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234 POPLAR STREET, STAYNER

STORMWATER MANAGEMENT AND FUNCTIONAL SERVICING REPORT

Reinhart Foods Ltd.

Document Control

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**July
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| Issue | Date | Description |
|-------|---------------|----------------------------------|
| 1 | July 16, 2025 | First Submission to the Township |

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1 Introduction

Tatham Engineering Limited (Tatham) has been retained by Reinhart Foods Ltd. to prepare a combined Stormwater Management (SWM) and Functional Servicing Report (FSR) in support of a proposed industrial truck parking facility located at 234 Poplar Street in the Town of Stayner in the Township of Clearview. This report outlines the proposed stormwater management strategy and servicing approach developed in accordance with the Township of Clearview's Engineering Standards and applicable provincial guidelines. The SWM strategy includes enhanced water quality and quantity controls to mitigate post-development impacts and confirms that existing municipal infrastructure is sufficient to support the proposed development.

1.1 SITE DESCRIPTION

The subject property is zoned General Industrial (MG) and is approximately 0.82 hectares in area. The site has been cleared and has an existing gravel pad. Surrounding the site is industrial lands to the north, east, and west, while to the south lies a 30 m wide municipally-owned environmental buffer strip and the decommissioned Stayner Landfill (Landfill #34).

The property location is illustrated in Figure 1 – Site Location Plan.

1.2 PROPOSED DEVELOPMENT

The proposed development will consist of a gravel parking lot for 30 transport trailers, a dry pond stormwater management facility (SWMF), and a landscape strip around the perimeter of the site. The SWMF will be located along the east and south side of the site and will outlet to the existing ditch along Poplar Street, providing both quantity control and enhanced quality treatment through a treatment train approach. A new entrance was recently installed off Poplar Street at the west end of the property via an entrance permit from the Township. Streetlights will be provided along the frontage of the parking lot. No building is proposed for the site as it will only be utilized at this time for truck trailer parking and storage.

1.3 REFERENCES AND STANDARDS

The following references and standards were used in preparation for this report and was developed recognizing the pertinent municipal and provincial guidelines on municipal design, water resources, and the environment, including the following:

- Township of Clearview Engineering Standards. Township of Clearview (March 22, 2017).
- Nottawasaga Valley Conservation Authority (NVCA) Stormwater Technical Guide. NVCA (December 2013).



- Low Impact Development Stormwater Management Planning and Design Guide (2010).
- Stormwater Management Planning and Design Manual. Ministry of the Environment (MOE) (March 2003).
- Geotechnical Investigation for Proposed Stormwater Management Ponds 238 and 242 Poplar Street (February 2023).
- Modified Rational Method was used for the Stormwater Management Design.



2 Existing Conditions

2.1 SITE SERVICING

2.1.1 WATER SUPPLY AND DISTRIBUTION

The site is currently serviced by an existing 50 mm diameter water service connection to a 300 mm diameter municipal watermain located within the Poplar Street right-of-way. This information is based on the Stayner Industrial Servicing As-Built Drawings (Preliminary), Drawing C-004, prepared by RJ Burnside & Associates Limited.

As no building is proposed at this time, no water servicing is required to support the proposed trailer parking and storage use. However, the existing water connection will remain in place and may be utilized should future development require it.

2.1.2 SANITARY SEWAGE COLLECTION

Sanitary servicing for the site is provided through an existing 150 mm diameter sanitary service connection stubbed at the property line to a 250 mm diameter municipal sanitary sewer located within the Poplar Street right-of-way, as per the Stayner Industrial Servicing As-Built Drawings.

Similar to the water service, no sanitary servicing is required for the proposed development. The connection will remain available for potential future development should it be required.



3 Stormwater Management

The stormwater management plan (SWMP) has been prepared in accordance with the references outlined in Section 1.3. The SWMP is subject to review and approval by the Township of Clearview and is presented in the following sections.

