | 2.833 | 2.95 | 3.83 |
| 1.77 | 0.917 | 7.31 | 1.917 | 6.30 | 2.917 | 2.68 | 3.92 |
| 1.77 | 1.000 | 7.31 | 2.000 | 6.30 | 3.000 | 2.68 | 4.00 |

```

Max.Eff.Inten.(mm/hr)= 76.80 16.12
over (min)= 5.00 5.00
Storage Coeff. (min)= 1.33 (ii) 4.58 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.33 0.23

```

```

*TOTALS*
PEAK FLOW (cms)= 0.02 0.00 0.023 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 32.89 9.03 30.50
TOTAL RAINFALL (mm)= 33.89 33.89 33.89
RUNOFF COEFFICIENT = 0.97 0.27 0.90

```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

```

CALIB STANDHYD ( 0004) Area (ha)= 0.05
ID= 1 DT= 5.0 min Total Imp(%)= 83.00 Dir. Conn.(%)= 83.00

```

| | IMPERVIOUS | PERVIOUS (i) |
|---------------|------------|--------------|
| Surface Area | (ha)= 0.04 | 0.01 |
| Dep. Storage | (mm)= 1.00 | 5.00 |
| Average Slope | (%)= 1.00 | 2.00 |
| Length | (m)= 17.51 | 40.00 |
| Mannings n | = 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|-------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.083 | 0.083 | 2.05 | 1.083 | 18.21 | 2.083 | 5.10 | 3.08 |
| 2.46 | 0.167 | 2.05 | 1.167 | 18.21 | 2.167 | 5.10 | 3.17 |
| 2.46 | 0.250 | 2.37 | 1.250 | 76.80 | 2.250 | 4.29 | 3.25 |
| 2.28 | 0.333 | 2.37 | 1.333 | 76.80 | 2.333 | 4.29 | 3.33 |
| 2.28 | 0.417 | 2.81 | 1.417 | 24.08 | 2.417 | 3.72 | 3.42 |
| 2.12 | 0.500 | 2.81 | 1.500 | 24.08 | 2.500 | 3.72 | 3.50 |
| 1.99 | 0.583 | 3.50 | 1.583 | 12.36 | 2.583 | 3.29 | 3.58 |
| 1.99 | 0.667 | 3.50 | 1.667 | 12.36 | 2.667 | 3.29 | 3.67 |
| 1.87 | 0.750 | 4.69 | 1.750 | 8.32 | 2.750 | 2.95 | 3.75 |
| 1.87 | 0.833 | 4.69 | 1.833 | 8.32 | 2.833 | 2.95 | 3.83 |
| 1.77 | 0.917 | 7.31 | 1.917 | 6.30 | 2.917 | 2.68 | 3.92 |
| 1.77 | 1.000 | 7.31 | 2.000 | 6.30 | 3.000 | 2.68 | 4.00 |

```

Max.Eff.Inten.(mm/hr)= 76.80 16.12
over (min)= 5.00 10.00
Storage Coeff. (min)= 1.00 (ii) 5.16 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.16

```

```

*TOTALS*
PEAK FLOW (cms)= 0.01 0.00 0.008 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 32.89 9.03 28.82
TOTAL RAINFALL (mm)= 33.89 33.89 33.89
RUNOFF COEFFICIENT = 0.97 0.27 0.85

```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

```

ADD HYD ( 0005)
1 + 2 = 3
AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

```



ID1= 1 (0001): 0.12 0.023 1.33 30.50
 + ID2= 2 (0004): 0.05 0.008 1.33 28.82
 =====
 ID = 3 (0005): 0.17 0.032 1.33 30.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| | | |
|--|---------------------------------------|---------------------|
| CALIB STANDHYD (0008) ID= 1 DT= 5.0 min | Area (ha)= 0.08 Total Imp(%)= 9.00 | Dir. Conn.(%)= 9.00 |
|--|---------------------------------------|---------------------|

| | | |
|--------------------|------------|--------------|
| | IMPERVIOUS | PERVIOUS (i) |
| Surface Area (ha)= | 0.01 | 0.07 |
| Dep. Storage (mm)= | 1.00 | 5.00 |
| Average Slope (%)= | 1.00 | 2.00 |
| Length (m)= | 23.09 | 40.00 |
| Mannings n = | 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|----------------------------------|-------|-------|-------|-------|-------|-------|------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.083 | 2.05 | 1.083 | 18.21 | 2.083 | 5.10 | 3.08 | |
| 2.46 | 0.167 | 2.05 | 1.167 | 18.21 | 2.167 | 5.10 | 3.17 |
| 2.46 | 0.250 | 2.37 | 1.250 | 76.80 | 2.250 | 4.29 | 3.25 |
| 2.28 | 0.333 | 2.37 | 1.333 | 76.80 | 2.333 | 4.29 | 3.33 |
| 2.28 | 0.417 | 2.81 | 1.417 | 24.08 | 2.417 | 3.72 | 3.42 |
| 2.12 | 0.500 | 2.81 | 1.500 | 24.08 | 2.500 | 3.72 | 3.50 |
| 2.12 | 0.583 | 3.50 | 1.583 | 12.36 | 2.583 | 3.29 | 3.58 |
| 1.99 | 0.667 | 3.50 | 1.667 | 12.36 | 2.667 | 3.29 | 3.67 |
| 1.99 | 0.750 | 4.69 | 1.750 | 8.32 | 2.750 | 2.95 | 3.75 |
| 1.87 | 0.833 | 4.69 | 1.833 | 8.32 | 2.833 | 2.95 | 3.83 |
| 1.87 | 0.917 | 7.31 | 1.917 | 6.30 | 2.917 | 2.68 | 3.92 |
| 1.77 | 1.000 | 7.31 | 2.000 | 6.30 | 3.000 | 2.68 | 4.00 |

Max.Eff.Inten.(mm/hr)= 76.80 12.53
 over (min) 5.00 20.00
 Storage Coeff. (min)= 1.18 (ii) 17.38 (ii)
 Unit Hyd. Tpeak (min)= 5.00 20.00
 Unit Hyd. peak (cms)= 0.33 0.06

PEAK FLOW (cms)= 0.00 0.00
 TIME TO PEAK (hrs)= 1.33 1.58 1.33
 RUNOFF VOLUME (mm)= 32.89 9.03 11.06
 TOTAL RAINFALL (mm)= 33.89 33.89 33.89
 RUNOFF COEFFICIENT = 0.97 0.27 0.33

TOTALS
 PEAK FLOW (cms)= 0.00 0.00 0.002 (iii)
 TIME TO PEAK (hrs)= 1.33 1.58 1.33
 RUNOFF VOLUME (mm)= 32.89 9.03 11.06
 TOTAL RAINFALL (mm)= 33.89 33.89 33.89
 RUNOFF COEFFICIENT = 0.97 0.27 0.33

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 ***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
 YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

```

V V I SSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLL

```

```

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y Y M M O O
OOO T T H H Y Y M M OOO

```

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***** D E T A I L E D O U T P U T *****

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 Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\1086d16f-1f16-4187-b879-1fe8d5c41a2e\scenar

DATE: 09/22/2025

TIME: 02:22:22

USER:

COMMENTS:

 ** SIMULATION : 005yr 4hr 10min Chicago Copy **

| | |
|-----------------------------------|--|
| CHICAGO STORM Ptotal= 45.16 mm | IDF curve parameters: A= 998.070 B= 6.050 C= 0.814 |
|-----------------------------------|--|

used in: INTENSITY = A / (t + B)^C
 Duration of storm = 4.00 hrs
 Storm time step = 10.00 min
 Time to peak ratio = 0.33

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|-------|--------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.00 | 2.68 | 1.00 | 24.17 | 2.00 | 6.69 | 3.00 | |
| 3.22 | 0.17 | 3.10 | 1.17 | 104.21 | 2.17 | 5.63 | 3.17 |
| 2.98 | 0.33 | 3.68 | 1.33 | 32.03 | 2.33 | 4.87 | 3.33 |
| 2.77 | 0.50 | 4.58 | 1.50 | 16.34 | 2.50 | 4.30 | 3.50 |
| 2.60 | 0.67 | 6.15 | 1.67 | 10.96 | 2.67 | 3.86 | 3.67 |
| 2.44 | 0.83 | 9.61 | 1.83 | 8.29 | 2.83 | 3.51 | 3.83 |
| 2.31 | | | | | | | |

| | | |
|--|--|----------------------|
| CALIB STANDHYD (0001) ID= 1 DT= 5.0 min | Area (ha)= 0.12 Total Imp(%)= 90.00 | Dir. Conn.(%)= 90.00 |
|--|--|----------------------|

| | | |
|--------------------|------------|--------------|
| | IMPERVIOUS | PERVIOUS (i) |
| Surface Area (ha)= | 0.11 | 0.01 |
| Dep. Storage (mm)= | 1.00 | 5.00 |
| Average Slope (%)= | 1.00 | 2.00 |
| Length (m)= | 28.17 | 40.00 |
| Mannings n = | 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|----------------------------------|-------|-------|-------|--------|-------|-------|------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.083 | 2.68 | 1.083 | 24.17 | 2.083 | 6.69 | 3.08 | |
| 3.22 | 0.167 | 2.68 | 1.167 | 24.17 | 2.167 | 6.69 | 3.17 |
| 3.22 | 0.250 | 3.10 | 1.250 | 104.21 | 2.250 | 5.63 | 3.25 |
| 2.98 | 0.333 | 3.10 | 1.333 | 104.21 | 2.333 | 5.63 | 3.33 |
| 2.98 | 0.417 | 3.68 | 1.417 | 32.03 | 2.417 | 4.87 | 3.42 |
| 2.77 | 0.500 | 3.68 | 1.500 | 32.03 | 2.500 | 4.87 | 3.50 |
| 2.77 | 0.583 | 4.58 | 1.583 | 16.34 | 2.583 | 4.30 | 3.58 |
| 2.60 | 0.667 | 4.58 | 1.667 | 16.34 | 2.667 | 4.30 | 3.67 |
| 2.60 | 0.750 | 6.15 | 1.750 | 10.96 | 2.750 | 3.86 | 3.75 |
| 2.44 | 0.833 | 6.15 | 1.833 | 10.96 | 2.833 | 3.86 | 3.83 |
| 2.44 | 0.917 | 9.61 | 1.917 | 8.29 | 2.917 | 3.51 | 3.92 |
| 2.31 | 1.000 | 9.61 | 2.000 | 8.29 | 3.000 | 3.51 | 4.00 |
| 2.31 | | | | | | | |

Max.Eff.Inten.(mm/hr)= 104.21 30.85
 over (min) 5.00 5.00
 Storage Coeff. (min)= 1.18 (ii) 4.06 (ii)
 Unit Hyd. Tpeak (min)= 5.00 5.00
 Unit Hyd. peak (cms)= 0.33 0.24

PEAK FLOW (cms)= 0.03 0.00 0.032 (iii)
 TIME TO PEAK (hrs)= 1.33 1.33 1.33
 RUNOFF VOLUME (mm)= 44.16 15.56 41.30
 TOTAL RAINFALL (mm)= 45.16 45.16 45.16
 RUNOFF COEFFICIENT = 0.98 0.34 0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

```

-----
CALIB
STANDHYD ( 0004)
ID= 1 DT= 5.0 min
-----

```

```

Area (ha)= 0.05
Total Imp(%)= 83.00 Dir. Conn.(%)= 83.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.04 0.01
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 17.51 40.00
Mannings n = 0.013 0.250

```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| | | ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|------|-------|----------------------------------|-------|--------|-------|------|-------|------|-------|
| | | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
| RAIN | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 3.22 | 0.083 | 2.68 | 1.083 | 24.17 | 2.083 | 6.69 | 3.08 | | |
| 2.98 | 0.167 | 2.68 | 1.167 | 24.17 | 2.167 | 6.69 | 3.17 | | |
| 2.98 | 0.250 | 3.10 | 1.250 | 104.21 | 2.250 | 5.63 | 3.25 | | |
| 2.77 | 0.333 | 3.10 | 1.333 | 104.21 | 2.333 | 5.63 | 3.33 | | |
| 2.77 | 0.417 | 3.68 | 1.417 | 32.03 | 2.417 | 4.87 | 3.42 | | |
| 2.77 | 0.500 | 3.68 | 1.500 | 32.03 | 2.500 | 4.87 | 3.50 | | |
| 2.60 | 0.583 | 4.58 | 1.583 | 16.34 | 2.583 | 4.30 | 3.58 | | |
| 2.60 | 0.667 | 4.58 | 1.667 | 16.34 | 2.667 | 4.30 | 3.67 | | |
| 2.44 | 0.750 | 6.15 | 1.750 | 10.96 | 2.750 | 3.86 | 3.75 | | |
| 2.44 | 0.833 | 6.15 | 1.833 | 10.96 | 2.833 | 3.86 | 3.83 | | |
| 2.31 | 0.917 | 9.61 | 1.917 | 8.29 | 2.917 | 3.51 | 3.92 | | |
| 2.31 | 1.000 | 9.61 | 2.000 | 8.29 | 3.000 | 3.51 | 4.00 | | |

```

Max.Eff.Inten.(mm/hr)= 104.21 30.85
over (min) = 5.00 5.00
Storage Coeff. (min)= 0.88 (ii) 4.57 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.23

PEAK FLOW (cms)= 0.01 0.00
TIME TO PEAK (hrs)= 1.33 1.33
RUNOFF VOLUME (mm)= 44.16 15.56
TOTAL RAINFALL (mm)= 45.16 45.16
RUNOFF COEFFICIENT = 0.98 0.34

```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

```

-----
ADD HYD ( 0005)
1 + 2 = 3
-----
ID1= 1 ( 0001): 0.12 0.032 1.33 41.30
+ ID2= 2 ( 0004): 0.05 0.012 1.33 39.29
-----
ID = 3 ( 0005): 0.17 0.044 1.33 40.74

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
CALIB
STANDHYD ( 0008)
ID= 1 DT= 5.0 min
-----

```

```

Area (ha)= 0.08
Total Imp(%)= 9.00 Dir. Conn.(%)= 9.00

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= 0.01 0.07
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 23.09 40.00
Mannings n = 0.013 0.250

```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| | | ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|------|-------|----------------------------------|-------|-------|-------|------|-------|------|-------|
| | | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
| RAIN | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 3.22 | 0.083 | 2.68 | 1.083 | 24.17 | 2.083 | 6.69 | 3.08 | | |

| | | | | | | | |
|------|-------|------|-------|--------|-------|------|------|
| 3.22 | 0.167 | 2.68 | 1.167 | 24.17 | 2.167 | 6.69 | 3.17 |
| 2.98 | 0.250 | 3.10 | 1.250 | 104.21 | 2.250 | 5.63 | 3.25 |
| 2.98 | 0.333 | 3.10 | 1.333 | 104.21 | 2.333 | 5.63 | 3.33 |
| 2.77 | 0.417 | 3.68 | 1.417 | 32.03 | 2.417 | 4.87 | 3.42 |
| 2.77 | 0.500 | 3.68 | 1.500 | 32.03 | 2.500 | 4.87 | 3.50 |
| 2.60 | 0.583 | 4.58 | 1.583 | 16.34 | 2.583 | 4.30 | 3.58 |
| 2.60 | 0.667 | 4.58 | 1.667 | 16.34 | 2.667 | 4.30 | 3.67 |
| 2.44 | 0.750 | 6.15 | 1.750 | 10.96 | 2.750 | 3.86 | 3.75 |
| 2.44 | 0.833 | 6.15 | 1.833 | 10.96 | 2.833 | 3.86 | 3.83 |
| 2.31 | 0.917 | 9.61 | 1.917 | 8.29 | 2.917 | 3.51 | 3.92 |
| 2.31 | 1.000 | 9.61 | 2.000 | 8.29 | 3.000 | 3.51 | 4.00 |

```

Max.Eff.Inten.(mm/hr)= 104.21 25.45
over (min) = 5.00 15.00
Storage Coeff. (min)= 1.04 (ii) 13.24 (ii)
Unit Hyd. Tpeak (min)= 5.00 15.00
Unit Hyd. peak (cms)= 0.34 0.08

PEAK FLOW (cms)= 0.00 0.00
TIME TO PEAK (hrs)= 1.33 1.50
RUNOFF VOLUME (mm)= 44.16 15.56
TOTAL RAINFALL (mm)= 45.16 45.16
RUNOFF COEFFICIENT = 0.98 0.34

```

TOTALS

0.004 (iii)

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20% YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

```

-----
V V I SSSS U U A A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLL
OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y Y M M O O
OOO T T H H Y Y M M OOO

```

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***** D E T A I L E D O U T P U T *****

```

Input filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voain.dat
Output filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\efea7f53-fad1-4174-9dde-0e7e139c7424\scenar
Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9fa1fb-
87a1-436c-84fa-29e684f29ce0\efea7f53-fad1-4174-9dde-0e7e139c7424\scenar

```

DATE: 09/22/2025 TIME: 02:22:22

USER:

COMMENTS:

```

*****
** SIMULATION : 010yr 4hr 10min Chicago Copy **
*****

```

```

CHICAGO STORM IDF curve parameters: A=1174.184
Ptotal= 52.56 mm B= 6.010
C= 0.816
used in: INTENSITY = A / (t + B)^C

```

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|------|-------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 3.71 | 0.00 | 3.09 | 1.00 | 28.10 | 2.00 | 7.73 | 3.00 |



| | | | | | | | |
|------|------|-------|------|--------|------|------|------|
| 3.43 | 0.17 | 3.57 | 1.17 | 122.17 | 2.17 | 6.50 | 3.17 |
| 3.20 | 0.33 | 4.25 | 1.33 | 37.28 | 2.33 | 5.62 | 3.33 |
| 2.99 | 0.50 | 5.29 | 1.50 | 18.95 | 2.50 | 4.97 | 3.50 |
| 2.81 | 0.67 | 7.11 | 1.67 | 12.70 | 2.67 | 4.46 | 3.67 |
| 2.66 | 0.83 | 11.13 | 1.83 | 9.59 | 2.83 | 4.05 | 3.83 |

| | | | | | | | |
|------|-------|-------|-------|--------|-------|------|------|
| 3.43 | 0.333 | 3.57 | 1.333 | 122.17 | 2.333 | 6.50 | 3.33 |
| 3.20 | 0.417 | 4.25 | 1.417 | 37.28 | 2.417 | 5.62 | 3.42 |
| 3.20 | 0.500 | 4.25 | 1.500 | 37.28 | 2.500 | 5.62 | 3.50 |
| 2.99 | 0.583 | 5.29 | 1.583 | 18.95 | 2.583 | 4.97 | 3.58 |
| 2.99 | 0.667 | 5.29 | 1.667 | 18.95 | 2.667 | 4.97 | 3.67 |
| 2.81 | 0.750 | 7.11 | 1.750 | 12.70 | 2.750 | 4.46 | 3.75 |
| 2.81 | 0.833 | 7.11 | 1.833 | 12.70 | 2.833 | 4.46 | 3.83 |
| 2.66 | 0.917 | 11.13 | 1.917 | 9.59 | 2.917 | 4.05 | 3.92 |
| 2.66 | 1.000 | 11.13 | 2.000 | 9.59 | 3.000 | 4.05 | 4.00 |

| | | |
|--|--|----------------------|
| CALIB STANDHYD (0001) ID= 1 DT= 5.0 min | Area (ha)= 0.12 Total Imp(%)= 90.00 | Dir. Conn.(%)= 90.00 |
|--|--|----------------------|

| | | |
|-------------------------|------------|--------------|
| Surface Area (ha)= 0.11 | IMPERVIOUS | PERVIOUS (i) |
| Dep. Storage (mm)= 1.00 | | |
| Average Slope (%)= 1.00 | | |
| Length (m)= 28.17 | | |
| Mannings n = 0.013 | | |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|----------------------------------|-------|-------|-------|--------|-------|-------|------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 3.71 | 0.083 | 3.09 | 1.083 | 28.10 | 2.083 | 7.73 | 3.08 |
| 3.71 | 0.167 | 3.09 | 1.167 | 28.10 | 2.167 | 7.73 | 3.17 |
| 3.43 | 0.250 | 3.57 | 1.250 | 122.17 | 2.250 | 6.50 | 3.25 |
| 3.43 | 0.333 | 3.57 | 1.333 | 122.17 | 2.333 | 6.50 | 3.33 |
| 3.20 | 0.417 | 4.25 | 1.417 | 37.28 | 2.417 | 5.62 | 3.42 |
| 3.20 | 0.500 | 4.25 | 1.500 | 37.28 | 2.500 | 5.62 | 3.50 |
| 2.99 | 0.583 | 5.29 | 1.583 | 18.95 | 2.583 | 4.97 | 3.58 |
| 2.99 | 0.667 | 5.29 | 1.667 | 18.95 | 2.667 | 4.97 | 3.67 |
| 2.81 | 0.750 | 7.11 | 1.750 | 12.70 | 2.750 | 4.46 | 3.75 |
| 2.81 | 0.833 | 7.11 | 1.833 | 12.70 | 2.833 | 4.46 | 3.83 |
| 2.66 | 0.917 | 11.13 | 1.917 | 9.59 | 2.917 | 4.05 | 3.92 |
| 2.66 | 1.000 | 11.13 | 2.000 | 9.59 | 3.000 | 4.05 | 4.00 |

| | | |
|---------------------------------|-----------|-------------|
| Max.Eff.Inten.(mm/hr)= 122.17 | 42.11 | |
| over (min)= 5.00 | 5.00 | |
| Storage Coeff. (min)= 1.10 (ii) | 3.81 (ii) | |
| Unit Hyd. Tpeak (min)= 5.00 | 5.00 | |
| Unit Hyd. peak (cms)= 0.34 | 0.25 | |
| PEAK FLOW (cms)= 0.04 | 0.00 | *TOTALS* |
| TIME TO PEAK (hrs)= 1.33 | 1.33 | 0.038 (iii) |
| RUNOFF VOLUME (mm)= 51.56 | 20.37 | 48.43 |
| TOTAL RAINFALL (mm)= 52.56 | 52.56 | 52.56 |
| RUNOFF COEFFICIENT = 0.98 | 0.39 | 0.92 |