3.1 DESIGN CRITERIA

The following design criteria are to be satisfied in the proposed SWMP:

- the SWMP must maintain existing stormwater runoff rates at the site outlet by restricting post development peak flow rates to pre-development levels for the 1:2-year through 1:100-year design storms;
- the SWMP must achieve the required Level 1 “Enhanced” water quality removing 80% total suspended solids (TSS) from site effluent; and
- safe conveyance of the Regulatory storm event peak flows through the site to the downstream drainage system must be provided for surface runoff generated within the development.

The proposed development is within 250 m of the decommissioned Stayner Landfill, as such NVCA water balance criteria were not considered as part of this SWMP.

3.2 EXISTING CONDITION HYDROLOGY

Existing site topography, ground cover, land use and drainage patterns were established through interpretation of topographic maps, aerial photography, and a site survey. An existing Drainage Plan (Drawing DP.1, enclosed) illustrating the existing drainage conditions across the subject property and the surrounding area should be referenced when reviewing this section of the report.

The site is currently vacant and has undergone some minor earthworks site alterations in preparation for a transport trailer storage parking lot. There is currently silt fence installed along perimeter of the vacant parcel.

The site is relatively flat with surface drainage flowing west to east and collected in an existing ditch along the south and east property limits which outlets to the ditch on Poplar Street. A pre-development runoff coefficient of $C = 0.15$ was assigned to the site and utilized for determining pre-development peak flow rates.

To quantify the existing peak flows draining from the site, the Modified Rational Method was used. Rainfall data for the site was obtained from the MTO IDF Curve lookup (Appendix A). The



existing peak flows for the 1:2-year through 1:100-year design storms are summarized in Table 1 and further detailed in Appendix A.

Table 1: Pre-Development Peak Flow Rate Summary

| DESIGN STORM | PEAK FLOW (m ³ /s) |
|--------------|-------------------------------|
| 1:2-year | 0.019 |
| 1:5-year | 0.025 |
| 1:10-year | 0.029 |
| 1:25-year | 0.037 |
| 1:50-year | 0.045 |
| 1:100-year | 0.051 |

3.3 PROPOSED STORMWATER MANAGEMENT PLAN

A Proposed Drainage Plan (Drawing DP.2, enclosed) illustrates the post-development drainage conditions and should be referenced when reviewing Section 3 of this report.

Under proposed conditions, the site will be divided into two drainage catchments, 201 will manage the majority of the site runoff and has a total area of approximately 0.72 hectares, all of which will be developed as a gravel parking lot with a runoff coefficient of $C = 0.60$.

Catchment 202 will generally be grass covered with slopes of 3:1 maximum. A runoff coefficient of $C = 0.30$ has been allocated due to its pervious nature. Although this area will discharge runoff without detention, Catchment 201 has been conservatively overcontrolled with respect to quantity to offset the uncontrolled release from Catchment 202 and maintain overall site-level drainage balance.

The proposed SWMP will incorporate an enhanced grass swale at the east and south limit of the property. Runoff will flow overland and be directed into the proposed swale, which will outlet to the Poplar Street roadside ditch under controlled conditions.

3.3.1 Water Quantity Control

The enhanced swale will provide the required water quantity controls for the proposed development in the form of pre to post-development peak flow matching. Approximately 508 m³ of storage is provided in the swale to attenuate the 1:2-year through 1:100-year design storms.



An engineered outlet has been designed to control peak flows from the site consisting of the following:

- A 450 mm diameter storm pipe with (2) 75 mm diameter orifice plates installed at elevations 225.45 m and 225.82 m.
- A trapezoidal emergency overflow weir with a bottom width of 1.0 m, depth of 0.20 m, 5:1 (H:V) side slopes and sill elevation of 226.20. The overflow weir will have a maximum flow rate of 0.253 m³/s which is greater than the 100-year flow rate of 0.182 m³/s.