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

| | | |
|--|--|----------------------|
| CALIB STANDHYD (0004) ID= 1 DT= 5.0 min | Area (ha)= 0.05 Total Imp(%)= 83.00 | Dir. Conn.(%)= 83.00 |
|--|--|----------------------|

| | | |
|-------------------------|------------|--------------|
| Surface Area (ha)= 0.04 | IMPERVIOUS | PERVIOUS (i) |
| Dep. Storage (mm)= 1.00 | | |
| Average Slope (%)= 1.00 | | |
| Length (m)= 17.51 | | |
| Mannings n = 0.013 | | |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|----------------------------------|-------|-------|-------|--------|-------|-------|------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 3.71 | 0.083 | 3.09 | 1.083 | 28.10 | 2.083 | 7.73 | 3.08 |
| 3.71 | 0.167 | 3.09 | 1.167 | 28.10 | 2.167 | 7.73 | 3.17 |
| 3.43 | 0.250 | 3.57 | 1.250 | 122.17 | 2.250 | 6.50 | 3.25 |

| | | |
|---------------------------------|-----------|-------------|
| Max.Eff.Inten.(mm/hr)= 122.17 | 42.11 | |
| over (min)= 5.00 | 5.00 | |
| Storage Coeff. (min)= 0.83 (ii) | 4.28 (ii) | |
| Unit Hyd. Tpeak (min)= 5.00 | 5.00 | |
| Unit Hyd. peak (cms)= 0.34 | 0.23 | |
| PEAK FLOW (cms)= 0.01 | 0.00 | *TOTALS* |
| TIME TO PEAK (hrs)= 1.33 | 1.33 | 0.014 (iii) |
| RUNOFF VOLUME (mm)= 51.56 | 20.37 | 1.33 |
| TOTAL RAINFALL (mm)= 52.56 | 52.56 | 46.24 |
| RUNOFF COEFFICIENT = 0.98 | 0.39 | 52.56 |

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

| | | | | |
|------------------------------|-----------|-------------|-------------|-----------|
| ADD HYD (0005) 1 + 2 = 3 | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
| ID1= 1 (0001): | 0.12 | 0.038 | 1.33 | 48.43 |
| + ID2= 2 (0004): | 0.05 | 0.014 | 1.33 | 46.24 |
| ID = 3 (0005): | 0.17 | 0.052 | 1.33 | 47.82 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| | | |
|--|---------------------------------------|---------------------|
| CALIB STANDHYD (0008) ID= 1 DT= 5.0 min | Area (ha)= 0.08 Total Imp(%)= 9.00 | Dir. Conn.(%)= 9.00 |
|--|---------------------------------------|---------------------|

| | | |
|-------------------------|------------|--------------|
| Surface Area (ha)= 0.01 | IMPERVIOUS | PERVIOUS (i) |
| Dep. Storage (mm)= 1.00 | | |
| Average Slope (%)= 1.00 | | |
| Length (m)= 23.09 | | |
| Mannings n = 0.013 | | |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|----------------------------------|-------|-------|-------|--------|-------|-------|------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 3.71 | 0.083 | 3.09 | 1.083 | 28.10 | 2.083 | 7.73 | 3.08 |
| 3.71 | 0.167 | 3.09 | 1.167 | 28.10 | 2.167 | 7.73 | 3.17 |
| 3.43 | 0.250 | 3.57 | 1.250 | 122.17 | 2.250 | 6.50 | 3.25 |
| 3.43 | 0.333 | 3.57 | 1.333 | 122.17 | 2.333 | 6.50 | 3.33 |
| 3.20 | 0.417 | 4.25 | 1.417 | 37.28 | 2.417 | 5.62 | 3.42 |
| 3.20 | 0.500 | 4.25 | 1.500 | 37.28 | 2.500 | 5.62 | 3.50 |
| 2.99 | 0.583 | 5.29 | 1.583 | 18.95 | 2.583 | 4.97 | 3.58 |
| 2.99 | 0.667 | 5.29 | 1.667 | 18.95 | 2.667 | 4.97 | 3.67 |
| 2.81 | 0.750 | 7.11 | 1.750 | 12.70 | 2.750 | 4.46 | 3.75 |
| 2.81 | 0.833 | 7.11 | 1.833 | 12.70 | 2.833 | 4.46 | 3.83 |
| 2.66 | 0.917 | 11.13 | 1.917 | 9.59 | 2.917 | 4.05 | 3.92 |
| 2.66 | 1.000 | 11.13 | 2.000 | 9.59 | 3.000 | 4.05 | 4.00 |

| | | |
|---------------------------------|------------|-------------|
| Max.Eff.Inten.(mm/hr)= 122.17 | 42.11 | |
| over (min)= 5.00 | 15.00 | |
| Storage Coeff. (min)= 0.98 (ii) | 10.95 (ii) | |
| Unit Hyd. Tpeak (min)= 5.00 | 15.00 | |
| Unit Hyd. peak (cms)= 0.34 | 0.09 | |
| PEAK FLOW (cms)= 0.00 | 0.01 | *TOTALS* |
| TIME TO PEAK (hrs)= 1.33 | 1.50 | 0.006 (iii) |
| | | 1.50 |



RUNOFF VOLUME (mm) = 51.56 20.37 23.10
 TOTAL RAINFALL (mm) = 52.56 52.56 52.56
 RUNOFF COEFFICIENT = 0.98 0.39 0.44

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 ***** WARNING: FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
 YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

 =====

V V I SSSS U U A L (v 6.2.2015)
 V V I SS U U A A L
 V V I SS U U A A A A L
 V V I SS U U A A L
 V V I SSSS UUUU A A LLLL

OOO TTTT TTTT H H Y Y M M OOO TM
 O O T T H H Y Y MM MM O O
 O O T T H H Y M M O O
 OOO T T H H Y M M OOO

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO
 6.2\VO2\voin.dat
 Output filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\9ac93451-0933-4936-99d5-17c12563a5d3\scenar
 Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\9ac93451-0933-4936-99d5-17c12563a5d3\scenar

DATE: 09/22/2025 TIME: 02:22:22

USER:

COMMENTS: _____

 ** SIMULATION : 025yr 4hr 10min Chicago Copy **

CHICAGO STORM IDF curve parameters: A=1402.884
 Ptotal= 61.76 mm B= 6.020
 C= 0.819
 used in: INTENSITY = A / (t + B)^C
 Duration of storm = 4.00 hrs
 Storm time step = 10.00 min
 Time to peak ratio = 0.33

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|------|--------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.31 | 0.00 | 3.58 | 1.00 | 33.04 | 2.00 | 9.01 | 3.00 |
| 4.31 | 0.17 | 4.14 | 1.17 | 144.68 | 2.17 | 7.57 | 3.17 |
| 3.98 | 0.33 | 4.93 | 1.33 | 43.91 | 2.33 | 6.54 | 3.33 |
| 3.71 | 0.50 | 6.15 | 1.50 | 22.23 | 2.50 | 5.78 | 3.50 |
| 3.47 | 0.67 | 8.28 | 1.67 | 14.85 | 2.67 | 5.18 | 3.67 |
| 3.26 | 0.83 | 13.01 | 1.83 | 11.19 | 2.83 | 4.70 | 3.83 |
| 3.08 | | | | | | | |

CALIB STANDHYD (0001) Area (ha)= 0.12
 ID= 1 DT= 5.0 min Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.11 0.01
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 28.17 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.31 | 0.083 | 3.58 | 1.083 | 33.04 | 2.083 | 9.01 | 3.08 |
| 4.31 | 0.167 | 3.58 | 1.167 | 33.04 | 2.167 | 9.01 | 3.17 |
| 3.98 | 0.250 | 4.14 | 1.250 | 144.68 | 2.250 | 7.57 | 3.25 |
| 3.98 | 0.333 | 4.14 | 1.333 | 144.68 | 2.333 | 7.57 | 3.33 |
| 3.71 | 0.417 | 4.93 | 1.417 | 43.91 | 2.417 | 6.54 | 3.42 |
| 3.71 | 0.500 | 4.93 | 1.500 | 43.91 | 2.500 | 6.54 | 3.50 |
| 3.47 | 0.583 | 6.15 | 1.583 | 22.23 | 2.583 | 5.78 | 3.58 |
| 3.47 | 0.667 | 6.15 | 1.667 | 22.23 | 2.667 | 5.78 | 3.67 |
| 3.26 | 0.750 | 8.28 | 1.750 | 14.85 | 2.750 | 5.18 | 3.75 |
| 3.26 | 0.833 | 8.28 | 1.833 | 14.85 | 2.833 | 5.18 | 3.83 |
| 3.08 | 0.917 | 13.01 | 1.917 | 11.19 | 2.917 | 4.70 | 3.92 |
| 3.08 | 1.000 | 13.01 | 2.000 | 11.19 | 3.000 | 4.70 | 4.00 |

Max.Eff.Inten.(mm/hr)= 144.68 57.63
 over (min) 5.00 5.00
 Storage Coeff. (min)= 1.03 (ii) 3.56 (ii)
 Unit Hyd. Tpeak (min)= 5.00 5.00
 Unit Hyd. peak (cms)= 0.34 0.26

 PEAK FLOW (cms)= 0.04 0.00 0.045 (iii)
 TIME TO PEAK (hrs)= 1.33 1.33 1.33
 RUNOFF VOLUME (mm)= 60.76 26.79 57.36
 TOTAL RAINFALL (mm)= 61.76 61.76 61.76
 RUNOFF COEFFICIENT = 0.98 0.43 0.93

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

CALIB STANDHYD (0004) Area (ha)= 0.05
 ID= 1 DT= 5.0 min Total Imp(%)= 83.00 Dir. Conn.(%)= 83.00

IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.04 0.01
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 17.51 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.31 | 0.083 | 3.58 | 1.083 | 33.04 | 2.083 | 9.01 | 3.08 |
| 4.31 | 0.167 | 3.58 | 1.167 | 33.04 | 2.167 | 9.01 | 3.17 |
| 3.98 | 0.250 | 4.14 | 1.250 | 144.68 | 2.250 | 7.57 | 3.25 |
| 3.98 | 0.333 | 4.14 | 1.333 | 144.68 | 2.333 | 7.57 | 3.33 |
| 3.71 | 0.417 | 4.93 | 1.417 | 43.91 | 2.417 | 6.54 | 3.42 |
| 3.71 | 0.500 | 4.93 | 1.500 | 43.91 | 2.500 | 6.54 | 3.50 |
| 3.47 | 0.583 | 6.15 | 1.583 | 22.23 | 2.583 | 5.78 | 3.58 |
| 3.47 | 0.667 | 6.15 | 1.667 | 22.23 | 2.667 | 5.78 | 3.67 |
| 3.26 | 0.750 | 8.28 | 1.750 | 14.85 | 2.750 | 5.18 | 3.75 |
| 3.26 | 0.833 | 8.28 | 1.833 | 14.85 | 2.833 | 5.18 | 3.83 |
| 3.08 | 0.917 | 13.01 | 1.917 | 11.19 | 2.917 | 4.70 | 3.92 |
| 3.08 | 1.000 | 13.01 | 2.000 | 11.19 | 3.000 | 4.70 | 4.00 |

Max.Eff.Inten.(mm/hr)= 144.68 57.63
 over (min) 5.00 5.00
 Storage Coeff. (min)= 0.77 (ii) 4.00 (ii)
 Unit Hyd. Tpeak (min)= 5.00 5.00
 Unit Hyd. peak (cms)= 0.34 0.24

 PEAK FLOW (cms)= 0.02 0.00 0.017 (iii)
 TIME TO PEAK (hrs)= 1.33 1.33 1.33
 RUNOFF VOLUME (mm)= 60.76 26.79 54.98
 TOTAL RAINFALL (mm)= 61.76 61.76 61.76
 RUNOFF COEFFICIENT = 0.98 0.43 0.89



***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
Output filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
87a1-436c-84fa-29e684f29ce0\75932167-5ae9-4d30-99a2-032d345df1f9\scenar
Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
87a1-436c-84fa-29e684f29ce0\75932167-5ae9-4d30-99a2-032d345df1f9\scenar

DATE: 09/22/2025 TIME: 02:22:22

USER:

COMMENTS:

| ADD HYD (0005) | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|-----------|-------------|-------------|-----------|
| 1 + 2 = 3 | | | | |
| ID1= 1 (0001): | 0.12 | 0.045 | 1.33 | 57.36 |
| + ID2= 2 (0004): | 0.05 | 0.017 | 1.33 | 54.98 |
| ID = 3 (0005): | 0.17 | 0.062 | 1.33 | 56.70 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB STANDHYD (0008) | Area (ha) | Dir. Conn.(%) |
|------------------------|-----------|---------------|
| ID= 1 DT= 5.0 min | 0.08 | 9.00 |

| | IMPERVIOUS (ha) | PERVIOUS (i) |
|---------------|-----------------|--------------|
| Surface Area | 0.01 | 0.07 |
| Dep. Storage | 1.00 | 5.00 |
| Average Slope | 1.00 | 2.00 |
| Length | 23.09 | 40.00 |
| Mannings n | 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

** SIMULATION : 050yr 4hr 10min Chicago Copy **

| CHICAGO STORM | IDF curve parameters: |
|------------------|-----------------------|
| Ptotal= 68.73 mm | A=1569.580 |
| | B= 6.010 |
| | C= 0.820 |

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|----------------------------------|-------|-------|-------|--------|-------|-------|------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.31 | 0.083 | 3.58 | 1.083 | 33.04 | 2.083 | 9.01 | 3.08 |
| 4.31 | 0.167 | 3.58 | 1.167 | 33.04 | 2.167 | 9.01 | 3.17 |
| 3.98 | 0.250 | 4.14 | 1.250 | 144.68 | 2.250 | 7.57 | 3.25 |
| 3.98 | 0.333 | 4.14 | 1.333 | 144.68 | 2.333 | 7.57 | 3.33 |
| 3.71 | 0.417 | 4.93 | 1.417 | 43.91 | 2.417 | 6.54 | 3.42 |
| 3.71 | 0.500 | 4.93 | 1.500 | 43.91 | 2.500 | 6.54 | 3.50 |
| 3.47 | 0.583 | 6.15 | 1.583 | 22.23 | 2.583 | 5.78 | 3.58 |
| 3.47 | 0.667 | 6.15 | 1.667 | 22.23 | 2.667 | 5.78 | 3.67 |
| 3.26 | 0.750 | 8.28 | 1.750 | 14.85 | 2.750 | 5.18 | 3.75 |
| 3.26 | 0.833 | 8.28 | 1.833 | 14.85 | 2.833 | 5.18 | 3.83 |
| 3.08 | 0.917 | 13.01 | 1.917 | 11.19 | 2.917 | 4.70 | 3.92 |
| 3.08 | 1.000 | 13.01 | 2.000 | 11.19 | 3.000 | 4.70 | 4.00 |

| | | |
|--------------------------|-----------|-----------|
| Max.Eff.Inten. (mm/hr) = | 144.68 | 57.63 |
| over (min) | 5.00 | 10.00 |
| Storage Coeff. (min) = | 0.91 (ii) | 9.71 (ii) |
| Unit Hyd. Tpeak (min) = | 5.00 | 10.00 |
| Unit Hyd. peak (cms) = | 0.34 | 0.11 |

| *TOTALS* | | | |
|-----------------------|-------|-------|-------------|
| PEAK FLOW (cms) = | 0.00 | 0.01 | 0.009 (iii) |
| TIME TO PEAK (hrs) = | 1.33 | 1.42 | 1.33 |
| RUNOFF VOLUME (mm) = | 60.76 | 26.79 | 29.77 |
| TOTAL RAINFALL (mm) = | 61.76 | 61.76 | 61.76 |
| RUNOFF COEFFICIENT = | 0.98 | 0.43 | 0.48 |

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|------|--------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.77 | 0.00 | 3.97 | 1.00 | 36.76 | 2.00 | 10.00 | 3.00 |
| 4.41 | 0.17 | 4.59 | 1.17 | 161.50 | 2.17 | 8.40 | 3.17 |
| 4.10 | 0.33 | 5.47 | 1.33 | 48.87 | 2.33 | 7.26 | 3.33 |
| 3.84 | 0.50 | 6.82 | 1.50 | 24.70 | 2.50 | 6.40 | 3.50 |
| 3.61 | 0.67 | 9.19 | 1.67 | 16.49 | 2.67 | 5.74 | 3.67 |
| 3.41 | 0.83 | 14.44 | 1.83 | 12.42 | 2.83 | 5.21 | 3.83 |

| CALIB STANDHYD (0001) | Area (ha) | Dir. Conn.(%) |
|------------------------|-----------|---------------|
| ID= 1 DT= 5.0 min | 0.12 | 90.00 |

| | IMPERVIOUS (ha) | PERVIOUS (i) |
|---------------|-----------------|--------------|
| Surface Area | 0.11 | 0.01 |
| Dep. Storage | 1.00 | 5.00 |
| Average Slope | 1.00 | 2.00 |
| Length | 28.17 | 40.00 |
| Mannings n | 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|----------------------------------|-------|-------|-------|--------|-------|-------|------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.77 | 0.083 | 3.97 | 1.083 | 36.76 | 2.083 | 10.00 | 3.08 |
| 4.77 | 0.167 | 3.97 | 1.167 | 36.76 | 2.167 | 10.00 | 3.17 |
| 4.41 | 0.250 | 4.59 | 1.250 | 161.50 | 2.250 | 8.40 | 3.25 |
| 4.41 | 0.333 | 4.59 | 1.333 | 161.50 | 2.333 | 8.40 | 3.33 |
| 4.10 | 0.417 | 5.47 | 1.417 | 48.87 | 2.417 | 7.26 | 3.42 |
| 4.10 | 0.500 | 5.47 | 1.500 | 48.87 | 2.500 | 7.26 | 3.50 |
| 3.84 | 0.583 | 6.82 | 1.583 | 24.70 | 2.583 | 6.40 | 3.58 |
| 3.84 | 0.667 | 6.82 | 1.667 | 24.70 | 2.667 | 6.40 | 3.67 |
| 3.61 | 0.750 | 9.19 | 1.750 | 16.49 | 2.750 | 5.74 | 3.75 |
| 3.61 | 0.833 | 9.19 | 1.833 | 16.49 | 2.833 | 5.74 | 3.83 |
| 3.41 | 0.917 | 14.44 | 1.917 | 12.42 | 2.917 | 5.21 | 3.92 |
| 3.41 | 1.000 | 14.44 | 2.000 | 12.42 | 3.000 | 5.21 | 4.00 |

| | | |
|--------------------------|--------|-------|
| Max.Eff.Inten. (mm/hr) = | 161.50 | 70.15 |
| over (min) | 5.00 | 5.00 |

V V I SSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLL
OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y M M M O O
O O T T H H Y Y M M O O O
OOO T T H H Y M M OOO
Developed and Distributed by Smart City Water Inc



Storage Coeff. (min)= 0.99 (ii) 3.41 (ii)
 Unit Hyd. Tpeak (min)= 5.00 5.00
 Unit Hyd. peak (cms)= 0.34 0.26

Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 23.09 40.00
 Mannings n = 0.013 0.250

TOTALS
 PEAK FLOW (cms)= 0.05 0.00 0.051 (iii)
 TIME TO PEAK (hrs)= 1.33 1.33 1.33
 RUNOFF VOLUME (mm)= 67.73 31.92 64.14
 TOTAL RAINFALL (mm)= 68.73 68.73 68.73
 RUNOFF COEFFICIENT = 0.99 0.46 0.93

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
 CN* = 80.0 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.

 CALIB
 STANDHYD (0004)
 ID= 1 DT= 5.0 min
 Area (ha)= 0.05
 Total Imp(%)= 83.00 Dir. Conn.(%)= 83.00

IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.04 0.01
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 17.51 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|-------|----------------------------------|-------|-------|--------|-------|-------|------|-------|
| | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 4.77 | 0.083 | 3.97 | 1.083 | 36.76 | 2.083 | 10.00 | 3.08 | |
| 4.77 | 0.167 | 3.97 | 1.167 | 36.76 | 2.167 | 10.00 | 3.17 | |
| 4.41 | 0.250 | 4.59 | 1.250 | 161.50 | 2.250 | 8.40 | 3.25 | |
| 4.41 | 0.333 | 4.59 | 1.333 | 161.50 | 2.333 | 8.40 | 3.33 | |
| 4.10 | 0.417 | 5.47 | 1.417 | 48.87 | 2.417 | 7.26 | 3.42 | |
| 4.10 | 0.500 | 5.47 | 1.500 | 48.87 | 2.500 | 7.26 | 3.50 | |
| 3.84 | 0.583 | 6.82 | 1.583 | 24.70 | 2.583 | 6.40 | 3.58 | |
| 3.84 | 0.667 | 6.82 | 1.667 | 24.70 | 2.667 | 6.40 | 3.67 | |
| 3.61 | 0.750 | 9.19 | 1.750 | 16.49 | 2.750 | 5.74 | 3.75 | |
| 3.61 | 0.833 | 9.19 | 1.833 | 16.49 | 2.833 | 5.74 | 3.83 | |
| 3.41 | 0.917 | 14.44 | 1.917 | 12.42 | 2.917 | 5.21 | 3.92 | |
| 3.41 | 1.000 | 14.44 | 2.000 | 12.42 | 3.000 | 5.21 | 4.00 | |

| RAIN | ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|-------|----------------------------------|-------|-------|--------|-------|-------|------|-------|
| | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 4.77 | 0.083 | 3.97 | 1.083 | 36.76 | 2.083 | 10.00 | 3.08 | |
| 4.77 | 0.167 | 3.97 | 1.167 | 36.76 | 2.167 | 10.00 | 3.17 | |
| 4.41 | 0.250 | 4.59 | 1.250 | 161.50 | 2.250 | 8.40 | 3.25 | |
| 4.41 | 0.333 | 4.59 | 1.333 | 161.50 | 2.333 | 8.40 | 3.33 | |
| 4.10 | 0.417 | 5.47 | 1.417 | 48.87 | 2.417 | 7.26 | 3.42 | |
| 4.10 | 0.500 | 5.47 | 1.500 | 48.87 | 2.500 | 7.26 | 3.50 | |
| 3.84 | 0.583 | 6.82 | 1.583 | 24.70 | 2.583 | 6.40 | 3.58 | |
| 3.84 | 0.667 | 6.82 | 1.667 | 24.70 | 2.667 | 6.40 | 3.67 | |
| 3.61 | 0.750 | 9.19 | 1.750 | 16.49 | 2.750 | 5.74 | 3.75 | |
| 3.61 | 0.833 | 9.19 | 1.833 | 16.49 | 2.833 | 5.74 | 3.83 | |
| 3.41 | 0.917 | 14.44 | 1.917 | 12.42 | 2.917 | 5.21 | 3.92 | |
| 3.41 | 1.000 | 14.44 | 2.000 | 12.42 | 3.000 | 5.21 | 4.00 | |

Max.Eff.Inten.(mm/hr)= 161.50 70.15
 over (min)= 5.00 10.00
 Storage Coeff. (min)= 0.88 (ii) 9.01 (ii)
 Unit Hyd. Tpeak (min)= 5.00 10.00
 Unit Hyd. peak (cms)= 0.34 0.12

TOTALS
 PEAK FLOW (cms)= 0.00 0.01 0.011 (iii)
 TIME TO PEAK (hrs)= 1.33 1.42 1.33
 RUNOFF VOLUME (mm)= 67.73 31.92 35.07
 TOTAL RAINFALL (mm)= 68.73 68.73 68.73
 RUNOFF COEFFICIENT = 0.99 0.46 0.51

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 ***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
 YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
 CN* = 80.0 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.