To confirm the required water quantity control, a hydrologic analysis using the Modified Rational Method was completed under the proposed conditions. The peak flow rates calculated using the Modified Rational Method with IDF parameters obtained from the MTO IDF Curve Lookup. The peak-controlled post-development runoff rates are summarized in Table 2 and compared with the corresponding pre-development peak flow rates. Detailed hydrologic summaries and stage-storage-discharge table are included in Appendix A.

Table 2: Post-Development Peak Flow Rate Summary

| DESIGN STORM | PEAK FLOW (CONTROLLED - AREA 201) (m ³ /s) | PEAK FLOW (UNCONTROLLED - AREA 202) (m ³ /s) | PEAK FLOW (TOTAL) (m ³ /s) |
|--------------|--|--|---|
| 1:2-year | 0.007 | 0.005 | 0.012 (0.019) |
| 1:5-year | 0.009 | 0.006 | 0.015 (0.025) |
| 1:10-year | 0.011 | 0.007 | 0.018 (0.029) |
| 1:25-year | 0.014 | 0.09 | 0.023 (0.037) |
| 1:50-year | 0.016 | 0.011 | 0.027 (0.045) |
| 1:100-year | 0.017 | 0.013 | 0.030 (0.051) |

Note: (0.051) denotes pre-development peak flow

The proposed SWMF reduces the peak flow rates generated by the proposed development below pre-development levels.

Details of the enhanced swale and engineered outlets are illustrated on the Site Development Plan (Drawing SD.1) as part of the Site Plan application package.



Table 3: SWMF Stage-Storage-Discharge Summary

| DESIGN STORM | DISCHARGE (m ³ /s) | STORAGE VOLUME (m ³) | WATER SURFACE ELEVATION (m) |
|--------------|----------------------------------|-------------------------------------|-----------------------------------|
| 1:2-year | 0.007 | 82 | 225.86 |
| 1:5-year | 0.009 | 111 | 225.93 |
| 1:10-year | 0.011 | 129 | 225.97 |
| 1:25-year | 0.014 | 167 | 226.04 |
| 1:50-year | 0.016 | 212 | 226.12 |
| 1:100-year | 0.017 | 247 | 226.17 |

As shown in Tables 2 & 3, the SWMP provides quantity controls for the proposed development.

3.3.2 Water Quality Control

The SWMP has been designed to achieve Level 1 “Enhanced” water quality control. The SWMP utilizes a treatment train approach including:

- enhanced grass swale complete with rock check dams to promote extended detention and encourage sediment deposition behind the rock check dams prior to outletting to the control structure. Based on an evaluation by Sustainable Technologies Evaluation Program (STEP), a median total suspended solid (TSS) removal rate for similar enhanced grass swales is 76%; and
- a controlled outlet to maximize detention time with a reduced TSS removal efficiency of 30% is assumed due to limited detention time. In accordance with Table 3.2 of the MECP Design Guidelines, a quality control storage volume of 137 m³ is required (based on 167 m³/ha for a Basic TSS removal (60% impervious level) dry pond facility). The proposed stormwater management facility provides 264 m³ of storage below the emergency spillway.

Based on the TSS removal efficiencies, the treatment train will achieve 83% TSS removal. A detailed calculation summary is included in Appendix A.

3.4 PHOSPHORUS LOADING

In accordance with the NVCA SWM Technical Guidelines and based on parameters outlined in Managing New Urban Development in Phosphorus-Sensitive Watersheds by Hutchinson Environmental Sciences Ltd., a phosphorus loading assessment was completed for the site under



pre- and post-development conditions. Under existing conditions, the 0.82-hectare site, which was primarily forested, generates an estimated phosphorus export of 0.05 kg/year.

The proposed development includes the conversion of the site into a parking lot for transport trailers. Based on the NVCA phosphorus loading tool, the post-development land use comprises 0.65 hectares of unpaved road, with a loading rate of 0.83 kg/ha/year, and 0.17 hectares of turf-sod, with a loading rate of 0.11 kg/ha/year. Without any treatment controls, the total phosphorus export after development is calculated to be 0.56 kg/year.