Max.Eff.Inten.(mm/hr)= 161.50 70.15
 over (min)= 5.00 5.00
 Storage Coeff. (min)= 0.74 (ii) 3.83 (ii)
 Unit Hyd. Tpeak (min)= 5.00 5.00
 Unit Hyd. peak (cms)= 0.34 0.25

TOTALS
 PEAK FLOW (cms)= 0.02 0.00 0.019 (iii)
 TIME TO PEAK (hrs)= 1.33 1.33 1.33
 RUNOFF VOLUME (mm)= 67.73 31.92 61.63
 TOTAL RAINFALL (mm)= 68.73 68.73 68.73
 RUNOFF COEFFICIENT = 0.99 0.46 0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
 CN* = 80.0 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.

V V I SSSSS U U A L (v 6.2.2015)
 V V I SS U U A A L
 V V I SS U U A A A A L
 V V I SS U U A A L
 V V I SSSSS UUUU A A LLLL

OOO TTTT TTTT H H Y Y M M OOO TM
 O O T T H H Y Y MM MM O O
 O O T T H H Y Y M M O O
 OOO T T H H Y Y M M OOO

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO
 6.2\VO2\voindat
 Output filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\55260f8-7b04-4935-abb2-d390026d61b0\scenar
 Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\55260f8-7b04-4935-abb2-d390026d61b0\scenar

DATE: 09/22/2025 TIME: 02:22:22

USER:

COMMENTS:

 ADD HYD (0005)
 1 + 2 = 3
 AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID1= 1 (0001): 0.12 0.051 1.33 64.14
 + ID2= 2 (0004): 0.05 0.019 1.33 61.63
 ID = 3 (0005): 0.17 0.069 1.33 63.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 CALIB
 STANDHYD (0008)
 ID= 1 DT= 5.0 min
 Area (ha)= 0.08
 Total Imp(%)= 9.00 Dir. Conn.(%)= 9.00

IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.01 0.07



CHICAGO STORM
Ptotal= 76.00 mm

IDF curve parameters: A=1735.688
B= 6.010
C= 0.820

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|------|--------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 5.28 | 0.00 | 4.39 | 1.00 | 40.65 | 2.00 | 11.06 | 3.00 |
| 4.88 | 0.17 | 5.07 | 1.17 | 178.60 | 2.17 | 9.28 | 3.17 |
| 4.54 | 0.33 | 6.05 | 1.33 | 54.04 | 2.33 | 8.02 | 3.33 |
| 4.25 | 0.50 | 7.54 | 1.50 | 27.31 | 2.50 | 7.08 | 3.50 |
| 3.99 | 0.67 | 10.16 | 1.67 | 18.24 | 2.67 | 6.35 | 3.67 |
| 3.77 | 0.83 | 15.97 | 1.83 | 13.74 | 2.83 | 5.76 | 3.83 |

| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|----------------------------------|-------|-------|-------|--------|-------|-------|------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 5.28 | 0.083 | 4.39 | 1.083 | 40.65 | 2.083 | 11.06 | 3.08 |
| 5.28 | 0.167 | 4.39 | 1.167 | 40.65 | 2.167 | 11.06 | 3.17 |
| 4.88 | 0.250 | 5.07 | 1.250 | 178.60 | 2.250 | 9.28 | 3.25 |
| 4.88 | 0.333 | 5.07 | 1.333 | 178.60 | 2.333 | 9.28 | 3.33 |
| 4.54 | 0.417 | 6.05 | 1.417 | 54.04 | 2.417 | 8.02 | 3.42 |
| 4.54 | 0.500 | 6.05 | 1.500 | 54.04 | 2.500 | 8.02 | 3.50 |
| 4.25 | 0.583 | 7.54 | 1.583 | 27.31 | 2.583 | 7.08 | 3.58 |
| 4.25 | 0.667 | 7.54 | 1.667 | 27.31 | 2.667 | 7.08 | 3.67 |
| 3.99 | 0.750 | 10.16 | 1.750 | 18.24 | 2.750 | 6.35 | 3.75 |
| 3.99 | 0.833 | 10.16 | 1.833 | 18.24 | 2.833 | 6.35 | 3.83 |
| 3.77 | 0.917 | 15.97 | 1.917 | 13.74 | 2.917 | 5.76 | 3.92 |
| 3.77 | 1.000 | 15.97 | 2.000 | 13.74 | 3.000 | 5.76 | 4.00 |

CALIB
STANDHYD (0001)
ID= 1 DT= 5.0 min

Area (ha)= 0.12
Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

| | IMPERVIOUS | PERVIOUS (i) |
|-------------------|------------|--------------|
| Surface Area (ha) | 0.11 | 0.01 |
| Dep. Storage (mm) | 1.00 | 5.00 |
| Average Slope (%) | 1.00 | 2.00 |
| Length (m) | 28.17 | 40.00 |
| Mannings n | 0.013 | 0.250 |

| | | |
|------------------------|-----------|-----------|
| Max.Eff.Inten.(mm/hr)= | 178.60 | 83.65 |
| over (min) | 5.00 | 5.00 |
| Storage Coeff. (min)= | 0.71 (ii) | 3.68 (ii) |
| Unit Hyd. Tpeak (min)= | 5.00 | 5.00 |
| Unit Hyd. peak (cms)= | 0.34 | 0.25 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| | | | |
|----------------------|-------|-------|-------------|
| PEAK FLOW (cms)= | 0.02 | 0.00 | *TOTALS* |
| TIME TO PEAK (hrs)= | 1.33 | 1.33 | 0.021 (iii) |
| RUNOFF VOLUME (mm)= | 75.00 | 37.48 | 1.33 |
| TOTAL RAINFALL (mm)= | 76.00 | 76.00 | 68.61 |
| RUNOFF COEFFICIENT = | 0.99 | 0.49 | 76.00 |
| | | | 0.90 |

| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|----------------------------------|-------|-------|-------|--------|-------|-------|------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 5.28 | 0.083 | 4.39 | 1.083 | 40.65 | 2.083 | 11.06 | 3.08 |
| 5.28 | 0.167 | 4.39 | 1.167 | 40.65 | 2.167 | 11.06 | 3.17 |
| 4.88 | 0.250 | 5.07 | 1.250 | 178.60 | 2.250 | 9.28 | 3.25 |
| 4.88 | 0.333 | 5.07 | 1.333 | 178.60 | 2.333 | 9.28 | 3.33 |
| 4.54 | 0.417 | 6.05 | 1.417 | 54.04 | 2.417 | 8.02 | 3.42 |
| 4.54 | 0.500 | 6.05 | 1.500 | 54.04 | 2.500 | 8.02 | 3.50 |
| 4.25 | 0.583 | 7.54 | 1.583 | 27.31 | 2.583 | 7.08 | 3.58 |
| 4.25 | 0.667 | 7.54 | 1.667 | 27.31 | 2.667 | 7.08 | 3.67 |
| 3.99 | 0.750 | 10.16 | 1.750 | 18.24 | 2.750 | 6.35 | 3.75 |
| 3.99 | 0.833 | 10.16 | 1.833 | 18.24 | 2.833 | 6.35 | 3.83 |
| 3.77 | 0.917 | 15.97 | 1.917 | 13.74 | 2.917 | 5.76 | 3.92 |
| 3.77 | 1.000 | 15.97 | 2.000 | 13.74 | 3.000 | 5.76 | 4.00 |

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

ADD HYD (0005)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|-----------|-------------|-------------|-----------|
| ID1= 1 (0001): | 0.12 | 0.056 | 1.33 | 71.24 |
| + ID2= 2 (0004): | 0.05 | 0.021 | 1.33 | 68.61 |
| ID = 3 (0005): | 0.17 | 0.077 | 1.33 | 70.51 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0008)
ID= 1 DT= 5.0 min

Area (ha)= 0.08
Total Imp(%)= 9.00 Dir. Conn.(%)= 9.00

| | | | |
|------------------------|-----------|-----------|-------------|
| Max.Eff.Inten.(mm/hr)= | 178.60 | 83.65 | |
| over (min) | 5.00 | 5.00 | |
| Storage Coeff. (min)= | 0.95 (ii) | 3.27 (ii) | |
| Unit Hyd. Tpeak (min)= | 5.00 | 5.00 | |
| Unit Hyd. peak (cms)= | 0.34 | 0.27 | |
| | | *TOTALS* | |
| PEAK FLOW (cms)= | 0.05 | 0.00 | 0.056 (iii) |
| TIME TO PEAK (hrs)= | 1.33 | 1.33 | 1.33 |
| RUNOFF VOLUME (mm)= | 75.00 | 37.48 | 71.24 |
| TOTAL RAINFALL (mm)= | 76.00 | 76.00 | 76.00 |
| RUNOFF COEFFICIENT = | 0.99 | 0.49 | 0.94 |

| | IMPERVIOUS | PERVIOUS (i) |
|-------------------|------------|--------------|
| Surface Area (ha) | 0.01 | 0.07 |
| Dep. Storage (mm) | 1.00 | 5.00 |
| Average Slope (%) | 1.00 | 2.00 |
| Length (m) | 23.09 | 40.00 |
| Mannings n | 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

CALIB
STANDHYD (0004)
ID= 1 DT= 5.0 min

Area (ha)= 0.05
Total Imp(%)= 83.00 Dir. Conn.(%)= 83.00

| | IMPERVIOUS | PERVIOUS (i) |
|-------------------|------------|--------------|
| Surface Area (ha) | 0.04 | 0.01 |
| Dep. Storage (mm) | 1.00 | 5.00 |
| Average Slope (%) | 1.00 | 2.00 |
| Length (m) | 17.51 | 40.00 |
| Mannings n | 0.013 | 0.250 |

| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | |
|----------------------------------|-------|-------|-------|--------|-------|-------|------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 5.28 | 0.083 | 4.39 | 1.083 | 40.65 | 2.083 | 11.06 | 3.08 |
| 5.28 | 0.167 | 4.39 | 1.167 | 40.65 | 2.167 | 11.06 | 3.17 |
| 4.88 | 0.250 | 5.07 | 1.250 | 178.60 | 2.250 | 9.28 | 3.25 |
| 4.88 | 0.333 | 5.07 | 1.333 | 178.60 | 2.333 | 9.28 | 3.33 |
| 4.54 | 0.417 | 6.05 | 1.417 | 54.04 | 2.417 | 8.02 | 3.42 |
| 4.54 | 0.500 | 6.05 | 1.500 | 54.04 | 2.500 | 8.02 | 3.50 |
| 4.25 | 0.583 | 7.54 | 1.583 | 27.31 | 2.583 | 7.08 | 3.58 |
| 4.25 | 0.667 | 7.54 | 1.667 | 27.31 | 2.667 | 7.08 | 3.67 |
| 3.99 | 0.750 | 10.16 | 1.750 | 18.24 | 2.750 | 6.35 | 3.75 |



3.99 0.833 10.16 | 1.833 18.24 | 2.833 6.35 | 3.83
 3.77 0.917 15.97 | 1.917 13.74 | 2.917 5.76 | 3.92
 3.77 1.000 15.97 | 2.000 13.74 | 3.000 5.76 | 4.00

Max.Eff.Inten.(mm/hr)= 178.60 83.65
 over (min) 5.00 10.00
 Storage Coeff. (min)= 0.84 (ii) 8.42 (ii)
 Unit Hyd. Tpeak (min)= 5.00 10.00
 Unit Hyd. peak (cms)= 0.34 0.12
 PEAK FLOW (cms)= 0.00 0.01
 TIME TO PEAK (hrs)= 1.33 1.42
 RUNOFF VOLUME (mm)= 75.00 37.48
 TOTAL RAINFALL (mm)= 76.00 76.00
 RUNOFF COEFFICIENT = 0.99 0.49

TOTALS
 0.013 (iii)
 1.42
 40.79
 76.00
 0.54

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 ***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
 YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

 =====
 =====

V V I SSSS U U A L (v 6.2.2015)
 V V I SS U U A A L
 V V I SS U U A A A A L
 V V I SS U U A A L
 VV I SSSS UUUU A A LLLL

OOO TTTT TTTT H H Y Y M M OOO TM
 O O T T H H Y Y M M O O O
 O O T T H H Y Y M M O O O
 OOO T T H H Y M M OOO

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO
 6.2\VO2\voain.dat
 Output filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\576f806c-09fb-438f-b67e-3a6b27cf3fd8\scenar
 Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\576f806c-09fb-438f-b67e-3a6b27cf3fd8\scenar

DATE: 09/22/2025 TIME: 02:22:22

USER:

COMMENTS: _____

 ** SIMULATION : 25mm 4hr Chicago (VO) **

 READ STORM Filename: C:\Users\KimJo\AppData\Local\Temp\
 0fecc8302c7a\234daf06 39a79002-ddca-46ff-a3a1-
 | Ptotal= 25.00 mm | Comments: 25mm 4hr Chicago (VO)

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|------|-------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.80 | 0.00 | 2.07 | 1.00 | 5.70 | 2.00 | 5.19 | 3.00 |
| 2.80 | 0.17 | 2.27 | 1.17 | 10.78 | 2.17 | 4.47 | 3.17 |
| 2.62 | 0.33 | 2.52 | 1.33 | 50.21 | 2.33 | 3.95 | 3.33 |
| 2.48 | 0.50 | 2.88 | 1.50 | 13.37 | 2.50 | 3.56 | 3.50 |
| 2.35 | 0.67 | 3.38 | 1.67 | 8.29 | 2.67 | 3.25 | 3.67 |
| 2.23 | 0.83 | 4.18 | 1.83 | 6.30 | 2.83 | 3.01 | 3.83 |

 CALIB STANDHYD (0001) Area (ha)= 0.12
 ID= 1 DT= 5.0 min Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

 IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.11 0.01
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 28.17 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|-------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.80 | 0.083 | 2.07 | 1.083 | 5.70 | 2.083 | 5.19 | 3.08 |
| 2.80 | 0.167 | 2.07 | 1.167 | 5.70 | 2.167 | 5.19 | 3.17 |
| 2.80 | 0.250 | 2.27 | 1.250 | 10.78 | 2.250 | 4.47 | 3.25 |
| 2.62 | 0.333 | 2.27 | 1.333 | 10.78 | 2.333 | 4.47 | 3.33 |
| 2.62 | 0.417 | 2.52 | 1.417 | 50.21 | 2.417 | 3.95 | 3.42 |
| 2.48 | 0.500 | 2.52 | 1.500 | 50.21 | 2.500 | 3.95 | 3.50 |
| 2.48 | 0.583 | 2.88 | 1.583 | 13.37 | 2.583 | 3.56 | 3.58 |
| 2.35 | 0.667 | 2.88 | 1.667 | 13.37 | 2.667 | 3.56 | 3.67 |
| 2.35 | 0.750 | 3.38 | 1.750 | 8.29 | 2.750 | 3.25 | 3.75 |
| 2.23 | 0.833 | 3.38 | 1.833 | 8.29 | 2.833 | 3.25 | 3.83 |
| 2.23 | 0.917 | 4.17 | 1.917 | 6.30 | 2.917 | 3.01 | 3.92 |
| 2.14 | 1.000 | 4.18 | 2.000 | 6.29 | 3.000 | 3.01 | 4.00 |

Max.Eff.Inten.(mm/hr)= 50.21 6.66
 over (min) 5.00 10.00
 Storage Coeff. (min)= 1.57 (ii) 5.43 (ii)
 Unit Hyd. Tpeak (min)= 5.00 10.00
 Unit Hyd. peak (cms)= 0.33 0.16
 PEAK FLOW (cms)= 0.01 0.00
 TIME TO PEAK (hrs)= 1.50 1.58
 RUNOFF VOLUME (mm)= 24.00 4.79
 TOTAL RAINFALL (mm)= 25.00 25.00
 RUNOFF COEFFICIENT = 0.96 0.19

TOTALS
 0.015 (iii)
 1.50
 22.06
 25.00
 0.88

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

 CALIB STANDHYD (0004) Area (ha)= 0.05
 ID= 1 DT= 5.0 min Total Imp(%)= 83.00 Dir. Conn.(%)= 83.00

IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.04 0.01
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 17.51 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|-------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.80 | 0.083 | 2.07 | 1.083 | 5.70 | 2.083 | 5.19 | 3.08 |
| 2.80 | 0.167 | 2.07 | 1.167 | 5.70 | 2.167 | 5.19 | 3.17 |
| 2.80 | 0.250 | 2.27 | 1.250 | 10.78 | 2.250 | 4.47 | 3.25 |
| 2.62 | 0.333 | 2.27 | 1.333 | 10.78 | 2.333 | 4.47 | 3.33 |
| 2.62 | 0.417 | 2.52 | 1.417 | 50.21 | 2.417 | 3.95 | 3.42 |
| 2.48 | 0.500 | 2.52 | 1.500 | 50.21 | 2.500 | 3.95 | 3.50 |
| 2.48 | 0.583 | 2.88 | 1.583 | 13.37 | 2.583 | 3.56 | 3.58 |
| 2.35 | 0.667 | 2.88 | 1.667 | 13.37 | 2.667 | 3.56 | 3.67 |
| 2.35 | 0.750 | 3.38 | 1.750 | 8.29 | 2.750 | 3.25 | 3.75 |
| 2.23 | 0.833 | 3.38 | 1.833 | 8.29 | 2.833 | 3.25 | 3.83 |
| 2.23 | 0.917 | 4.17 | 1.917 | 6.30 | 2.917 | 3.01 | 3.92 |
| 2.14 | 1.000 | 4.18 | 2.000 | 6.29 | 3.000 | 3.01 | 4.00 |



```

Max.Eff.Inten.(mm/hr)= 50.21      6.66
                    over (min)= 5.00      10.00
Storage Coeff. (min)= 1.18 (ii)  6.11 (ii)
Unit Hyd. Tpeak (min)= 5.00      10.00
Unit Hyd. peak (cms)= 0.33      0.15

PEAK FLOW (cms)= 0.01      0.00
TIME TO PEAK (hrs)= 1.50      1.58      1.50
RUNOFF VOLUME (mm)= 24.00      4.79      20.71
TOTAL RAINFALL (mm)= 25.00      25.00      25.00
RUNOFF COEFFICIENT = 0.96      0.19      0.83

```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

```

-----
| ADD HYD ( 0005) |
| 1 + 2 = 3 |
-----
          AREA   QPEAK   TPEAK   R.V.
          (ha)   (cms)   (hrs)   (mm)
ID1= 1 ( 0001): 0.12  0.015  1.50  22.06
+ ID2= 2 ( 0004): 0.05  0.005  1.50  20.71
=====
ID = 3 ( 0005): 0.17  0.020  1.50  21.68

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| CALIB |
| STANDHYD ( 0008) |
| ID= 1 DT= 5.0 min |
-----
          Area (ha)= 0.08
          Total Imp(%)= 9.00 Dir. Conn.(%)= 9.00

          IMPERVIOUS   PERVIOUS (i)
Surface Area (ha)= 0.01  0.07
Dep. Storage (mm)= 1.00  5.00
Average Slope (%)= 1.00  2.00
Length (m)= 23.09  40.00
Mannings n = 0.013  0.250

```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

```

          ----- TRANSFORMED HYETOGRAPH -----
RAIN      TIME    RAIN | TIME    RAIN | TIME    RAIN | TIME
mm/hr     hrs  mm/hr | hrs  mm/hr | hrs  mm/hr | hrs

```

```

2.80      0.083  2.07 | 1.083  5.70 | 2.083  5.19 | 3.08
2.80      0.167  2.07 | 1.167  5.70 | 2.167  5.19 | 3.17
2.62      0.250  2.27 | 1.250  10.78 | 2.250  4.47 | 3.25
2.62      0.333  2.27 | 1.333  10.78 | 2.333  4.47 | 3.33
2.48      0.417  2.52 | 1.417  50.21 | 2.417  3.95 | 3.42
2.48      0.500  2.52 | 1.500  50.21 | 2.500  3.95 | 3.50
2.35      0.583  2.88 | 1.583  13.37 | 2.583  3.56 | 3.58
2.35      0.667  2.88 | 1.667  13.37 | 2.667  3.56 | 3.67
2.23      0.750  3.38 | 1.750  8.29 | 2.750  3.25 | 3.75
2.23      0.833  3.38 | 1.833  8.29 | 2.833  3.25 | 3.83
2.14      0.917  4.17 | 1.917  6.30 | 2.917  3.01 | 3.92
2.14      1.000  4.18 | 2.000  6.29 | 3.000  3.01 | 4.00
2.14

```

```

Max.Eff.Inten.(mm/hr)= 50.21      4.50
                    over (min)= 5.00      30.00
Storage Coeff. (min)= 1.40 (ii)  25.79 (ii)
Unit Hyd. Tpeak (min)= 5.00      30.00
Unit Hyd. peak (cms)= 0.33      0.04

PEAK FLOW (cms)= 0.00      0.00      0.001 (iii)
TIME TO PEAK (hrs)= 1.50      2.00      1.50
RUNOFF VOLUME (mm)= 24.00      4.79      6.32
TOTAL RAINFALL (mm)= 25.00      25.00      25.00
RUNOFF COEFFICIENT = 0.96      0.19      0.25

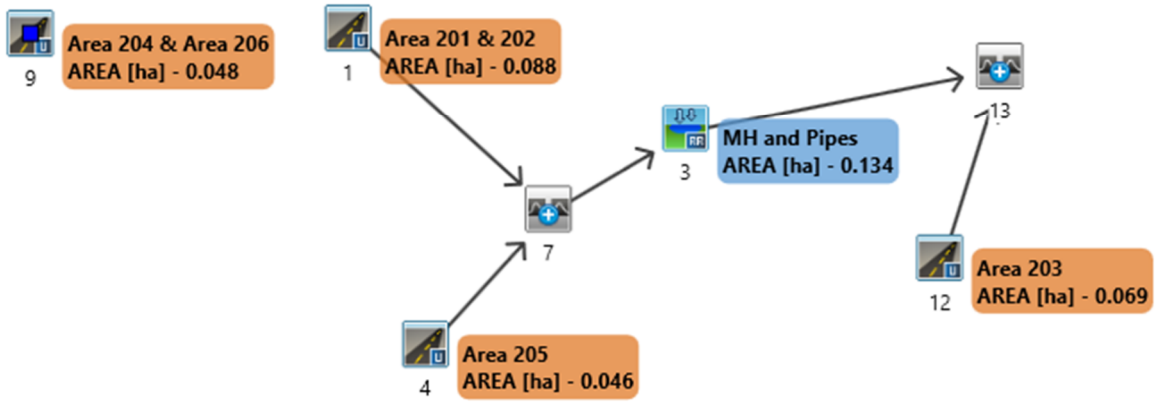
```

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

FINISH

Post-Development VOH Model Schematic



```

=====
V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y M M O O
O O T T H H Y Y M M O O
OOO T T H H Y M M OOO

```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTHYMO
 6.2\VO2\voindat
 Output filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\cff1e640-e193-465e-b0fc-241bf70b6776\scenar
 Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\cff1e640-e193-465e-b0fc-241bf70b6776\scenar

DATE: 09/22/2025 TIME: 02:46:33
 USER:

COMMENTS: _____

 ** SIMULATION : 002yr 4hr 10min Chicago Copy **

| | |
|-----------------------------------|--|
| CHICAGO STORM Ptotal= 33.89 mm | IDF curve parameters: A= 732.951 B= 6.200 C= 0.810 |
|-----------------------------------|--|

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
 Storm time step = 10.00 min
 Time to peak ratio = 0.33

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|------|-------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.46 | 0.00 | 2.05 | 1.00 | 18.21 | 2.00 | 5.10 | 3.00 |
| 2.46 | 0.17 | 2.37 | 1.17 | 76.80 | 2.17 | 4.29 | 3.17 |
| 2.28 | 0.33 | 2.81 | 1.33 | 24.08 | 2.33 | 3.72 | 3.33 |
| 2.12 | 0.50 | 3.50 | 1.50 | 12.36 | 2.50 | 3.29 | 3.50 |
| 1.99 | 0.67 | 4.69 | 1.67 | 8.32 | 2.67 | 2.95 | 3.67 |
| 1.87 | 0.83 | 7.31 | 1.83 | 6.30 | 2.83 | 2.68 | 3.83 |

| | |
|--|---|
| CALIB STANDHYD (0009) ID= 1 DT= 5.0 min | Area (ha)= 0.05 Total Imp(%)= 27.00 Dir. Conn.(%)= 27.00 |
|--|---|

| | |
|-------------------------|-------------------|
| Surface Area (ha)= 0.01 | PERVIOUS (i) 0.04 |
| Dep. Storage (mm)= 1.00 | 5.00 |
| Average Slope (%)= 1.00 | 2.00 |
| Length (m)= 17.89 | 40.00 |
| Mannings n = 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|-------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.46 | 0.083 | 2.05 | 1.083 | 18.21 | 2.083 | 5.10 | 3.08 |
| 2.46 | 0.167 | 2.05 | 1.167 | 18.21 | 2.167 | 5.10 | 3.17 |
| 2.28 | 0.250 | 2.37 | 1.250 | 76.80 | 2.250 | 4.29 | 3.25 |
| 2.28 | 0.333 | 2.37 | 1.333 | 76.80 | 2.333 | 4.29 | 3.33 |
| 2.12 | 0.417 | 2.81 | 1.417 | 24.08 | 2.417 | 3.72 | 3.42 |
| 2.12 | 0.500 | 2.81 | 1.500 | 24.08 | 2.500 | 3.72 | 3.50 |

| | | | | | | | |
|------|-------|------|-------|-------|-------|------|------|
| 1.99 | 0.583 | 3.50 | 1.583 | 12.36 | 2.583 | 3.29 | 3.58 |
| 1.99 | 0.667 | 3.50 | 1.667 | 12.36 | 2.667 | 3.29 | 3.67 |
| 1.87 | 0.750 | 4.69 | 1.750 | 8.32 | 2.750 | 2.95 | 3.75 |
| 1.87 | 0.833 | 4.69 | 1.833 | 8.32 | 2.833 | 2.95 | 3.83 |
| 1.77 | 0.917 | 7.31 | 1.917 | 6.30 | 2.917 | 2.68 | 3.92 |
| 1.77 | 1.000 | 7.31 | 2.000 | 6.30 | 3.000 | 2.68 | 4.00 |

Max.Eff.Inten.(mm/hr)= 76.80 12.53
 over (min) 5.00 20.00
 Storage Coeff. (min)= 1.01 (ii) 17.21 (ii)
 Unit Hyd. Tpeak (min)= 5.00 20.00
 Unit Hyd. peak (cms)= 0.34 0.06

*****TOTALS*
 PEAK FLOW (cms)= 0.00 0.00 0.003 (iii)
 TIME TO PEAK (hrs)= 1.33 1.58 1.33
 RUNOFF VOLUME (mm)= 32.89 9.03 15.19
 TOTAL RAINFALL (mm)= 33.89 33.89 33.89
 RUNOFF COEFFICIENT = 0.97 0.27 0.45

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

| | |
|--|---|
| CALIB STANDHYD (0012) ID= 1 DT= 5.0 min | Area (ha)= 0.07 Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00 |
|--|---|

| | |
|-------------------------|-------------------|
| Surface Area (ha)= 0.05 | PERVIOUS (i) 0.02 |
| Dep. Storage (mm)= 1.00 | 5.00 |
| Average Slope (%)= 1.00 | 2.00 |
| Length (m)= 21.45 | 40.00 |
| Mannings n = 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|-------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.46 | 0.083 | 2.05 | 1.083 | 18.21 | 2.083 | 5.10 | 3.08 |
| 2.46 | 0.167 | 2.05 | 1.167 | 18.21 | 2.167 | 5.10 | 3.17 |
| 2.28 | 0.250 | 2.37 | 1.250 | 76.80 | 2.250 | 4.29 | 3.25 |
| 2.28 | 0.333 | 2.37 | 1.333 | 76.80 | 2.333 | 4.29 | 3.33 |
| 2.12 | 0.417 | 2.81 | 1.417 | 24.08 | 2.417 | 3.72 | 3.42 |
| 2.12 | 0.500 | 2.81 | 1.500 | 24.08 | 2.500 | 3.72 | 3.50 |
| 1.99 | 0.583 | 3.50 | 1.583 | 12.36 | 2.583 | 3.29 | 3.58 |
| 1.99 | 0.667 | 3.50 | 1.667 | 12.36 | 2.667 | 3.29 | 3.67 |
| 1.87 | 0.750 | 4.69 | 1.750 | 8.32 | 2.750 | 2.95 | 3.75 |
| 1.87 | 0.833 | 4.69 | 1.833 | 8.32 | 2.833 | 2.95 | 3.83 |
| 1.77 | 0.917 | 7.31 | 1.917 | 6.30 | 2.917 | 2.68 | 3.92 |
| 1.77 | 1.000 | 7.31 | 2.000 | 6.30 | 3.000 | 2.68 | 4.00 |

Max.Eff.Inten.(mm/hr)= 76.80 12.53
 over (min) 5.00 20.00
 Storage Coeff. (min)= 1.13 (ii) 17.32 (ii)
 Unit Hyd. Tpeak (min)= 5.00 20.00
 Unit Hyd. peak (cms)= 0.34 0.06

*****TOTALS*
 PEAK FLOW (cms)= 0.01 0.00 0.011 (iii)
 TIME TO PEAK (hrs)= 1.33 1.58 1.33
 RUNOFF VOLUME (mm)= 32.89 9.03 26.82
 TOTAL RAINFALL (mm)= 33.89 33.89 33.89
 RUNOFF COEFFICIENT = 0.97 0.27 0.79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

| | |
|--|---|
| CALIB STANDHYD (0001) ID= 1 DT= 5.0 min | Area (ha)= 0.09 Total Imp(%)= 97.00 Dir. Conn.(%)= 97.00 |
|--|---|



IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.09 0.00
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 24.22 40.00
 Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 76.80 73.96
 over (min) 5.00 5.00
 Storage Coeff. (min)= 1.00 (ii) 2.25 (ii)
 Unit Hyd. Tpeak (min)= 5.00 5.00
 Unit Hyd. peak (cms)= 0.34 0.30

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

TOTALS
 PEAK FLOW (cms)= 0.01 0.00 0.010 (iii)
 TIME TO PEAK (hrs)= 1.33 1.33 1.33
 RUNOFF VOLUME (mm)= 32.89 30.51 32.86
 TOTAL RAINFALL (mm)= 33.89 33.89 33.89
 RUNOFF COEFFICIENT = 0.97 0.90 0.97

---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|-------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.46 | 0.083 | 2.05 | 1.083 | 18.21 | 2.083 | 5.10 | 3.08 |
| 2.46 | 0.167 | 2.05 | 1.167 | 18.21 | 2.167 | 5.10 | 3.17 |
| 2.28 | 0.250 | 2.37 | 1.250 | 76.80 | 2.250 | 4.29 | 3.25 |
| 2.28 | 0.333 | 2.37 | 1.333 | 76.80 | 2.333 | 4.29 | 3.33 |
| 2.12 | 0.417 | 2.81 | 1.417 | 24.08 | 2.417 | 3.72 | 3.42 |
| 2.12 | 0.500 | 2.81 | 1.500 | 24.08 | 2.500 | 3.72 | 3.50 |
| 1.99 | 0.583 | 3.50 | 1.583 | 12.36 | 2.583 | 3.29 | 3.58 |
| 1.99 | 0.667 | 3.50 | 1.667 | 12.36 | 2.667 | 3.29 | 3.67 |
| 1.87 | 0.750 | 4.69 | 1.750 | 8.32 | 2.750 | 2.95 | 3.75 |
| 1.87 | 0.833 | 4.69 | 1.833 | 8.32 | 2.833 | 2.95 | 3.83 |
| 1.77 | 0.917 | 7.31 | 1.917 | 6.30 | 2.917 | 2.68 | 3.92 |
| 1.77 | 1.000 | 7.31 | 2.000 | 6.30 | 3.000 | 2.68 | 4.00 |

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 99.0 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.

ADD HYD (0007)

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|-----------|-------------|-------------|-----------|
| ID1= 1 (0001): | 0.09 | 0.018 | 1.33 | 32.17 |
| + ID2= 2 (0004): | 0.05 | 0.010 | 1.33 | 32.86 |
| ID = 3 (0007): | 0.13 | 0.028 | 1.33 | 32.41 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Max.Eff.Inten.(mm/hr)= 76.80 16.12
 over (min) 5.00 5.00
 Storage Coeff. (min)= 1.21 (ii) 3.17 (ii)
 Unit Hyd. Tpeak (min)= 5.00 5.00
 Unit Hyd. peak (cms)= 0.33 0.27
 TOTALS
 PEAK FLOW (cms)= 0.02 0.00 0.018 (iii)
 TIME TO PEAK (hrs)= 1.33 1.33 1.33
 RUNOFF VOLUME (mm)= 32.89 9.03 32.17
 TOTAL RAINFALL (mm)= 33.89 33.89 33.89
 RUNOFF COEFFICIENT = 0.97 0.27 0.95

RESERVOIR(0003) OVERFLOW IS OFF

| IN= 2--> OUT= 1 | DT= 5.0 min | OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|-----------------|-------------|---------------|-----------------|---------------|-----------------|
| | | 0.0000 | 0.0000 | 0.0374 | 0.0016 |
| | | 0.0363 | 0.0009 | 0.0380 | 0.0025 |
| | | 0.0369 | 0.0010 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|------------------------|-----------|-------------|-------------|-----------|
| INFLOW : ID= 2 (0007) | 0.134 | 0.028 | 1.33 | 32.41 |
| OUTFLOW: ID= 1 (0003) | 0.134 | 0.025 | 1.33 | 32.40 |

PEAK FLOW REDUCTION [Qout/Qin] (%) = 87.55
 TIME SHIFT OF PEAK FLOW (min) = 0.00
 MAXIMUM STORAGE USED (ha.m.) = 0.0007

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

ADD HYD (0013)

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|-----------|-------------|-------------|-----------|
| ID1= 1 (0012): | 0.07 | 0.011 | 1.33 | 26.82 |
| + ID2= 2 (0003): | 0.13 | 0.025 | 1.33 | 32.40 |
| ID = 3 (0013): | 0.20 | 0.036 | 1.33 | 30.51 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0004)
 ID= 1 DT= 5.0 min
 Area (ha)= 0.05
 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.05 0.00
 Dep. Storage (mm)= 1.00 1.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 17.59 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|-------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.46 | 0.083 | 2.05 | 1.083 | 18.21 | 2.083 | 5.10 | 3.08 |
| 2.46 | 0.167 | 2.05 | 1.167 | 18.21 | 2.167 | 5.10 | 3.17 |
| 2.28 | 0.250 | 2.37 | 1.250 | 76.80 | 2.250 | 4.29 | 3.25 |
| 2.28 | 0.333 | 2.37 | 1.333 | 76.80 | 2.333 | 4.29 | 3.33 |
| 2.12 | 0.417 | 2.81 | 1.417 | 24.08 | 2.417 | 3.72 | 3.42 |
| 2.12 | 0.500 | 2.81 | 1.500 | 24.08 | 2.500 | 3.72 | 3.50 |
| 1.99 | 0.583 | 3.50 | 1.583 | 12.36 | 2.583 | 3.29 | 3.58 |
| 1.99 | 0.667 | 3.50 | 1.667 | 12.36 | 2.667 | 3.29 | 3.67 |
| 1.87 | 0.750 | 4.69 | 1.750 | 8.32 | 2.750 | 2.95 | 3.75 |
| 1.87 | 0.833 | 4.69 | 1.833 | 8.32 | 2.833 | 2.95 | 3.83 |
| 1.77 | 0.917 | 7.31 | 1.917 | 6.30 | 2.917 | 2.68 | 3.92 |
| 1.77 | 1.000 | 7.31 | 2.000 | 6.30 | 3.000 | 2.68 | 4.00 |

V V I SSSS U U A L (v 6.2.2015)
 V V I SS U U A A L
 V V I SS U U AAAAA L
 V V I SS U U A A L
 VV I SSSS UUUU A A LLLL

OOO TTTT TTTT H H Y Y M M OOO TM
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***** D E T A I L E D O U T P U T *****

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DATE: 09/22/2025 TIME: 02:46:33

USER:

COMMENTS:



 ** SIMULATION : 005yr 4hr 10min Chicago Copy **

CHICAGO STORM
 Ptotal= 45.16 mm

IDF curve parameters: A= 998.070
 B= 6.050
 C= 0.814
 used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
 Storm time step = 10.00 min
 Time to peak ratio = 0.33

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|------|--------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 3.22 | 0.00 | 2.68 | 1.00 | 24.17 | 2.00 | 6.69 | 3.00 |
| 2.98 | 0.17 | 3.10 | 1.17 | 104.21 | 2.17 | 5.63 | 3.17 |
| 2.77 | 0.33 | 3.68 | 1.33 | 32.03 | 2.33 | 4.87 | 3.33 |
| 2.60 | 0.50 | 4.58 | 1.50 | 16.34 | 2.50 | 4.30 | 3.50 |
| 2.44 | 0.67 | 6.15 | 1.67 | 10.96 | 2.67 | 3.86 | 3.67 |
| 2.31 | 0.83 | 9.61 | 1.83 | 8.29 | 2.83 | 3.51 | 3.83 |

CALIB
 STANDHYD (0009)
 ID= 1 DT= 5.0 min

Area (ha)= 0.05
 Total Imp(%)= 27.00 Dir. Conn.(%)= 27.00

IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.01 0.04
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 17.89 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 3.22 | 0.083 | 2.68 | 1.083 | 24.17 | 2.083 | 6.69 | 3.08 |
| 3.22 | 0.167 | 2.68 | 1.167 | 24.17 | 2.167 | 6.69 | 3.17 |
| 2.98 | 0.250 | 3.10 | 1.250 | 104.21 | 2.250 | 5.63 | 3.25 |
| 2.98 | 0.333 | 3.10 | 1.333 | 104.21 | 2.333 | 5.63 | 3.33 |
| 2.77 | 0.417 | 3.68 | 1.417 | 32.03 | 2.417 | 4.87 | 3.42 |
| 2.77 | 0.500 | 3.68 | 1.500 | 32.03 | 2.500 | 4.87 | 3.50 |
| 2.60 | 0.583 | 4.58 | 1.583 | 16.34 | 2.583 | 4.30 | 3.58 |
| 2.60 | 0.667 | 4.58 | 1.667 | 16.34 | 2.667 | 4.30 | 3.67 |
| 2.44 | 0.750 | 6.15 | 1.750 | 10.96 | 2.750 | 3.86 | 3.75 |
| 2.44 | 0.833 | 6.15 | 1.833 | 10.96 | 2.833 | 3.86 | 3.83 |
| 2.31 | 0.917 | 9.61 | 1.917 | 8.29 | 2.917 | 3.51 | 3.92 |
| 2.31 | 1.000 | 9.61 | 2.000 | 8.29 | 3.000 | 3.51 | 4.00 |

Max.Eff.Inten.(mm/hr)= 104.21 25.45
 over (min) 5.00 15.00
 Storage Coeff. (min)= 0.89 (ii) 13.10 (ii)
 Unit Hyd. Tpeak (min)= 5.00 15.00
 Unit Hyd. peak (cms)= 0.34 0.08
 TOTALS
 PEAK FLOW (cms)= 0.00 0.00 0.004 (iii)
 TIME TO PEAK (hrs)= 1.33 1.50 1.33
 RUNOFF VOLUME (mm)= 44.16 15.56 23.13
 TOTAL RAINFALL (mm)= 45.16 45.16 45.16
 RUNOFF COEFFICIENT = 0.98 0.34 0.51

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

CALIB
 STANDHYD (0012)
 ID= 1 DT= 5.0 min

Area (ha)= 0.07
 Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00

IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.05 0.02
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 21.45 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 3.22 | 0.083 | 2.68 | 1.083 | 24.17 | 2.083 | 6.69 | 3.08 |
| 3.22 | 0.167 | 2.68 | 1.167 | 24.17 | 2.167 | 6.69 | 3.17 |
| 2.98 | 0.250 | 3.10 | 1.250 | 104.21 | 2.250 | 5.63 | 3.25 |
| 2.98 | 0.333 | 3.10 | 1.333 | 104.21 | 2.333 | 5.63 | 3.33 |
| 2.77 | 0.417 | 3.68 | 1.417 | 32.03 | 2.417 | 4.87 | 3.42 |
| 2.77 | 0.500 | 3.68 | 1.500 | 32.03 | 2.500 | 4.87 | 3.50 |
| 2.60 | 0.583 | 4.58 | 1.583 | 16.34 | 2.583 | 4.30 | 3.58 |
| 2.60 | 0.667 | 4.58 | 1.667 | 16.34 | 2.667 | 4.30 | 3.67 |
| 2.44 | 0.750 | 6.15 | 1.750 | 10.96 | 2.750 | 3.86 | 3.75 |
| 2.44 | 0.833 | 6.15 | 1.833 | 10.96 | 2.833 | 3.86 | 3.83 |
| 2.31 | 0.917 | 9.61 | 1.917 | 8.29 | 2.917 | 3.51 | 3.92 |
| 2.31 | 1.000 | 9.61 | 2.000 | 8.29 | 3.000 | 3.51 | 4.00 |

Max.Eff.Inten.(mm/hr)= 104.21 30.85
 over (min) 5.00 10.00
 Storage Coeff. (min)= 1.00 (ii) 5.47 (ii)
 Unit Hyd. Tpeak (min)= 5.00 10.00
 Unit Hyd. peak (cms)= 0.34 0.16

PEAK FLOW (cms)= 0.01 0.00 0.016 (iii)
 TIME TO PEAK (hrs)= 1.33 1.42 1.33
 RUNOFF VOLUME (mm)= 44.16 15.56 36.97
 TOTAL RAINFALL (mm)= 45.16 45.16 45.16
 RUNOFF COEFFICIENT = 0.98 0.34 0.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

CALIB
 STANDHYD (0001)
 ID= 1 DT= 5.0 min

Area (ha)= 0.09
 Total Imp(%)= 97.00 Dir. Conn.(%)= 97.00

IMPERVIOUS PERVIOUS (i)
 Surface Area (ha)= 0.09 0.00
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 24.22 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 3.22 | 0.083 | 2.68 | 1.083 | 24.17 | 2.083 | 6.69 | 3.08 |
| 3.22 | 0.167 | 2.68 | 1.167 | 24.17 | 2.167 | 6.69 | 3.17 |
| 2.98 | 0.250 | 3.10 | 1.250 | 104.21 | 2.250 | 5.63 | 3.25 |
| 2.98 | 0.333 | 3.10 | 1.333 | 104.21 | 2.333 | 5.63 | 3.33 |
| 2.77 | 0.417 | 3.68 | 1.417 | 32.03 | 2.417 | 4.87 | 3.42 |
| 2.77 | 0.500 | 3.68 | 1.500 | 32.03 | 2.500 | 4.87 | 3.50 |
| 2.60 | 0.583 | 4.58 | 1.583 | 16.34 | 2.583 | 4.30 | 3.58 |
| 2.60 | 0.667 | 4.58 | 1.667 | 16.34 | 2.667 | 4.30 | 3.67 |
| 2.44 | 0.750 | 6.15 | 1.750 | 10.96 | 2.750 | 3.86 | 3.75 |
| 2.44 | 0.833 | 6.15 | 1.833 | 10.96 | 2.833 | 3.86 | 3.83 |
| 2.31 | 0.917 | 9.61 | 1.917 | 8.29 | 2.917 | 3.51 | 3.92 |
| 2.31 | 1.000 | 9.61 | 2.000 | 8.29 | 3.000 | 3.51 | 4.00 |



Max.Eff.Inten.(mm/hr)= 104.21 30.85
over (min) 5.00 5.00
Storage Coeff. (min)= 1.07 (ii) 2.80 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.28

TOTALS
0.025 (iii)

PEAK FLOW (cms)= 0.02 0.00
TIME TO PEAK (hrs)= 1.33 1.33
RUNOFF VOLUME (mm)= 44.16 15.56 43.30
TOTAL RAINFALL (mm)= 45.16 45.16 45.16
RUNOFF COEFFICIENT = 0.98 0.34 0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 80.0 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.

CALIB
STANDHYD (0004) Area (ha)= 0.05
ID= 1 DT= 5.0 min Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

IMPERVIOUS PVIOUS (i)
Surface Area (ha)= 0.05 0.00
Dep. Storage (mm)= 1.00 1.00
Average Slope (%)= 1.00 2.00
Length (m)= 17.59 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.083 | 2.68 | 1.083 | 24.17 | 2.083 | 6.69 | 3.08 | |
| 3.22 | 0.167 | 2.68 | 1.167 | 24.17 | 2.167 | 6.69 | 3.17 |
| 3.22 | 0.250 | 3.10 | 1.250 | 104.21 | 2.250 | 5.63 | 3.25 |
| 2.98 | 0.333 | 3.10 | 1.333 | 104.21 | 2.333 | 5.63 | 3.33 |
| 2.98 | 0.417 | 3.68 | 1.417 | 32.03 | 2.417 | 4.87 | 3.42 |
| 2.77 | 0.500 | 3.68 | 1.500 | 32.03 | 2.500 | 4.87 | 3.50 |
| 2.77 | 0.583 | 4.58 | 1.583 | 16.34 | 2.583 | 4.30 | 3.58 |
| 2.60 | 0.667 | 4.58 | 1.667 | 16.34 | 2.667 | 4.30 | 3.67 |
| 2.60 | 0.750 | 6.15 | 1.750 | 10.96 | 2.750 | 3.86 | 3.75 |
| 2.44 | 0.833 | 6.15 | 1.833 | 10.96 | 2.833 | 3.86 | 3.83 |
| 2.44 | 0.917 | 9.61 | 1.917 | 8.29 | 2.917 | 3.51 | 3.92 |
| 2.31 | 1.000 | 9.61 | 2.000 | 8.29 | 3.000 | 3.51 | 4.00 |

Max.Eff.Inten.(mm/hr)= 104.21 101.88
over (min) 5.00 5.00
Storage Coeff. (min)= 0.89 (ii) 1.99 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.31

TOTALS
0.013 (iii)

PEAK FLOW (cms)= 0.01 0.00
TIME TO PEAK (hrs)= 1.33 1.33
RUNOFF VOLUME (mm)= 44.16 41.74 44.14
TOTAL RAINFALL (mm)= 45.16 45.16 45.16
RUNOFF COEFFICIENT = 0.98 0.92 0.98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 99.0 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.

ADD HYD (0007)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|-----------|-------------|-------------|-----------|
| ID1= 1 (0001): | 0.09 | 0.025 | 1.33 | 43.30 |
| + ID2= 2 (0004): | 0.05 | 0.013 | 1.33 | 44.14 |
| ID = 3 (0007): | 0.13 | 0.038 | 1.33 | 43.59 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0003) OVERFLOW IS OFF
IN= 2----> OUT= 1
DT= 5.0 min

OUTFLOW STORAGE | OUTFLOW STORAGE

| | (cms) | (ha.m.) | (cms) | (ha.m.) |
|--|--------|---------|--------|---------|
| | 0.0000 | 0.0000 | 0.0374 | 0.0016 |
| | 0.0363 | 0.0009 | 0.0380 | 0.0025 |
| | 0.0369 | 0.0010 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|------------------------|-----------|-------------|-------------|-----------|
| INFLOW : ID= 2 (0007) | 0.134 | 0.038 | 1.33 | 43.59 |
| OUTFLOW: ID= 1 (0003) | 0.134 | 0.034 | 1.33 | 43.58 |

PEAK FLOW REDUCTION [Qout/Qin] (%) = 87.64
TIME SHIFT OF PEAK FLOW (min) = 0.00
MAXIMUM STORAGE USED (ha.m.) = 0.0009

ADD HYD (0013)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|-----------|-------------|-------------|-----------|
| ID1= 1 (0012): | 0.07 | 0.016 | 1.33 | 36.97 |
| + ID2= 2 (0003): | 0.13 | 0.034 | 1.33 | 43.58 |
| ID = 3 (0013): | 0.20 | 0.050 | 1.33 | 41.34 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y M M O O
O O T T H H Y Y M M O O
OOO T T H H Y M M OOO

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DATE: 09/22/2025 TIME: 02:46:33

USER:

COMMENTS:

** SIMULATION : 010yr 4hr 10min Chicago Copy **

CHICAGO STORM IDF curve parameters: A=1174.184
Ptotal= 52.56 mm B= 6.010
C= 0.816
used in: INTENSITY = A / (t + B)^C
Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|-------|--------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.00 | 3.09 | 1.00 | 28.10 | 2.00 | 7.73 | 3.00 | |
| 3.71 | 0.17 | 3.57 | 1.17 | 122.17 | 2.17 | 6.50 | 3.17 |
| 3.43 | 0.33 | 4.25 | 1.33 | 37.28 | 2.33 | 5.62 | 3.33 |
| 3.20 | 0.50 | 5.29 | 1.50 | 18.95 | 2.50 | 4.97 | 3.50 |
| 2.99 | 0.67 | 7.11 | 1.67 | 12.70 | 2.67 | 4.46 | 3.67 |
| 2.81 | 0.83 | 11.13 | 1.83 | 9.59 | 2.83 | 4.05 | 3.83 |
| 2.66 | | | | | | | |

CALIB
STANDHYD (0009) Area (ha)= 0.05
ID= 1 DT= 5.0 min Total Imp(%)= 27.00 Dir. Conn.(%)= 27.00



IMPERVIOUS PVIOUS (i)
 Surface Area (ha)= 0.01 0.04
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 17.89 40.00
 Mannings n = 0.013 0.250

Max.Eff.Inten.(mm/hr)= 122.17 42.11
 over (min) 5.00 10.00
 Storage Coeff. (min)= 0.94 (ii) 5.13 (ii)
 Unit Hyd. Tpeak (min)= 5.00 10.00
 Unit Hyd. peak (cms)= 0.34 0.16

TOTALS
 PEAK FLOW (cms)= 0.02 0.00 0.019 (iii)
 TIME TO PEAK (hrs)= 1.33 1.42 1.33
 RUNOFF VOLUME (mm)= 51.56 20.37 43.71
 TOTAL RAINFALL (mm)= 52.56 52.56 52.56
 RUNOFF COEFFICIENT = 0.98 0.39 0.83

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| ----- TRANSFORMED HYETOGRAPH ----- | | | | | | | | |
|------------------------------------|-------|-------|-------|--------|-------|-------|------|-------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 3.09 | 1.083 | 28.10 | 2.083 | 7.73 | 3.08 | | |
| 3.71 | 0.167 | 3.09 | 1.167 | 28.10 | 2.167 | 7.73 | 3.17 | |
| 3.71 | 0.250 | 3.57 | 1.250 | 122.17 | 2.250 | 6.50 | 3.25 | |
| 3.43 | 0.333 | 3.57 | 1.333 | 122.17 | 2.333 | 6.50 | 3.33 | |
| 3.43 | 0.417 | 4.25 | 1.417 | 37.28 | 2.417 | 5.62 | 3.42 | |
| 3.20 | 0.500 | 4.25 | 1.500 | 37.28 | 2.500 | 5.62 | 3.50 | |
| 3.20 | 0.583 | 5.29 | 1.583 | 18.95 | 2.583 | 4.97 | 3.58 | |
| 2.99 | 0.667 | 5.29 | 1.667 | 18.95 | 2.667 | 4.97 | 3.67 | |
| 2.99 | 0.750 | 7.11 | 1.750 | 12.70 | 2.750 | 4.46 | 3.75 | |
| 2.81 | 0.833 | 7.11 | 1.833 | 12.70 | 2.833 | 4.46 | 3.83 | |
| 2.81 | 0.917 | 11.13 | 1.917 | 9.59 | 2.917 | 4.05 | 3.92 | |
| 2.66 | 1.000 | 11.13 | 2.000 | 9.59 | 3.000 | 4.05 | 4.00 | |

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 80.0 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.

CALIB
 STANDHYD (0001) Area (ha)= 0.09
 ID= 1 DT= 5.0 min Total Imp(%)= 97.00 Dir. Conn.(%)= 97.00

IMPERVIOUS PVIOUS (i)
 Surface Area (ha)= 0.09 0.00
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 24.22 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| ----- TRANSFORMED HYETOGRAPH ----- | | | | | | | | |
|------------------------------------|-------|-------|-------|--------|-------|-------|------|-------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 3.09 | 1.083 | 28.10 | 2.083 | 7.73 | 3.08 | | |
| 3.71 | 0.167 | 3.09 | 1.167 | 28.10 | 2.167 | 7.73 | 3.17 | |
| 3.71 | 0.250 | 3.57 | 1.250 | 122.17 | 2.250 | 6.50 | 3.25 | |
| 3.43 | 0.333 | 3.57 | 1.333 | 122.17 | 2.333 | 6.50 | 3.33 | |
| 3.43 | 0.417 | 4.25 | 1.417 | 37.28 | 2.417 | 5.62 | 3.42 | |
| 3.20 | 0.500 | 4.25 | 1.500 | 37.28 | 2.500 | 5.62 | 3.50 | |
| 3.20 | 0.583 | 5.29 | 1.583 | 18.95 | 2.583 | 4.97 | 3.58 | |
| 2.99 | 0.667 | 5.29 | 1.667 | 18.95 | 2.667 | 4.97 | 3.67 | |
| 2.99 | 0.750 | 7.11 | 1.750 | 12.70 | 2.750 | 4.46 | 3.75 | |
| 2.81 | 0.833 | 7.11 | 1.833 | 12.70 | 2.833 | 4.46 | 3.83 | |
| 2.81 | 0.917 | 11.13 | 1.917 | 9.59 | 2.917 | 4.05 | 3.92 | |
| 2.66 | 1.000 | 11.13 | 2.000 | 9.59 | 3.000 | 4.05 | 4.00 | |

Max.Eff.Inten.(mm/hr)= 122.17 42.11
 over (min) 5.00 15.00
 Storage Coeff. (min)= 0.84 (ii) 10.81 (ii)
 Unit Hyd. Tpeak (min)= 5.00 15.00
 Unit Hyd. peak (cms)= 0.34 0.09
 PEAK FLOW (cms)= 0.00 0.00 0.006 (iii)
 TIME TO PEAK (hrs)= 1.33 1.50 1.33
 RUNOFF VOLUME (mm)= 51.56 20.37 28.65
 TOTAL RAINFALL (mm)= 52.56 52.56 52.56
 RUNOFF COEFFICIENT = 0.98 0.39 0.55

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 80.0 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.

CALIB
 STANDHYD (0012) Area (ha)= 0.07
 ID= 1 DT= 5.0 min Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00

IMPERVIOUS PVIOUS (i)
 Surface Area (ha)= 0.05 0.02
 Dep. Storage (mm)= 1.00 5.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 21.45 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Max.Eff.Inten.(mm/hr)= 122.17 42.11
 over (min) 5.00 5.00
 Storage Coeff. (min)= 1.01 (ii) 2.63 (ii)
 Unit Hyd. Tpeak (min)= 5.00 5.00
 Unit Hyd. peak (cms)= 0.34 0.29

TOTALS
 PEAK FLOW (cms)= 0.03 0.00 0.029 (iii)
 TIME TO PEAK (hrs)= 1.33 1.33 1.33
 RUNOFF VOLUME (mm)= 51.56 20.37 50.62
 TOTAL RAINFALL (mm)= 52.56 52.56 52.56
 RUNOFF COEFFICIENT = 0.98 0.39 0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 80.0 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.

CALIB
 STANDHYD (0004) Area (ha)= 0.05
 ID= 1 DT= 5.0 min Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

IMPERVIOUS PVIOUS (i)
 Surface Area (ha)= 0.05 0.00
 Dep. Storage (mm)= 1.00 1.00
 Average Slope (%)= 1.00 2.00
 Length (m)= 17.59 40.00
 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| ----- TRANSFORMED HYETOGRAPH ----- | | | | | | | | |
|------------------------------------|-------|-------|-------|--------|-------|-------|------|-------|
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 3.09 | 1.083 | 28.10 | 2.083 | 7.73 | 3.08 | | |
| 3.71 | 0.167 | 3.09 | 1.167 | 28.10 | 2.167 | 7.73 | 3.17 | |
| 3.71 | 0.250 | 3.57 | 1.250 | 122.17 | 2.250 | 6.50 | 3.25 | |
| 3.43 | 0.333 | 3.57 | 1.333 | 122.17 | 2.333 | 6.50 | 3.33 | |
| 3.43 | 0.417 | 4.25 | 1.417 | 37.28 | 2.417 | 5.62 | 3.42 | |
| 3.20 | 0.500 | 4.25 | 1.500 | 37.28 | 2.500 | 5.62 | 3.50 | |
| 3.20 | 0.583 | 5.29 | 1.583 | 18.95 | 2.583 | 4.97 | 3.58 | |
| 2.99 | 0.667 | 5.29 | 1.667 | 18.95 | 2.667 | 4.97 | 3.67 | |
| 2.99 | 0.750 | 7.11 | 1.750 | 12.70 | 2.750 | 4.46 | 3.75 | |
| 2.81 | 0.833 | 7.11 | 1.833 | 12.70 | 2.833 | 4.46 | 3.83 | |
| 2.81 | 0.917 | 11.13 | 1.917 | 9.59 | 2.917 | 4.05 | 3.92 | |
| 2.66 | 1.000 | 11.13 | 2.000 | 9.59 | 3.000 | 4.05 | 4.00 | |

----- TRANSFORMED HYETOGRAPH -----



| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.083 | 3.09 | 1.083 | 28.10 | 2.083 | 7.73 | 3.08 | |
| 3.71 | 0.167 | 3.09 | 1.167 | 28.10 | 2.167 | 7.73 | 3.17 |
| 3.71 | 0.250 | 3.57 | 1.250 | 122.17 | 2.250 | 6.50 | 3.25 |
| 3.43 | 0.333 | 3.57 | 1.333 | 122.17 | 2.333 | 6.50 | 3.33 |
| 3.43 | 0.417 | 4.25 | 1.417 | 37.28 | 2.417 | 5.62 | 3.42 |
| 3.20 | 0.500 | 4.25 | 1.500 | 37.28 | 2.500 | 5.62 | 3.50 |
| 3.20 | 0.583 | 5.29 | 1.583 | 18.95 | 2.583 | 4.97 | 3.58 |
| 2.99 | 0.667 | 5.29 | 1.667 | 18.95 | 2.667 | 4.97 | 3.67 |
| 2.99 | 0.750 | 7.11 | 1.750 | 12.70 | 2.750 | 4.46 | 3.75 |
| 2.81 | 0.833 | 7.11 | 1.833 | 12.70 | 2.833 | 4.46 | 3.83 |
| 2.81 | 0.917 | 11.13 | 1.917 | 9.59 | 2.917 | 4.05 | 3.92 |
| 2.66 | 1.000 | 11.13 | 2.000 | 9.59 | 3.000 | 4.05 | 4.00 |
| 2.66 | | | | | | | |

Max.Eff.Inten.(mm/hr)= 122.17 120.09
over (min) 5.00 5.00
Storage Coeff. (min)= 0.83 (ii) 1.87 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.32

PEAK FLOW (cms)= 0.02 0.00 0.016 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 51.56 49.11 51.53
TOTAL RAINFALL (mm)= 52.56 52.56 52.56
RUNOFF COEFFICIENT = 0.98 0.93 0.98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 99.0 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.

| ADD HYD (0007) | AREA | QPEAK | TPEAK | R.V. |
|-------------------|------|-------|-------|-------|
| 1 + 2 = 3 | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0001): | 0.09 | 0.029 | 1.33 | 50.62 |
| + ID2= 2 (0004): | 0.05 | 0.016 | 1.33 | 51.53 |
| ID = 3 (0007): | 0.13 | 0.045 | 1.33 | 50.94 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| RESERVOIR(0003) | OUTFLOW | STORAGE | OUTFLOW | STORAGE |
|-------------------|---------|---------|---------|---------|
| IN= 2----> OUT= 1 | (cms) | (ha.m.) | (cms) | (ha.m.) |
| DT= 5.0 min | 0.0000 | 0.0000 | 0.0374 | 0.0016 |
| | 0.0363 | 0.0009 | 0.0380 | 0.0025 |
| | 0.0369 | 0.0010 | 0.0000 | 0.0000 |

| | AREA | QPEAK | TPEAK | R.V. |
|------------------------|-------|-------|-------|-------|
| | (ha) | (cms) | (hrs) | (mm) |
| INFLOW : ID= 2 (0007) | 0.134 | 0.045 | 1.33 | 50.94 |
| OUTFLOW: ID= 1 (0003) | 0.134 | 0.037 | 1.33 | 50.92 |

PEAK FLOW REDUCTION [Qout/Qin](%) = 81.69
TIME SHIFT OF PEAK FLOW (min) = 0.00
MAXIMUM STORAGE USED (ha.m.) = 0.0011

| ADD HYD (0013) | AREA | QPEAK | TPEAK | R.V. |
|-------------------|------|-------|-------|-------|
| 1 + 2 = 3 | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0012): | 0.07 | 0.019 | 1.33 | 43.71 |
| + ID2= 2 (0003): | 0.13 | 0.037 | 1.33 | 50.92 |
| ID = 3 (0013): | 0.20 | 0.056 | 1.33 | 48.48 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSS UUUU A A LLLL
OOO TTTT TTTT H H Y Y M M OOO TM

O O T T H H Y Y M M O O
O O T T H H Y M M O O O
OOO T T H H Y M M OOO
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***** DETAILED OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voain.dat
Output filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9fa1fb-87a1-436c-84fa-29e684f29ce0\32aaa68e-1688-4d17-94ad-e94a96a5aead\scenar
Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9fa1fb-87a1-436c-84fa-29e684f29ce0\32aaa68e-1688-4d17-94ad-e94a96a5aead\scenar

DATE: 09/22/2025 TIME: 02:46:34

USER:

COMMENTS:

** SIMULATION : 025yr 4hr 10min Chicago Copy **

| | |
|------------------|----------------------------------|
| CHICAGO STORM | IDF curve parameters: A=1402.884 |
| Ptotal= 61.76 mm | B= 6.020 |
| | C= 0.819 |

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|------|-------|------|--------|------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.31 | 0.00 | 3.58 | 1.00 | 33.04 | 2.00 | 9.01 | 3.00 |
| 3.98 | 0.17 | 4.14 | 1.17 | 144.68 | 2.17 | 7.57 | 3.17 |
| 3.71 | 0.33 | 4.93 | 1.33 | 43.91 | 2.33 | 6.54 | 3.33 |
| 3.47 | 0.50 | 6.15 | 1.50 | 22.23 | 2.50 | 5.78 | 3.50 |
| 3.26 | 0.67 | 8.28 | 1.67 | 14.85 | 2.67 | 5.18 | 3.67 |
| 3.08 | 0.83 | 13.01 | 1.83 | 11.19 | 2.83 | 4.70 | 3.83 |

| CALIB | Area | (ha)= | 0.05 |
|-------------------|---------------|-------|----------------------|
| STANDHYD (0009) | Total Imp(%)= | 27.00 | Dir. Conn.(%)= 27.00 |
| ID= 1 DT= 5.0 min | | | |
| | IMPERVIOUS | (%)= | 0.01 |
| | PERVIOUS (i) | (%)= | 0.04 |
| Surface Area | (ha)= | 1.00 | 5.00 |
| Dep. Storage | (mm)= | 1.00 | 2.00 |
| Average Slope | (%)= | 17.89 | 40.00 |
| Length | (m)= | 0.013 | 0.250 |
| Mannings n | = | | |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.31 | 0.083 | 3.58 | 1.083 | 33.04 | 2.083 | 9.01 | 3.08 |
| 4.31 | 0.167 | 3.58 | 1.167 | 33.04 | 2.167 | 9.01 | 3.17 |
| 3.98 | 0.250 | 4.14 | 1.250 | 144.68 | 2.250 | 7.57 | 3.25 |
| 3.98 | 0.333 | 4.14 | 1.333 | 144.68 | 2.333 | 7.57 | 3.33 |
| 3.71 | 0.417 | 4.93 | 1.417 | 43.91 | 2.417 | 6.54 | 3.42 |
| 3.71 | 0.500 | 4.93 | 1.500 | 43.91 | 2.500 | 6.54 | 3.50 |
| 3.47 | 0.583 | 6.15 | 1.583 | 22.23 | 2.583 | 5.78 | 3.58 |
| 3.47 | 0.667 | 6.15 | 1.667 | 22.23 | 2.667 | 5.78 | 3.67 |
| 3.26 | 0.750 | 8.28 | 1.750 | 14.85 | 2.750 | 5.18 | 3.75 |
| 3.26 | 0.833 | 8.28 | 1.833 | 14.85 | 2.833 | 5.18 | 3.83 |
| 3.08 | 0.917 | 13.01 | 1.917 | 11.19 | 2.917 | 4.70 | 3.92 |



3.08 1.000 13.01 | 2.000 11.19 | 3.000 4.70 | 4.00

Max.Eff.Inten.(mm/hr)= 144.68 57.63
over (min) 5.00 10.00
Storage Coeff. (min)= 0.78 (ii) 9.58 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.11
PEAK FLOW (cms)= 0.01 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 60.76 26.79 35.87
TOTAL RAINFALL (mm)= 61.76 61.76 61.76
RUNOFF COEFFICIENT = 0.98 0.43 0.58

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 80.0 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.

CALIB
STANDHYD (0012)
ID= 1 DT= 5.0 min
Area (ha)= 0.07
Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00

Surface Area (ha)= 0.05 IMPERVIOUS 0.02 PVIOUS (i)
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 21.45 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Table with 8 columns: TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN. Rows include values like 0.083, 3.58, 1.083, 33.04, 2.083, 9.01, 3.08.

Max.Eff.Inten.(mm/hr)= 144.68 57.63
over (min) 5.00 5.00
Storage Coeff. (min)= 0.88 (ii) 4.80 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.22
PEAK FLOW (cms)= 0.02 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 60.76 26.79 52.25
TOTAL RAINFALL (mm)= 61.76 61.76 61.76
RUNOFF COEFFICIENT = 0.98 0.43 0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 80.0 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.

CALIB
STANDHYD (0001)
ID= 1 DT= 5.0 min
Area (ha)= 0.09
Total Imp(%)= 97.00 Dir. Conn.(%)= 97.00

Surface Area (ha)= 0.09 IMPERVIOUS 0.00 PVIOUS (i)
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 24.22 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

Table with 8 columns: TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN. Rows include values like 0.083, 3.58, 1.083, 33.04, 2.083, 9.01, 3.08.

Max.Eff.Inten.(mm/hr)= 144.68 57.63
over (min) 5.00 5.00
Storage Coeff. (min)= 0.94 (ii) 2.46 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.30
PEAK FLOW (cms)= 0.03 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 60.76 26.79 59.74
TOTAL RAINFALL (mm)= 61.76 61.76 61.76
RUNOFF COEFFICIENT = 0.98 0.43 0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 80.0 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.

CALIB
STANDHYD (0004)
ID= 1 DT= 5.0 min
Area (ha)= 0.05
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

Surface Area (ha)= 0.05 IMPERVIOUS 0.00 PVIOUS (i)
Dep. Storage (mm)= 1.00 1.00
Average Slope (%)= 1.00 2.00
Length (m)= 17.59 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Table with 8 columns: TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN. Rows include values like 0.083, 3.58, 1.083, 33.04, 2.083, 9.01, 3.08.

Max.Eff.Inten.(mm/hr)= 144.68 142.85
over (min) 5.00 5.00
Storage Coeff. (min)= 0.78 (ii) 1.75 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.32
PEAK FLOW (cms)= 0.02 0.00 *TOTALS*
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 60.76 58.30 60.74
TOTAL RAINFALL (mm)= 61.76 61.76 61.76



RUNOFF COEFFICIENT = 0.98 0.94 0.98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

Duration of storm = 4.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 99.0 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.

Table with columns: RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME. Rows show rainfall intensity and duration at various times.

Table with columns: ADD HYD (0007), AREA, QPEAK, TPEAK, R.V. Rows show hydrograph data for different IDs.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Table with columns: RESERVOIR (0003), OVERFLOW IS OFF, OUTFLOW, STORAGE, AREA, QPEAK, TPEAK, R.V. Rows show reservoir and overflow data.

Table with columns: CALIB, STANDHYD (0009), Area, Total Imp, Dir. Conn., IMPERVIOUS, PVIOUS (i). Rows show calibration and impervious area data.

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

PEAK FLOW REDUCTION [Qout/Qin] (%) = 69.54
TIME SHIFT OF PEAK FLOW (min) = 0.00
MAXIMUM STORAGE USED (ha.m.) = 0.0016

Table with columns: RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME. Rows show transformed rainfall data.

Table with columns: ADD HYD (0013), AREA, QPEAK, TPEAK, R.V. Rows show hydrograph data for different IDs.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLL
OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y M M O O O
O O T T H H Y Y M M O O O
OOO T T H H Y M M OOO

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO
6.2\VO2\voin.dat
Output filename: C:\Users\KimJo\AppData\Local\Civica\...
Summary filename: C:\Users\KimJo\AppData\Local\Civica\...

DATE: 09/22/2025 TIME: 02:46:34

USER:

COMMENTS:

Max.Eff.Inten.(mm/hr)= 161.50 70.15
over (min) 5.00 10.00
Storage Coeff. (min)= 0.75 (ii) 8.88 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.34 0.12

PEAK FLOW (cms)= 0.01 0.00 0.009 (iii)
TIME TO PEAK (hrs)= 1.33 1.42 1.33
RUNOFF VOLUME (mm)= 67.73 31.92 41.49
TOTAL RAINFALL (mm)= 68.73 68.73 68.73
RUNOFF COEFFICIENT = 0.99 0.46 0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 80.0 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.

Table with columns: CALIB, STANDHYD (0012), Area, Total Imp, Dir. Conn., IMPERVIOUS, PVIOUS (i). Rows show calibration and impervious area data.

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

CHICAGO STORM IDF curve parameters: A=1569.580
Ptotal= 68.73 mm B= 6.010
C= 0.820
used in: INTENSITY = A / (t + B)^C



---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.77 | 0.083 | 3.97 | 1.083 | 36.76 | 2.083 | 10.00 | 3.08 |
| 4.77 | 0.167 | 3.97 | 1.167 | 36.76 | 2.167 | 10.00 | 3.17 |
| 4.41 | 0.250 | 4.59 | 1.250 | 161.50 | 2.250 | 8.40 | 3.25 |
| 4.41 | 0.333 | 4.59 | 1.333 | 161.50 | 2.333 | 8.40 | 3.33 |
| 4.10 | 0.417 | 5.47 | 1.417 | 48.87 | 2.417 | 7.26 | 3.42 |
| 4.10 | 0.500 | 5.47 | 1.500 | 48.87 | 2.500 | 7.26 | 3.50 |
| 3.84 | 0.583 | 6.82 | 1.583 | 24.70 | 2.583 | 6.40 | 3.58 |
| 3.84 | 0.667 | 6.82 | 1.667 | 24.70 | 2.667 | 6.40 | 3.67 |
| 3.61 | 0.750 | 9.19 | 1.750 | 16.49 | 2.750 | 5.74 | 3.75 |
| 3.61 | 0.833 | 9.19 | 1.833 | 16.49 | 2.833 | 5.74 | 3.83 |
| 3.41 | 0.917 | 14.44 | 1.917 | 12.42 | 2.917 | 5.21 | 3.92 |
| 3.41 | 1.000 | 14.44 | 2.000 | 12.42 | 3.000 | 5.21 | 4.00 |

Max.Eff.Inten.(mm/hr)= 161.50 70.15
over (min) 5.00 5.00
Storage Coeff. (min)= 0.84 (ii) 4.59 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.23

TOTALS

PEAK FLOW (cms)= 0.02 0.00 0.027 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 67.73 31.92 58.75
TOTAL RAINFALL (mm)= 68.73 68.73 68.73
RUNOFF COEFFICIENT = 0.99 0.46 0.85

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 80.0 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.

CALIB
STANDHYD (0001)
ID= 1 DT= 5.0 min

Area (ha)= 0.09
Total Imp(%)= 97.00 Dir. Conn.(%)= 97.00

IMPERVIOUS PVIOUS (i)
Surface Area (ha)= 0.09 0.00
Dep. Storage (mm)= 1.00 5.00
Average Slope (%)= 1.00 2.00
Length (m)= 24.22 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.77 | 0.083 | 3.97 | 1.083 | 36.76 | 2.083 | 10.00 | 3.08 |
| 4.77 | 0.167 | 3.97 | 1.167 | 36.76 | 2.167 | 10.00 | 3.17 |
| 4.41 | 0.250 | 4.59 | 1.250 | 161.50 | 2.250 | 8.40 | 3.25 |
| 4.41 | 0.333 | 4.59 | 1.333 | 161.50 | 2.333 | 8.40 | 3.33 |
| 4.10 | 0.417 | 5.47 | 1.417 | 48.87 | 2.417 | 7.26 | 3.42 |
| 4.10 | 0.500 | 5.47 | 1.500 | 48.87 | 2.500 | 7.26 | 3.50 |
| 3.84 | 0.583 | 6.82 | 1.583 | 24.70 | 2.583 | 6.40 | 3.58 |
| 3.84 | 0.667 | 6.82 | 1.667 | 24.70 | 2.667 | 6.40 | 3.67 |
| 3.61 | 0.750 | 9.19 | 1.750 | 16.49 | 2.750 | 5.74 | 3.75 |
| 3.61 | 0.833 | 9.19 | 1.833 | 16.49 | 2.833 | 5.74 | 3.83 |
| 3.41 | 0.917 | 14.44 | 1.917 | 12.42 | 2.917 | 5.21 | 3.92 |
| 3.41 | 1.000 | 14.44 | 2.000 | 12.42 | 3.000 | 5.21 | 4.00 |

Max.Eff.Inten.(mm/hr)= 161.50 70.15
over (min) 5.00 5.00
Storage Coeff. (min)= 0.90 (ii) 2.35 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.30

TOTALS

PEAK FLOW (cms)= 0.04 0.00 0.039 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 67.73 31.92 66.65
TOTAL RAINFALL (mm)= 68.73 68.73 68.73

RUNOFF COEFFICIENT = 0.99 0.46 0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 80.0 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.

CALIB
STANDHYD (0004)
ID= 1 DT= 5.0 min

Area (ha)= 0.05
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

IMPERVIOUS PVIOUS (i)
Surface Area (ha)= 0.05 0.00
Dep. Storage (mm)= 1.00 1.00
Average Slope (%)= 1.00 2.00
Length (m)= 17.59 40.00
Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 4.77 | 0.083 | 3.97 | 1.083 | 36.76 | 2.083 | 10.00 | 3.08 |
| 4.77 | 0.167 | 3.97 | 1.167 | 36.76 | 2.167 | 10.00 | 3.17 |
| 4.41 | 0.250 | 4.59 | 1.250 | 161.50 | 2.250 | 8.40 | 3.25 |
| 4.41 | 0.333 | 4.59 | 1.333 | 161.50 | 2.333 | 8.40 | 3.33 |
| 4.10 | 0.417 | 5.47 | 1.417 | 48.87 | 2.417 | 7.26 | 3.42 |
| 4.10 | 0.500 | 5.47 | 1.500 | 48.87 | 2.500 | 7.26 | 3.50 |
| 3.84 | 0.583 | 6.82 | 1.583 | 24.70 | 2.583 | 6.40 | 3.58 |
| 3.84 | 0.667 | 6.82 | 1.667 | 24.70 | 2.667 | 6.40 | 3.67 |
| 3.61 | 0.750 | 9.19 | 1.750 | 16.49 | 2.750 | 5.74 | 3.75 |
| 3.61 | 0.833 | 9.19 | 1.833 | 16.49 | 2.833 | 5.74 | 3.83 |
| 3.41 | 0.917 | 14.44 | 1.917 | 12.42 | 2.917 | 5.21 | 3.92 |
| 3.41 | 1.000 | 14.44 | 2.000 | 12.42 | 3.000 | 5.21 | 4.00 |

Max.Eff.Inten.(mm/hr)= 161.50 159.83
over (min) 5.00 5.00
Storage Coeff. (min)= 0.74 (ii) 1.67 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.34 0.32

TOTALS

PEAK FLOW (cms)= 0.02 0.00 0.021 (iii)
TIME TO PEAK (hrs)= 1.33 1.33 1.33
RUNOFF VOLUME (mm)= 67.73 65.25 67.70
TOTAL RAINFALL (mm)= 68.73 68.73 68.73
RUNOFF COEFFICIENT = 0.99 0.95 0.99

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES:
CN* = 99.0 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.

ADD HYD (0007)
1 + 2 = 3

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0001): 0.09 0.039 1.33 66.65
+ ID2= 2 (0004): 0.05 0.021 1.33 67.70
=====

ID = 3 (0007): 0.13 0.060 1.33 67.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0003)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

| OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---------------|-----------------|---------------|-----------------|
| 0.0000 | 0.0000 | 0.0374 | 0.0016 |
| 0.0363 | 0.0009 | 0.0380 | 0.0025 |
| 0.0369 | 0.0010 | 0.0000 | 0.0000 |

AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW : ID= 2 (0007) 0.134 0.060 1.33 67.01
OUTFLOW: ID= 1 (0003) 0.134 0.037 1.42 67.00

PEAK FLOW REDUCTION [Qout/Qin] (%) = 62.67



TIME SHIFT OF PEAK FLOW (min)= 5.00
 MAXIMUM STORAGE USED (ha.m.)= 0.0019

----- TRANSFORMED HYETOGRAPH -----

| ADD HYD (0013) | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|-----------|-------------|-------------|-----------|
| 1 + 2 = 3 | | | | |
| ID1= 1 (0012): | 0.07 | 0.027 | 1.33 | 58.75 |
| + ID2= 2 (0003): | 0.13 | 0.037 | 1.42 | 67.00 |
| ID = 3 (0013): | 0.20 | 0.064 | 1.33 | 64.20 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
V V I SSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSS UUUU A A LLLL
```

```
OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO
```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO
 6.2\VO2\voin.dat
 Output filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-87a1-436c-84fa-29e684f29ce0\9a038490-6e6c-46f4-8ca4-c741903fd9f2\scenar
 Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-87a1-436c-84fa-29e684f29ce0\9a038490-6e6c-46f4-8ca4-c741903fd9f2\scenar

DATE: 09/22/2025 TIME: 02:46:34
 USER:

COMMENTS: _____

 ** SIMULATION : 100yr 4hr 10min Chicago Copy **

| | |
|------------------|----------------------------------|
| CHICAGO STORM | IDF curve parameters: A=1735.688 |
| Ptotal= 76.00 mm | B= 6.010 |
| | C= 0.820 |

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs
 Storm time step = 10.00 min
 Time to peak ratio = 0.33

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|-------|-------|--------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.00 | 4.39 | 1.00 | 40.65 | 2.00 | 11.06 | 3.00 | |
| 5.28 | 0.17 | 5.07 | 1.17 | 178.60 | 2.17 | 9.28 | 3.17 |
| 4.88 | 0.33 | 6.05 | 1.33 | 54.04 | 2.33 | 8.02 | 3.33 |
| 4.54 | 0.50 | 7.54 | 1.50 | 27.31 | 2.50 | 7.08 | 3.50 |
| 4.25 | 0.67 | 10.16 | 1.67 | 18.24 | 2.67 | 6.35 | 3.67 |
| 3.99 | 0.83 | 15.97 | 1.83 | 13.74 | 2.83 | 5.76 | 3.83 |

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.083 | 4.39 | 1.083 | 40.65 | 2.083 | 11.06 | 3.08 | |
| 5.28 | 0.167 | 4.39 | 1.167 | 40.65 | 2.167 | 11.06 | 3.17 |
| 5.28 | 0.250 | 5.07 | 1.250 | 178.60 | 2.250 | 9.28 | 3.25 |
| 4.88 | 0.333 | 5.07 | 1.333 | 178.60 | 2.333 | 9.28 | 3.33 |
| 4.88 | 0.417 | 6.05 | 1.417 | 54.04 | 2.417 | 8.02 | 3.42 |
| 4.54 | 0.500 | 6.05 | 1.500 | 54.04 | 2.500 | 8.02 | 3.50 |
| 4.54 | 0.583 | 7.54 | 1.583 | 27.31 | 2.583 | 7.08 | 3.58 |
| 4.25 | 0.667 | 7.54 | 1.667 | 27.31 | 2.667 | 7.08 | 3.67 |
| 4.25 | 0.750 | 10.16 | 1.750 | 18.24 | 2.750 | 6.35 | 3.75 |
| 3.99 | 0.833 | 10.16 | 1.833 | 18.24 | 2.833 | 6.35 | 3.83 |
| 3.99 | 0.917 | 15.97 | 1.917 | 13.74 | 2.917 | 5.76 | 3.92 |
| 3.77 | 1.000 | 15.97 | 2.000 | 13.74 | 3.000 | 5.76 | 4.00 |

Max.Eff.Inten.(mm/hr)= 178.60 over (min)= 5.00
 Storage Coeff. (min)= 0.72 (ii) 8.30 (ii)
 Unit Hyd. Tpeak (min)= 5.00 10.00
 Unit Hyd. peak (cms)= 0.34 0.13

PEAK FLOW (cms)= 0.01 0.01 0.011 (iii)
 TIME TO PEAK (hrs)= 1.33 1.42 1.33
 RUNOFF VOLUME (mm)= 75.00 37.48 47.51
 TOTAL RAINFALL (mm)= 76.00 76.00 76.00
 RUNOFF COEFFICIENT = 0.99 0.49 0.63

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

| | |
|-------------------|--|
| CALIB | Area (ha)= 0.07 |
| STANDHYD (0012) | Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00 |
| ID= 1 DT= 5.0 min | |

| | IMPERVIOUS | PERVIOUS (i) |
|--------------------|------------|--------------|
| Surface Area (ha)= | 0.05 | 0.02 |
| Dep. Storage (mm)= | 1.00 | 5.00 |
| Average Slope (%)= | 1.00 | 2.00 |
| Length (m)= | 21.45 | 40.00 |
| Mannings n = | 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
|-------|-------|-------|-------|--------|-------|-------|------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 0.083 | 4.39 | 1.083 | 40.65 | 2.083 | 11.06 | 3.08 | |
| 5.28 | 0.167 | 4.39 | 1.167 | 40.65 | 2.167 | 11.06 | 3.17 |
| 5.28 | 0.250 | 5.07 | 1.250 | 178.60 | 2.250 | 9.28 | 3.25 |
| 4.88 | 0.333 | 5.07 | 1.333 | 178.60 | 2.333 | 9.28 | 3.33 |
| 4.88 | 0.417 | 6.05 | 1.417 | 54.04 | 2.417 | 8.02 | 3.42 |
| 4.54 | 0.500 | 6.05 | 1.500 | 54.04 | 2.500 | 8.02 | 3.50 |
| 4.54 | 0.583 | 7.54 | 1.583 | 27.31 | 2.583 | 7.08 | 3.58 |
| 4.25 | 0.667 | 7.54 | 1.667 | 27.31 | 2.667 | 7.08 | 3.67 |
| 4.25 | 0.750 | 10.16 | 1.750 | 18.24 | 2.750 | 6.35 | 3.75 |
| 3.99 | 0.833 | 10.16 | 1.833 | 18.24 | 2.833 | 6.35 | 3.83 |
| 3.99 | 0.917 | 15.97 | 1.917 | 13.74 | 2.917 | 5.76 | 3.92 |
| 3.77 | 1.000 | 15.97 | 2.000 | 13.74 | 3.000 | 5.76 | 4.00 |

| | | |
|------------------------|-----------|-----------|
| Max.Eff.Inten.(mm/hr)= | 178.60 | 83.65 |
| over (min)= | 5.00 | 5.00 |
| Storage Coeff. (min)= | 0.80 (ii) | 4.41 (ii) |
| Unit Hyd. Tpeak (min)= | 5.00 | 5.00 |
| Unit Hyd. peak (cms)= | 0.34 | 0.23 |

| | | | |
|----------------------|-------|-------|-------------|
| PEAK FLOW (cms)= | 0.03 | 0.00 | 0.030 (iii) |
| TIME TO PEAK (hrs)= | 1.33 | 1.33 | 1.33 |
| RUNOFF VOLUME (mm)= | 75.00 | 37.48 | 65.59 |
| TOTAL RAINFALL (mm)= | 76.00 | 76.00 | 76.00 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.



RUNOFF COEFFICIENT = 0.99 0.49 0.86

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES: CN* = 80.0 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.

CALIB STANDHYD (0001) ID= 1 DT= 5.0 min Area (ha)= 0.09 Total Imp(%)= 97.00 Dir. Conn.(%)= 97.00

IMPERVIOUS PVIOUS (i) Surface Area (ha)= 0.09 0.00 Dep. Storage (mm)= 1.00 5.00 Average Slope (%)= 1.00 2.00 Length (m)= 24.22 40.00 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Table with 8 columns: TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN. Rows show rainfall data for various times (0.083 to 1.000) and rates (4.39 to 15.97 mm/hr).

Max.Eff.Inten.(mm/hr)= 178.60 83.65 over (min)= 5.00 5.00 Storage Coeff. (min)= 0.87 (ii) 2.26 (ii) Unit Hyd. Tpeak (min)= 5.00 5.00 Unit Hyd. peak (cms)= 0.34 0.30 *TOTALS* PEAK FLOW (cms)= 0.04 0.00 0.043 (iii) TIME TO PEAK (hrs)= 1.33 1.33 1.33 RUNOFF VOLUME (mm)= 75.00 37.48 73.87 TOTAL RAINFALL (mm)= 76.00 76.00 76.00 RUNOFF COEFFICIENT = 0.99 0.49 0.97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES: CN* = 80.0 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.

CALIB STANDHYD (0004) ID= 1 DT= 5.0 min Area (ha)= 0.05 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

IMPERVIOUS PVIOUS (i) Surface Area (ha)= 0.05 0.00 Dep. Storage (mm)= 1.00 1.00 Average Slope (%)= 1.00 2.00 Length (m)= 17.59 40.00 Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Table with 8 columns: TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN. Rows show rainfall data for various times (0.083 to 0.333) and rates (4.39 to 5.07 mm/hr).

Table with 8 columns: TIME, RAIN, TIME, RAIN, TIME, RAIN, TIME, RAIN. Rows show rainfall data for various times (4.54 to 3.77) and rates (0.417 to 1.000 mm/hr).

Max.Eff.Inten.(mm/hr)= 178.60 177.06 over (min)= 5.00 5.00 Storage Coeff. (min)= 0.71 (ii) 1.60 (ii) Unit Hyd. Tpeak (min)= 5.00 5.00 Unit Hyd. peak (cms)= 0.34 0.32

TOTALS PEAK FLOW (cms)= 0.02 0.00 0.023 (iii) TIME TO PEAK (hrs)= 1.33 1.33 1.33 RUNOFF VOLUME (mm)= 75.00 72.52 74.97 TOTAL RAINFALL (mm)= 76.00 76.00 76.00 RUNOFF COEFFICIENT = 0.99 0.95 0.99

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) CN PROCEDURE SELECTED FOR PVIOUS LOSSES: CN* = 99.0 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.

ADD HYD (0007) 1 + 2 = 3 AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm) ID1= 1 (0001): 0.09 0.043 1.33 73.87 + ID2= 2 (0004): 0.05 0.023 1.33 74.97 ID = 3 (0007): 0.13 0.066 1.33 74.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0003) IN= 2--> OUT= 1 DT= 5.0 min OVERFLOW IS OFF OUTFLOW (cms) STORAGE (ha.m.) OUTFLOW (cms) STORAGE (ha.m.) 0.0000 0.0000 0.0374 0.0016 0.0363 0.0009 0.0380 0.0025 0.0369 0.0010 0.0000 0.0000 AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm) INFLOW : ID= 2 (0007) 0.134 0.066 1.33 74.25 OUTFLOW : ID= 1 (0003) 0.134 0.038 1.42 74.24

PEAK FLOW REDUCTION [Qout/Qin](%)= 56.95 TIME SHIFT OF PEAK FLOW (min)= 5.00 MAXIMUM STORAGE USED (ha.m.)= 0.0022

ADD HYD (0013) 1 + 2 = 3 AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm) ID1= 1 (0012): 0.07 0.030 1.33 65.59 + ID2= 2 (0003): 0.13 0.038 1.42 74.24 ID = 3 (0013): 0.20 0.067 1.33 71.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSS U U A L (v 6.2.2015) V V I SS U U A A L V V I SS U U AAAAA L V V I SS U U A A L VV I SSSS UUUU A A LLLL

OOO TTTT TTTT H H Y Y M M OOO TM O O T T H H Y Y MM MM O O O O O T T H H Y M M O O OOO T T H H Y M M OOO Developed and Distributed by Smart City Water Inc Copyright 2007 - 2022 Smart City Water Inc All rights reserved.

***** D E T A I L E D O U T P U T *****



Input filename: C:\Program Files (x86)\Visual OTTHYMO
 6.2\VO2\voin.dat
 Output filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\658c5b84-3f86-42d7-a95f-7e4cdda9bb7\scenar
 Summary filename: C:\Users\KimJo\AppData\Local\Civica\XH5\5f9falbf-
 87a1-436c-84fa-29e684f29ce0\658c5b84-3f86-42d7-a95f-7e4cdda9bb7\scenar

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

DATE: 09/22/2025 TIME: 02:46:34

USER:

COMMENTS: _____

| | | |
|--|--|----------------------|
| CALIB STANDHYD (0012) ID= 1 DT= 5.0 min | Area (ha)= 0.07 Total Imp(%)= 75.00 | Dir. Conn.(%)= 75.00 |
|--|--|----------------------|

| | IMPERVIOUS | PERVIOUS (i) |
|--------------------|------------|--------------|
| Surface Area (ha)= | 0.05 | 0.02 |
| Dep. Storage (mm)= | 1.00 | 5.00 |
| Average Slope (%)= | 1.00 | 2.00 |
| Length (m)= | 21.45 | 40.00 |
| Mannings n = | 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| | |
|---|---|
| READ STORM ea362ed19395\234daf06 Ptotal= 25.00 mm | Filename: C:\Users\KimJo\AppData\Local\Temp\ed2c3e3f-16cb-4cbc-9214- Comments: 25mm 4hr Chicago (VO) |
|---|---|

| RAIN | | TIME | | RAIN | | TIME | | RAIN | | TIME | |
|-------|------|-------|------|-------|------|-------|------|-------|-------|-------|-------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.80 | 0.00 | 2.07 | 1.00 | 5.70 | 2.00 | 5.19 | 3.00 | 2.80 | 0.17 | 2.27 | 1.17 |
| 2.62 | 0.33 | 2.52 | 1.33 | 50.21 | 2.33 | 3.95 | 3.33 | 2.62 | 0.417 | 2.52 | 1.417 |
| 2.48 | 0.50 | 2.88 | 1.50 | 13.37 | 2.50 | 3.56 | 3.50 | 2.48 | 0.500 | 2.52 | 1.500 |
| 2.35 | 0.67 | 3.38 | 1.67 | 8.29 | 2.67 | 3.25 | 3.67 | 2.35 | 0.583 | 2.88 | 1.583 |
| 2.23 | 0.83 | 4.18 | 1.83 | 6.30 | 2.83 | 3.01 | 3.83 | 2.23 | 0.667 | 2.88 | 1.667 |
| 2.14 | | | | | | | | 2.35 | 0.750 | 3.38 | 1.750 |
| | | | | | | | | 2.23 | 0.833 | 3.38 | 1.833 |
| | | | | | | | | 2.23 | 0.917 | 4.17 | 1.917 |
| | | | | | | | | 2.14 | 1.000 | 4.18 | 2.000 |
| | | | | | | | | 2.14 | | | |

| RAIN | | TIME | | RAIN | | TIME | | RAIN | | TIME | |
|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.80 | 0.083 | 2.07 | 1.083 | 5.70 | 2.083 | 5.19 | 3.08 | 2.80 | 0.167 | 2.07 | 1.167 |
| 2.80 | 0.167 | 2.07 | 1.167 | 5.70 | 2.167 | 5.19 | 3.17 | 2.80 | 0.250 | 2.27 | 1.250 |
| 2.62 | 0.250 | 2.27 | 1.250 | 10.78 | 2.250 | 4.47 | 3.25 | 2.62 | 0.333 | 2.27 | 1.333 |
| 2.62 | 0.333 | 2.27 | 1.333 | 10.78 | 2.333 | 4.47 | 3.33 | 2.62 | 0.417 | 2.52 | 1.417 |
| 2.48 | 0.417 | 2.52 | 1.417 | 50.21 | 2.417 | 3.95 | 3.42 | 2.48 | 0.500 | 2.52 | 1.500 |
| 2.48 | 0.500 | 2.52 | 1.500 | 50.21 | 2.500 | 3.95 | 3.50 | 2.48 | 0.583 | 2.88 | 1.583 |
| 2.35 | 0.583 | 2.88 | 1.583 | 13.37 | 2.583 | 3.56 | 3.58 | 2.35 | 0.667 | 2.88 | 1.667 |
| 2.35 | 0.667 | 2.88 | 1.667 | 13.37 | 2.667 | 3.56 | 3.67 | 2.35 | 0.750 | 3.38 | 1.750 |
| 2.23 | 0.750 | 3.38 | 1.750 | 8.29 | 2.750 | 3.25 | 3.75 | 2.23 | 0.833 | 3.38 | 1.833 |
| 2.23 | 0.833 | 3.38 | 1.833 | 8.29 | 2.833 | 3.25 | 3.83 | 2.23 | 0.917 | 4.17 | 1.917 |
| 2.14 | 0.917 | 4.17 | 1.917 | 6.30 | 2.917 | 3.01 | 3.92 | 2.14 | 1.000 | 4.18 | 2.000 |
| 2.14 | 1.000 | 4.18 | 2.000 | 6.29 | 3.000 | 3.01 | 4.00 | | | | |

| | | |
|------------------------|-----------|------------|
| Max.Eff.Inten.(mm/hr)= | 50.21 | 4.50 |
| over (min) | 5.00 | 30.00 |
| Storage Coeff. (min)= | 1.34 (ii) | 25.73 (ii) |
| Unit Hyd. Tpeak (min)= | 5.00 | 30.00 |
| Unit Hyd. peak (cms)= | 0.33 | 0.04 |
| PEAK FLOW (cms)= | 0.01 | 0.00 |
| TIME TO PEAK (hrs)= | 1.50 | 2.00 |
| RUNOFF VOLUME (mm)= | 24.00 | 4.79 |
| TOTAL RAINFALL (mm)= | 25.00 | 25.00 |
| RUNOFF COEFFICIENT = | 0.96 | 0.19 |

TOTALS
 0.007 (iii)

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 80.0 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.

| | | |
|--|--|----------------------|
| CALIB STANDHYD (0009) ID= 1 DT= 5.0 min | Area (ha)= 0.05 Total Imp(%)= 27.00 | Dir. Conn.(%)= 27.00 |
|--|--|----------------------|

| | IMPERVIOUS | PERVIOUS (i) |
|--------------------|------------|--------------|
| Surface Area (ha)= | 0.01 | 0.04 |
| Dep. Storage (mm)= | 1.00 | 5.00 |
| Average Slope (%)= | 1.00 | 2.00 |
| Length (m)= | 17.89 | 40.00 |
| Mannings n = | 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | | TIME | | RAIN | | TIME | | RAIN | | TIME | |
|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.80 | 0.083 | 2.07 | 1.083 | 5.70 | 2.083 | 5.19 | 3.08 | 2.80 | 0.167 | 2.07 | 1.167 |
| 2.80 | 0.167 | 2.07 | 1.167 | 5.70 | 2.167 | 5.19 | 3.17 | 2.80 | 0.250 | 2.27 | 1.250 |
| 2.62 | 0.250 | 2.27 | 1.250 | 10.78 | 2.250 | 4.47 | 3.25 | 2.62 | 0.333 | 2.27 | 1.333 |
| 2.62 | 0.333 | 2.27 | 1.333 | 10.78 | 2.333 | 4.47 | 3.33 | 2.62 | 0.417 | 2.52 | 1.417 |
| 2.48 | 0.417 | 2.52 | 1.417 | 50.21 | 2.417 | 3.95 | 3.42 | 2.48 | 0.500 | 2.52 | 1.500 |
| 2.48 | 0.500 | 2.52 | 1.500 | 50.21 | 2.500 | 3.95 | 3.50 | 2.48 | 0.583 | 2.88 | 1.583 |
| 2.35 | 0.583 | 2.88 | 1.583 | 13.37 | 2.583 | 3.56 | 3.58 | 2.35 | 0.667 | 2.88 | 1.667 |
| 2.35 | 0.667 | 2.88 | 1.667 | 13.37 | 2.667 | 3.56 | 3.67 | 2.35 | 0.750 | 3.38 | 1.750 |
| 2.35 | 0.750 | 3.38 | 1.750 | 8.29 | 2.750 | 3.25 | 3.75 | 2.23 | 0.833 | 3.38 | 1.833 |
| 2.23 | 0.833 | 3.38 | 1.833 | 8.29 | 2.833 | 3.25 | 3.83 | 2.23 | 0.917 | 4.17 | 1.917 |
| 2.23 | 0.917 | 4.17 | 1.917 | 6.30 | 2.917 | 3.01 | 3.92 | 2.14 | 1.000 | 4.18 | 2.000 |
| 2.14 | 1.000 | 4.18 | 2.000 | 6.29 | 3.000 | 3.01 | 4.00 | 2.14 | | | |

| | | |
|------------------------|-----------|------------|
| Max.Eff.Inten.(mm/hr)= | 50.21 | 4.50 |
| over (min) | 5.00 | 30.00 |
| Storage Coeff. (min)= | 1.20 (ii) | 25.59 (ii) |
| Unit Hyd. Tpeak (min)= | 5.00 | 30.00 |
| Unit Hyd. peak (cms)= | 0.33 | 0.04 |
| PEAK FLOW (cms)= | 0.00 | 0.00 |
| TIME TO PEAK (hrs)= | 1.50 | 2.00 |
| RUNOFF VOLUME (mm)= | 24.00 | 4.79 |
| TOTAL RAINFALL (mm)= | 25.00 | 25.00 |
| RUNOFF COEFFICIENT = | 0.96 | 0.19 |

TOTALS
 0.002 (iii)

| | | |
|--|--|----------------------|
| CALIB STANDHYD (0001) ID= 1 DT= 5.0 min | Area (ha)= 0.09 Total Imp(%)= 97.00 | Dir. Conn.(%)= 97.00 |
|--|--|----------------------|

| | IMPERVIOUS | PERVIOUS (i) |
|--------------------|------------|--------------|
| Surface Area (ha)= | 0.09 | 0.00 |
| Dep. Storage (mm)= | 1.00 | 5.00 |
| Average Slope (%)= | 1.00 | 2.00 |
| Length (m)= | 24.22 | 40.00 |
| Mannings n = | 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| RAIN | | TIME | | RAIN | | TIME | | RAIN | | TIME | |
|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.80 | 0.083 | 2.07 | 1.083 | 5.70 | 2.083 | 5.19 | 3.08 | 2.80 | 0.167 | 2.07 | 1.167 |
| 2.80 | 0.167 | 2.07 | 1.167 | 5.70 | 2.167 | 5.19 | 3.17 | 2.80 | 0.250 | 2.27 | 1.250 |
| 2.62 | 0.250 | 2.27 | 1.250 | 10.78 | 2.250 | 4.47 | 3.25 | 2.62 | 0.333 | 2.27 | 1.333 |
| 2.62 | 0.333 | 2.27 | 1.333 | 10.78 | 2.333 | 4.47 | 3.33 | | | | |



| | | | | | | | |
|------|-------|------|-------|-------|-------|------|------|
| 2.48 | 0.417 | 2.52 | 1.417 | 50.21 | 2.417 | 3.95 | 3.42 |
| 2.48 | 0.500 | 2.52 | 1.500 | 50.21 | 2.500 | 3.95 | 3.50 |
| 2.48 | 0.583 | 2.88 | 1.583 | 13.37 | 2.583 | 3.56 | 3.58 |
| 2.35 | 0.667 | 2.88 | 1.667 | 13.37 | 2.667 | 3.56 | 3.67 |
| 2.35 | 0.750 | 3.38 | 1.750 | 8.29 | 2.750 | 3.25 | 3.75 |
| 2.23 | 0.833 | 3.38 | 1.833 | 8.29 | 2.833 | 3.25 | 3.83 |
| 2.23 | 0.917 | 4.17 | 1.917 | 6.30 | 2.917 | 3.01 | 3.92 |
| 2.14 | 1.000 | 4.18 | 2.000 | 6.29 | 3.000 | 3.01 | 4.00 |
| 2.14 | | | | | | | |

Max.Eff.Inten.(mm/hr)= 50.21 6.66
over (min) 5.00 5.00
Storage Coeff. (min)= 1.44 (ii) 3.75 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.33 0.25

TOTALS

PEAK FLOW (cms)= 0.01 0.00 0.012 (iii)
TIME TO PEAK (hrs)= 1.50 1.50 1.50
RUNOFF VOLUME (mm)= 24.00 4.79 23.41
TOTAL RAINFALL (mm)= 25.00 25.00 25.00
RUNOFF COEFFICIENT = 0.96 0.19 0.94

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

| | |
|-------------------|--|
| CALIB | Area (ha)= 0.05 |
| STANDHYD (0004) | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00 |
| ID= 1 DT= 5.0 min | |

| | | |
|--------------------|------------|--------------|
| | IMPERVIOUS | PERVIOUS (i) |
| Surface Area (ha)= | 0.05 | 0.00 |
| Dep. Storage (mm)= | 1.00 | 1.00 |
| Average Slope (%)= | 1.00 | 2.00 |
| Length (m)= | 17.59 | 40.00 |
| Mannings n | = 0.013 | 0.250 |

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

| | | | | | | | | | |
|----------------------------------|-------|-------|-------|-------|-------|-------|------|-------|------|
| ---- TRANSFORMED HYETOGRAPH ---- | | | | | | | | | |
| RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME |
| mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs |
| 2.80 | 0.083 | 2.07 | 1.083 | 5.70 | 2.083 | 5.19 | 3.08 | | |
| 2.80 | 0.167 | 2.07 | 1.167 | 5.70 | 2.167 | 5.19 | 3.17 | | |
| 2.62 | 0.250 | 2.27 | 1.250 | 10.78 | 2.250 | 4.47 | 3.25 | | |
| 2.62 | 0.333 | 2.27 | 1.333 | 10.78 | 2.333 | 4.47 | 3.33 | | |
| 2.48 | 0.417 | 2.52 | 1.417 | 50.21 | 2.417 | 3.95 | 3.42 | | |
| 2.48 | 0.500 | 2.52 | 1.500 | 50.21 | 2.500 | 3.95 | 3.50 | | |
| 2.48 | 0.583 | 2.88 | 1.583 | 13.37 | 2.583 | 3.56 | 3.58 | | |
| 2.35 | 0.667 | 2.88 | 1.667 | 13.37 | 2.667 | 3.56 | 3.67 | | |
| 2.35 | 0.750 | 3.38 | 1.750 | 8.29 | 2.750 | 3.25 | 3.75 | | |
| 2.23 | 0.833 | 3.38 | 1.833 | 8.29 | 2.833 | 3.25 | 3.83 | | |
| 2.23 | | | | | | | | | |

| | | | | | | | |
|------|-------|------|-------|------|-------|------|------|
| 2.14 | 0.917 | 4.17 | 1.917 | 6.30 | 2.917 | 3.01 | 3.92 |
| 2.14 | 1.000 | 4.18 | 2.000 | 6.29 | 3.000 | 3.01 | 4.00 |

Max.Eff.Inten.(mm/hr)= 50.21 47.26
over (min) 5.00 5.00
Storage Coeff. (min)= 1.19 (ii) 2.67 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.33 0.29

TOTALS

PEAK FLOW (cms)= 0.01 0.00 0.006 (iii)
TIME TO PEAK (hrs)= 1.50 1.50 1.50
RUNOFF VOLUME (mm)= 24.00 21.68 23.97
TOTAL RAINFALL (mm)= 25.00 25.00 25.00
RUNOFF COEFFICIENT = 0.96 0.87 0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 99.0 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.

| | | | | |
|-------------------|------|-------|-------|-------|
| ADD HYD (0007) | AREA | QPEAK | TPEAK | R.V. |
| 1 + 2 = 3 | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0001): | 0.09 | 0.012 | 1.50 | 23.41 |
| + ID2= 2 (0004): | 0.05 | 0.006 | 1.50 | 23.97 |
| ID = 3 (0007): | 0.13 | 0.018 | 1.50 | 23.61 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| | |
|-------------------|-----------------|
| RESERVOIR(0003) | OVERFLOW IS OFF |
| IN= 2----> OUT= 1 | |
| DT= 5.0 min | |

| | | | | |
|--|---------|---------|---------|---------|
| | OUTFLOW | STORAGE | OUTFLOW | STORAGE |
| | (cms) | (ha.m.) | (cms) | (ha.m.) |
| | 0.0000 | 0.0000 | 0.0374 | 0.0016 |
| | 0.0363 | 0.0009 | 0.0380 | 0.0025 |
| | 0.0369 | 0.0010 | 0.0000 | 0.0000 |

| | | | | |
|------------------------|-------|-------|-------|-------|
| | AREA | QPEAK | TPEAK | R.V. |
| | (ha) | (cms) | (hrs) | (mm) |
| INFLOW : ID= 2 (0007) | 0.134 | 0.018 | 1.50 | 23.61 |
| OUTFLOW: ID= 1 (0003) | 0.134 | 0.016 | 1.50 | 23.60 |

PEAK FLOW REDUCTION [Qout/Qin] (%) = 86.83
TIME SHIFT OF PEAK FLOW (min) = 0.00
MAXIMUM STORAGE USED (ha.m.) = 0.0004

| | | | | |
|-------------------|------|-------|-------|-------|
| ADD HYD (0013) | AREA | QPEAK | TPEAK | R.V. |
| 1 + 2 = 3 | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0012): | 0.07 | 0.007 | 1.50 | 19.04 |
| + ID2= 2 (0003): | 0.13 | 0.016 | 1.50 | 23.60 |
| ID = 3 (0013): | 0.20 | 0.023 | 1.50 | 22.05 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH



Appendix E
Storm Water Management Calculation

PROJECT NO. : BRM-23002042-U0

PROJECT NAME. : Proposed Chick fil A, 5100 Erin Mills Parkway, Mississauga, ON

Date: March 2026



PREDEVELOPMENT FLOWS & ALLOWABLE FLOWS

Area 101

| | | |
|-----------------------------|-------|-----|
| Area (A)= | 0.345 | ha |
| Runoff Coefficient (C)= | 0.718 | |
| Time of Concentration (tc)= | 10 | min |
| equiv % imp= | 0.67 | |

Area 103 (To Eglinton Ave W.)

| | | |
|-----------------------------|-------|-----|
| Area (A)= | 0.061 | ha |
| Runoff Coefficient (C)= | 0.2 | |
| Time of Concentration (tc)= | 10 | min |
| equiv % imp= | 0.00 | |

Area 102 (To the Road on West)

| | | |
|-----------------------------|-------|-----|
| Area (A)= | 0.042 | ha |
| Runoff Coefficient (C)= | 0.26 | |
| Time of Concentration (tc)= | 10 | min |
| equiv % imp= | 0.01 | |

| | | |
|-------------------|--------------|-----------|
| Total Area | 0.448 | ha |
|-------------------|--------------|-----------|

| Yr Stm | a | b | c | I (mm/hr) |
|--------|------|--------|------|-----------|
| 2 | 1070 | 0.8759 | 7.85 | 85.72 |
| 5 | 1593 | 0.8789 | 11 | 109.68 |
| 10 | 2221 | 0.9080 | 12 | 134.16 |
| 25 | 3158 | 0.9335 | 15 | 156.47 |
| 50 | 3886 | 0.9495 | 16 | 176.19 |
| 100 | 4688 | 0.9624 | 17 | 196.54 |

Q=2.78*CiA

Area 101

| Yr Stm | Otthymo Peak Flow | |
|--------|-------------------|-------|
| | cms | L/s |
| 2 | 0.057 | 57.0 |
| 5 | 0.076 | 76.0 |
| 10 | 0.101 | 101.0 |
| 25 | 0.120 | 120.0 |
| 50 | 0.138 | 138.0 |
| 100 | 0.156 | 156.0 |

Area 102 (To the Road on West)

| Yr Stm | Otthymo Peak Flow | |
|--------|-------------------|------|
| | cms | L/s |
| 2 | 0.002 | 2.0 |
| 5 | 0.004 | 4.0 |
| 10 | 0.005 | 5.0 |
| 25 | 0.007 | 7.0 |
| 50 | 0.009 | 9.0 |
| 100 | 0.011 | 11.0 |

Area 103 (To Eglinton Ave W.)

| Yr Stm | Otthymo Peak Flow | |
|--------|-------------------|------|
| | cms | L/s |
| 2 | 0.002 | 2.0 |
| 5 | 0.004 | 4.0 |
| 10 | 0.006 | 6.0 |
| 25 | 0.008 | 8.0 |
| 50 | 0.009 | 9.0 |
| 100 | 0.011 | 11.0 |

PROJECT NO. : BRM-23002042-U0

PROJECT NAME. : Proposed Chick fil A, 5100 Erin Mills Parkway, Mississauga, ON

Date: March 2026

Post-Development :

| | | |
|---------------------------|-------|----|
| Controlled Catchment Area | 0.345 | ha |
| Percent Impervious | 0.68 | % |

| | | |
|---------------------|-------|----|
| Roof Catchment Area | 0.049 | ha |
|---------------------|-------|----|

| | | |
|----------------------|-------|----|
| TOTAL Catchment Area | 0.394 | ha |
|----------------------|-------|----|

ICD Information

| | | |
|------------------------------|----------|----|
| Location | STM MH01 | |
| Type | Plate | |
| Coefficient | 0.63 | |
| Size | 75 | mm |
| Invert Elevation | 173.32 | m |
| Lowest Surface/Rim Elevation | 174.70 | m |

Storage Information

| | Volume in Pipe (m3) | Volume in Structures (m3) | Roof Storage (m3) | TOTAL Volume (m3) |
|------------|---------------------|---------------------------|-------------------|-------------------|
| At 173.85m | 2.13 | 0.82 | 0.00 | 2.95 |
| At 174.83m | 5.01 | 4.50 | 3.72 | 13.23 |
| At 174.90m | 5.01 | 7.63 | 10.54 | 23.18 |
| At 174.95m | 5.01 | 8.00 | 17.78 | 30.79 |

Stage Storage Discharge:

| Stage ID | Elevation | Head | Discharge | | Storage Volume | |
|------------------|-----------|------|-----------|-------------------|----------------|---------|
| | m | m | L/sec | m ³ /s | m ³ | ha-m |
| Orifice Centroid | 173.36 | 0.00 | 0.00 | 0.0000 | 0.00 | 0.00000 |
| Stage 1 | 173.85 | 0.49 | 8.65 | 0.0087 | 2.95 | 0.00030 |
| Stage 2 | 174.83 | 1.47 | 14.96 | 0.0150 | 13.23 | 0.00132 |
| Stage 3 | 174.90 | 1.54 | 15.31 | 0.0153 | 23.18 | 0.00232 |
| Stage 4 | 174.95 | 1.59 | 15.56 | 0.01556 | 30.79 | 0.00308 |

| | | | |
|----------------|--------|-----|------------------------------|
| Allowable Flow | 0.1560 | cms | (100-yr Predevelopment Flow) |
|----------------|--------|-----|------------------------------|

Storage Requirements

| Storm Event | Total Peak Flow Offsite | | % Allowable | Storage Volume Used (Sewers and Surface) | | Water Elevation | Water Depth Above Surface |
|-------------|-------------------------|-------|-------------|--|----------------|-----------------|---------------------------|
| | m ³ /s | L/sec | | ha-m | m ³ | | |
| 2 Year | 0.055 | 55 | 35% | 0.0010 | 10 | 175.03 | 1.18 |
| 5 Year | 0.075 | 75 | 48% | 0.0010 | 10 | 174.52 | 0.00 |
| 10 Year | 0.094 | 94 | 60% | 0.0020 | 20 | 174.88 | 1.03 |
| 25 Year | 0.112 | 112 | 72% | 0.0020 | 20 | 174.88 | 1.03 |
| 50 Year | 0.128 | 128 | 82% | 0.0030 | 30 | 174.94 | 1.09 |
| 100 Year | 0.144 | 144 | 92% | 0.0030 | 30 | 174.94 | 1.09 |

PROJECT NO. : BRM-23002042-U0
 PROJECT NAME. : Proposed Chick fil A, 5100 Erin Mills Parkway, Mississauga, ON
 Date: March 2026



Post-Development :

Area 202 (To the Road on West)

| | | |
|-----------------------------|-------|-----|
| Area (A)= | 0.019 | ha |
| Runoff Coefficient (C)= | 0.250 | |
| Time of Concentration (tc)= | 10 | min |
| equiv % imp= | 0.00 | |

Area 203 (To Eglinton Ave W.)

| | | |
|-----------------------------|-------|-----|
| Area (A)= | 0.033 | ha |
| Runoff Coefficient (C)= | 0.29 | |
| Time of Concentration (tc)= | 10 | min |
| equiv % imp= | 0.06 | |

| Yr Stm | a | b | c | I (mm/hr) |
|--------|------|--------|------|-----------|
| 2 | 1070 | 0.8759 | 7.85 | 85.72 |
| 5 | 1593 | 0.8789 | 11 | 109.68 |
| 10 | 2221 | 0.9080 | 12 | 134.16 |
| 25 | 3158 | 0.9335 | 15 | 156.47 |
| 50 | 3886 | 0.9495 | 16 | 176.19 |
| 100 | 4688 | 0.9624 | 17 | 196.54 |

Q=2.78*CiA

Area 202 (To the Road on West)

| Yr Stm | Otthymo Peak Flow | |
|--------|-------------------|-----|
| | cms | L/s |
| 2 | 0.001 | 1.0 |
| 5 | 0.001 | 1.0 |
| 10 | 0.002 | 2.0 |
| 25 | 0.002 | 2.0 |
| 50 | 0.003 | 3.0 |
| 100 | 0.003 | 3.0 |

Area 203 (To Eglinton Ave W.)

| Yr Stm | Otthymo Peak Flow | |
|--------|-------------------|-----|
| | cms | L/s |
| 2 | 0.001 | 1.0 |
| 5 | 0.001 | 1.0 |
| 10 | 0.002 | 2.0 |
| 25 | 0.002 | 2.0 |
| 50 | 0.003 | 3.0 |
| 100 | 0.003 | 3.0 |

PROJECT NO. : BRM-23002042-U0

PROJECT NAME. : Proposed Chick fil A, 5100 Erin Mills Parkway, Mississauga, ON

Date: March 2026



ROOF STORAGE CALCULATION

| | | |
|------------------|-------|----------------|
| Roof Area, A | 0.049 | ha |
| Roof Area, A | 486 | m ² |
| Number of Drains | 4 | |

| Head (m) | Volume (m ³) | Discharge (L/s) | Volume (ha.m) | Discharge (cms) |
|----------|--------------------------|-----------------|---------------|-----------------|
| 0.00 | 0.00 | 0.00 | 0.0000 | 0.000 |
| 0.08 | 36.45 | 7.45 | 0.0036 | 0.007 |
| 0.18 | 87.48 | 17.88 | 0.0087 | 0.018 |
| 0.25 | 121.50 | 24.84 | 0.0122 | 0.025 |

Based on 1 weir per drain at 0.63 l/sec per 25.4mm of head. (10 GPM per inch of water)
Zurn Control-Flo roof drain



Site Quality Control - TSS Removal :

| | Area (m2) | % of Site Area | Upstream TSS Removal Rate % | SWM Tank TSS Removal Rate % | OGS TSS Removal Rate % | TOTAL TSS Removal Rate* % | TSS Removal (% of Surface) |
|--------------------------------|-------------|----------------|-----------------------------|-----------------------------|------------------------|---------------------------|----------------------------|
| Roof (to OGS)* | 486 | 10 | 80 | 50 | 50 | 95 | 9.7 |
| Asphalt and Concrete (to OGS)* | 3539 | 74 | 0 | 50 | 50 | 75 | 55.7 |
| Landscape (to OGS)* | 743 | 16 | 80 | 50 | 50 | 95 | 14.8 |
| TOTAL | 4768 | 100 | | | | | 80.2 |

OGS - Stormceptor (or approved equivalent)

*Train Treatment = $A + B - (A \times B) / 100$

where A= % TSS Removal Upstream
 B= % TSS Removal Downstream

PROJECT NO. : BRM-23002042-U0

PROJECT NAME. : Proposed Chick fil A, 5100 Erin Mills Parkway, Mississauga, ON

Date: March 2026



Water Balance :

Water Balance Target

| | | |
|-----------------------------|-------|----------------|
| Site Area | 0.448 | ha |
| Water Balance Target | 27 | mm |
| Water Balance Volume Target | 121 | m ³ |

Total Capture:

| Surface | Area (m2) | Initial Abstraction (mm) | Volume Capture (m3) |
|----------------------|-----------|--------------------------|---------------------|
| Conventional Roof | | | |
| -Roof Storage | 486 | - | 122 |
| Paved Surface | 3539 | 1 | 4 |
| Landscaping | 743 | 5 | 4 |
| TOTAL VOLUME CAPTURE | | | 129 m3 |

Appendix F
OGS Report

Imbrium® Systems

ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

12/09/2025

| | |
|---------------------------|-----------------|
| Province: | Ontario |
| City: | Mississauga |
| Nearest Rainfall Station: | TORONTO INTL AP |
| Climate Station Id: | 6158731 |
| Years of Rainfall Data: | 20 |

| | |
|-------------------|--------------------|
| Project Name: | CFA Erin Mills |
| Project Number: | 69554 |
| Designer Name: | Joo Ho Kim |
| Designer Company: | EXP |
| Designer Email: | joo.ho.kim@exp.com |
| Designer Phone: | 416-992-9942 |
| EOR Name: | |
| EOR Company: | |
| EOR Email: | |
| EOR Phone: | |

| | |
|------------|----------------|
| Site Name: | CFA Erin Mills |
|------------|----------------|

| | |
|---------------------|------|
| Drainage Area (ha): | 0.39 |
|---------------------|------|

| | |
|-------------------------|------|
| Runoff Coefficient 'c': | 0.72 |
|-------------------------|------|

| | |
|-----------------------------|------|
| Particle Size Distribution: | Fine |
|-----------------------------|------|

| | |
|-------------------------|------|
| Target TSS Removal (%): | 80.0 |
|-------------------------|------|

| | |
|--|-------|
| Required Water Quality Runoff Volume Capture (%): | 90.00 |
| Estimated Water Quality Flow Rate (L/s): | 8.73 |
| Oil / Fuel Spill Risk Site? | Yes |
| Upstream Flow Control? | Yes |
| Upstream Orifice Control Flow Rate to Stormceptor (L/s): | 15.56 |
| Peak Conveyance (maximum) Flow Rate (L/s): | |
| Influent TSS Concentration (mg/L): | 200 |
| Estimated Average Annual Sediment Load (kg/yr): | 302 |
| Estimated Average Annual Sediment Volume (L/yr): | 245 |

| Net Annual Sediment (TSS) Load Reduction Sizing Summary | |
|---|--------------------------|
| Stormceptor Model | TSS Removal Provided (%) |
| EFO4 | 90 |
| EFO5 | 94 |
| EFO6 | 96 |
| EFO8 | 99 |
| EFO10 | 100 |
| EFO12 | 100 |

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 90

Water Quality Runoff Volume Capture (%): > 90



THIRD-PARTY TESTING AND VERIFICATION

► Stormceptor® EF and Stormceptor® EFO are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

► Stormceptor® EF and EFO remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

► The Canadian ETV PSD shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

| Particle Size (µm) | Percent Less Than | Particle Size Fraction (µm) | Percent |
|--------------------|-------------------|-----------------------------|---------|
| 1000 | 100 | 500-1000 | 5 |
| 500 | 95 | 250-500 | 5 |
| 250 | 90 | 150-250 | 15 |
| 150 | 75 | 100-150 | 15 |
| 100 | 60 | 75-100 | 10 |
| 75 | 50 | 50-75 | 5 |
| 50 | 45 | 20-50 | 10 |
| 20 | 35 | 8-20 | 15 |
| 8 | 20 | 5-8 | 10 |
| 5 | 10 | 2-5 | 5 |
| 2 | 5 | <2 | 5 |

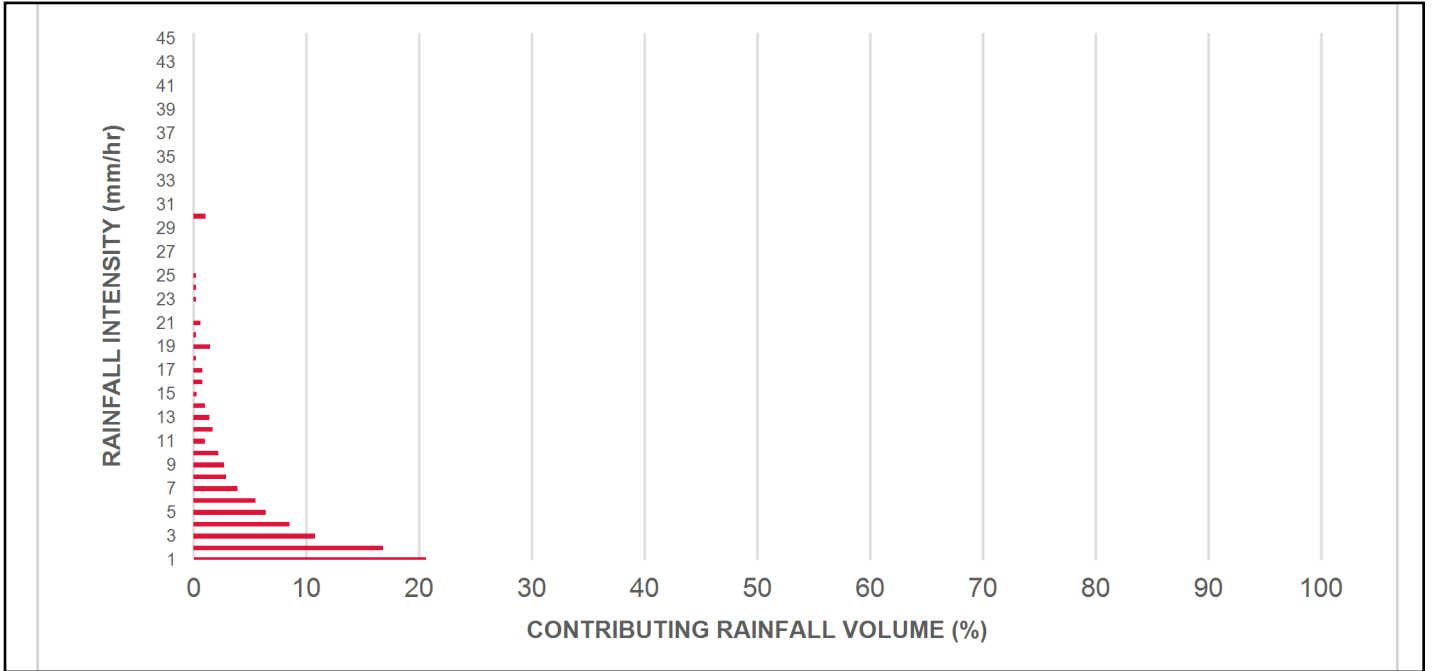
Upstream Flow Controlled Results

| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m ²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|---|-----------------------------|--------------------------------|-----------------|-------------------|--|------------------------|-------------------------|------------------------|
| 0.50 | 8.5 | 8.5 | 0.39 | 23.0 | 20.0 | 100 | 8.5 | 8.5 |
| 1.00 | 20.6 | 29.1 | 0.78 | 47.0 | 39.0 | 100 | 20.6 | 29.1 |
| 2.00 | 16.8 | 45.9 | 1.56 | 94.0 | 78.0 | 100 | 16.8 | 45.9 |
| 3.00 | 10.8 | 56.7 | 2.34 | 141.0 | 117.0 | 95 | 10.2 | 56.1 |
| 4.00 | 8.5 | 65.2 | 3.12 | 187.0 | 156.0 | 89 | 7.6 | 63.7 |
| 5.00 | 6.4 | 71.6 | 3.90 | 234.0 | 195.0 | 84 | 5.4 | 69.1 |
| 6.00 | 5.5 | 77.0 | 4.68 | 281.0 | 234.0 | 82 | 4.5 | 73.6 |
| 7.00 | 3.9 | 81.0 | 5.46 | 328.0 | 273.0 | 80 | 3.2 | 76.7 |
| 8.00 | 2.9 | 83.9 | 6.24 | 375.0 | 312.0 | 78 | 2.3 | 79.0 |
| 9.00 | 2.7 | 86.5 | 7.03 | 422.0 | 351.0 | 76 | 2.0 | 81.0 |
| 10.00 | 2.2 | 88.7 | 7.81 | 468.0 | 390.0 | 74 | 1.6 | 82.6 |
| 11.00 | 1.0 | 89.7 | 8.59 | 515.0 | 429.0 | 72 | 0.7 | 83.3 |
| 12.00 | 1.7 | 91.3 | 9.37 | 562.0 | 468.0 | 71 | 1.2 | 84.5 |
| 13.00 | 1.4 | 92.8 | 10.15 | 609.0 | 507.0 | 69 | 1.0 | 85.5 |
| 14.00 | 1.0 | 93.7 | 10.93 | 656.0 | 546.0 | 67 | 0.7 | 86.1 |
| 15.00 | 0.3 | 94.0 | 11.71 | 703.0 | 585.0 | 66 | 0.2 | 86.3 |
| 16.00 | 0.8 | 94.8 | 12.49 | 749.0 | 624.0 | 64 | 0.5 | 86.8 |
| 17.00 | 0.8 | 95.7 | 13.27 | 796.0 | 664.0 | 64 | 0.5 | 87.4 |
| 18.00 | 0.2 | 95.8 | 14.05 | 843.0 | 703.0 | 64 | 0.1 | 87.5 |
| 19.00 | 1.5 | 97.3 | 14.83 | 890.0 | 742.0 | 64 | 0.9 | 88.4 |
| 20.00 | 2.7 | 100.0 | 15.61 | 937.0 | 781.0 | 63 | 1.7 | 90.1 |
| 21.00 | 0.0 | 100.0 | 16.00 | 960.0 | 800.0 | 63 | 0.0 | 90.1 |
| 22.00 | 0.0 | 100.0 | 16.00 | 960.0 | 800.0 | 63 | 0.0 | 90.1 |
| 23.00 | 0.0 | 100.0 | 16.00 | 960.0 | 800.0 | 63 | 0.0 | 90.1 |
| 24.00 | 0.0 | 100.0 | 16.00 | 960.0 | 800.0 | 63 | 0.0 | 90.1 |
| 25.00 | 0.0 | 100.0 | 16.00 | 960.0 | 800.0 | 63 | 0.0 | 90.1 |
| 30.00 | 0.0 | 100.0 | 16.00 | 960.0 | 800.0 | 63 | 0.0 | 90.1 |
| 35.00 | 0.0 | 100.0 | 16.00 | 960.0 | 800.0 | 63 | 0.0 | 90.1 |
| 40.00 | 0.0 | 100.0 | 16.00 | 960.0 | 800.0 | 63 | 0.0 | 90.1 |
| 45.00 | 0.0 | 100.0 | 16.00 | 960.0 | 800.0 | 63 | 0.0 | 90.1 |
| Estimated Net Annual Sediment (TSS) Load Reduction = | | | | | | | | 90 % |

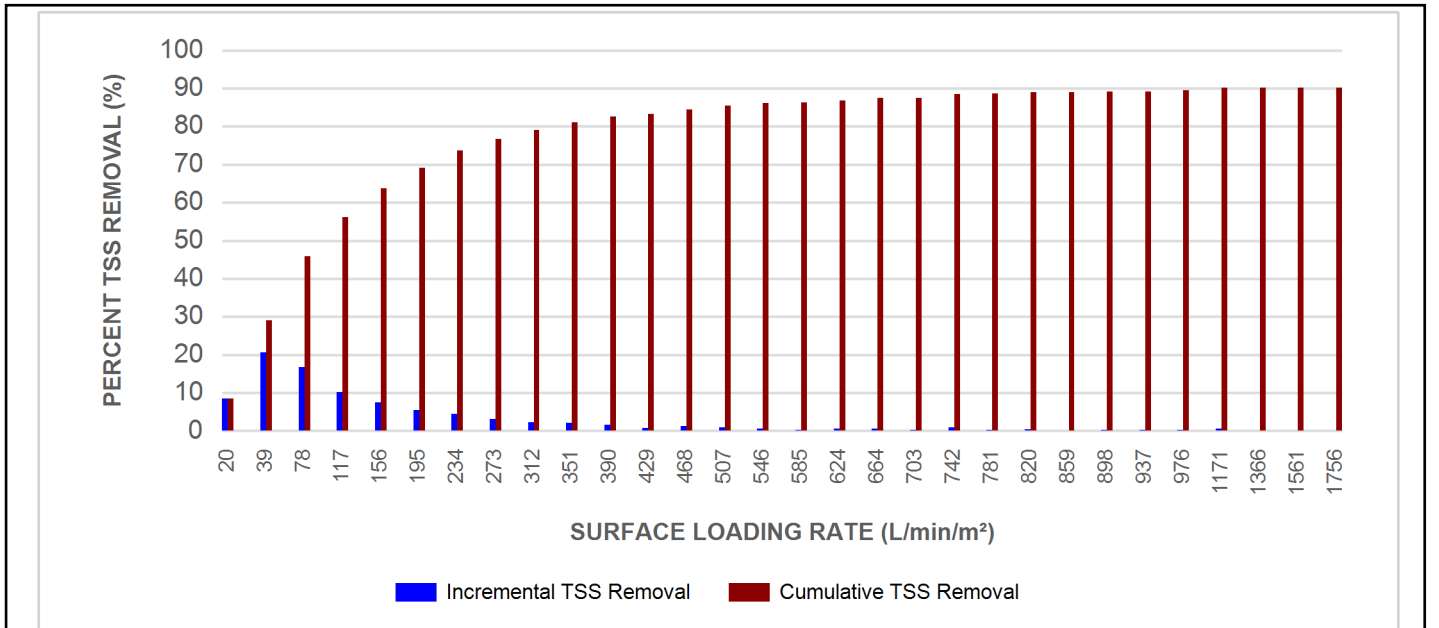
Climate Station ID: 6158731 Years of Rainfall Data: 20



RAINFALL DATA FROM TORONTO INTL AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

| Stormceptor EF / EFO | Model Diameter | | Min Angle Inlet / Outlet Pipes | Max Inlet Pipe Diameter | | Max Outlet Pipe Diameter | | Peak Conveyance Flow Rate | |
|----------------------|----------------|------|--------------------------------|-------------------------|------|--------------------------|------|---------------------------|-------|
| | (m) | (ft) | | (mm) | (in) | (mm) | (in) | (L/s) | (cfs) |
| EF4 / EFO4 | 1.2 | 4 | 90 | 609 | 24 | 609 | 24 | 425 | 15 |
| EF5 / EFO5 | 1.5 | 5 | 90 | 762 | 30 | 762 | 30 | 710 | 25 |
| EF6 / EFO6 | 1.8 | 6 | 90 | 914 | 36 | 914 | 36 | 990 | 35 |
| EF8 / EFO8 | 2.4 | 8 | 90 | 1219 | 48 | 1219 | 48 | 1700 | 60 |
| EF10 / EFO10 | 3.0 | 10 | 90 | 1828 | 72 | 1828 | 72 | 2830 | 100 |
| EF12 / EFO12 | 3.6 | 12 | 90 | 1828 | 72 | 1828 | 72 | 2830 | 100 |

SCOUR PREVENTION AND ONLINE CONFIGURATION

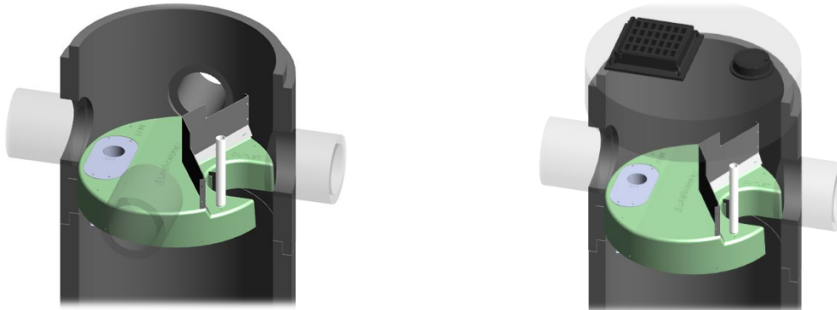
► Stormceptor® EF and EFO feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

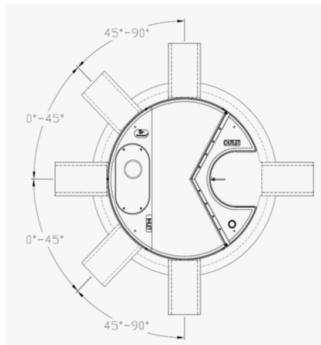
DESIGN FLEXIBILITY

► Stormceptor® EF and EFO offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

► While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, Stormceptor® EFO has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.





INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

| Stormceptor EF / EFO | Model Diameter | | Depth (Outlet Pipe Invert to Sump Floor) | | Oil Volume | | Recommended Sediment Maintenance Depth * | | Maximum Sediment Volume * | | Maximum Sediment Mass ** | |
|----------------------|----------------|------|--|------|------------|-------|--|------|---------------------------|-------|--------------------------|--------|
| | (m) | (ft) | (m) | (ft) | (L) | (Gal) | (mm) | (in) | (L) | (ft³) | (kg) | (lb) |
| EF4 / EFO4 | 1.2 | 4 | 1.52 | 5.0 | 265 | 70 | 203 | 8 | 1190 | 42 | 1904 | 5250 |
| EF5 / EFO5 | 1.5 | 5 | 1.62 | 5.3 | 420 | 111 | 305 | 10 | 2124 | 75 | 2612 | 5758 |
| EF6 / EFO6 | 1.8 | 6 | 1.93 | 6.3 | 610 | 160 | 305 | 12 | 3470 | 123 | 5552 | 15375 |
| EF8 / EFO8 | 2.4 | 8 | 2.59 | 8.5 | 1070 | 280 | 610 | 24 | 8780 | 310 | 14048 | 38750 |
| EF10 / EFO10 | 3.0 | 10 | 3.25 | 10.7 | 1670 | 440 | 610 | 24 | 17790 | 628 | 28464 | 78500 |
| EF12 / EFO12 | 3.6 | 12 | 3.89 | 12.8 | 2475 | 655 | 610 | 24 | 31220 | 1103 | 49952 | 137875 |

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

| Feature | Benefit | Feature Appeals To |
|---|---|---|
| Patent-pending enhanced flow treatment and scour prevention technology | Superior, verified third-party performance | Regulator, Specifying & Design Engineer |
| Third-party verified light liquid capture and retention for EFO version | Proven performance for fuel/oil hotspot locations | Regulator, Specifying & Design Engineer, Site Owner |
| Functions as bend, junction or inlet structure | Design flexibility | Specifying & Design Engineer |
| Minimal drop between inlet and outlet | Site installation ease | Contractor |
| Large diameter outlet riser for inspection and maintenance | Easy maintenance access from grade | Maintenance Contractor & Site Owner |

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit <http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef>

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit <http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef>

STANDARD PERFORMANCE SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program’s **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

| | | |
|-------|-------------------------------------|---|
| 2.1.1 | 4 ft (1219 mm) Diameter OGS Units: | 1.19 m ³ sediment / 265 L oil |
| | 5 ft (1524 mm) Diameter OGS Units: | 1.95 m ³ sediment / 420 L oil |
| | 6 ft (1829 mm) Diameter OGS Units: | 3.48 m ³ sediment / 609 L oil |
| | 8 ft (2438 mm) Diameter OGS Units: | 8.78 m ³ sediment / 1,071 L oil |
| | 10 ft (3048 mm) Diameter OGS Units: | 17.78 m ³ sediment / 1,673 L oil |
| | 12 ft (3657 mm) Diameter OGS Units: | 31.23 m ³ sediment / 2,476 L oil |

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m² to 1400 L/min/m², and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m² and 1400 L/min/m² shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m² shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m². No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m².

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m² shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m², and shall be calculated using a simple proportioning formula, with 1400 L/min/m² in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m².

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**.

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m².

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators**, with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m² to 2600 L/min/m²) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