To mitigate the increase in phosphorus load, an enhanced swale is proposed. The enhanced swale will function similar to a dry pond facility, thus a removal efficiency of 20% has been assumed. With this mitigation measure in place, the total post-development phosphorus export is reduced to 0.43 kg/year, resulting in an overall net increase of 0.38 kg/year. A detailed summary of the phosphorus loading calculations is provided in Appendix A.

3.5 EROSION CONTROL

Per Section 4.1 of the SWM Guidelines, a “best-efforts” approach was adopted to satisfy the erosion control criteria for the proposed stormwater management facility. Although site-specific constraints such as an elevated groundwater table limits the feasibility of typical infiltration-based LID practices, the design incorporates LID principles with extended detention, check dams, and vegetated conveyance features. The facility ultimately discharges to a roadside ditch, classified as an altered watercourse.



4 Siltation Control and Erosion Control Plan

Siltation and erosion control will be implemented for all construction activities, including topsoil stripping, material stockpiling, and grading operations. A detailed Site Development Plan (Drawings SD.1) is included in the Site Plan application package for the development which illustrates the sediment and erosion control measures to be implemented during construction. The basic principles to minimize erosion and sedimentation and resultant negative environmental impacts include:

1. Minimize disturbance activities where possible;
2. Expose the smallest possible land area to erosion for the shortest possible time;
3. Institute erosion control measures as required immediately;
4. Implement sediment control measures before the outset of construction activities;
5. Carry out regular inspections of erosion/sediment control measures and repair or maintain as necessary; and
6. Carry out regular inspections and required maintenance of the SWMF.

The proposed grading works should be carried out in such a manner that a minimum amount of erosion occurs and such that sedimentation facilities control any erosion that does occur.

Additional erosion, sediment, and pollution control measures should include the following:

1. Placement of temporary swales and check dams to control runoff and lower velocities and promote settling of solids;
2. Replacement/repair of existing silt control fence surrounding the site perimeter to control sediment movement;
3. Installing straw bale flow check dam at the east property limits within the Poplar Street ditch to capture any sediment from the site; and
4. Revegetate disturbed areas to enhance long-term siltation and erosion control.



5 Utilities

Utility connections (hydro and communications) are readily available within the Poplar Street right-of-way. The proposed parking lot will include streetlights along the frontage of the property which will be connected to the existing overhead distribution system.

A plan (L1 and L2) showing the proposed lighting locations and photometrics are included in the Site Plan application package for the development.



6 Summary

This report has been prepared in support of the proposed parking lot for transport truck trailers located at 234 Poplar Street in the Township of Clearview. It outlines the recommended Stormwater Management (SWM) plan and demonstrates that potential impacts on the local drainage systems will be mitigated through the implementation of the proposed measures, in accordance with municipal, regional, and provincial guidelines. In addition, this Stormwater Management and Functional Servicing Report confirms that adequate servicing exists to support the proposed development. The following provides a summary of the key findings presented in the report:

- The proponent intends to use the property as a truck parking and storage space. No buildings are being proposed on this site at this time;
- The existing water and sanitary services are not required for the proposed development but will remain in place and available for potential future use;
- The proposed SWM facility will provide pre-to-post quantity control and quality treatment at enhanced levels, and
- Existing utilities are readily available to provide service to the proposed parking lot.

In conclusion, the proposed transport truck storage parking lot supports the concept of an environmentally sustainable development. The proposed plan will mitigate anticipated impacts associated with the site development.





234 Poplar Street, Stayner

Figure 1 - Site Location Plan





POPLAR STREET

EDGE OF ASPHALT

EDGE OF GRASS

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101
0.82 0.15

226.00

226.00

226.00

226.00

226.00

226.50

226.50

226.50

226.50

226.50






227.00

226.26

226.70

BANK
BOTTOM OF BANK

LEGEND

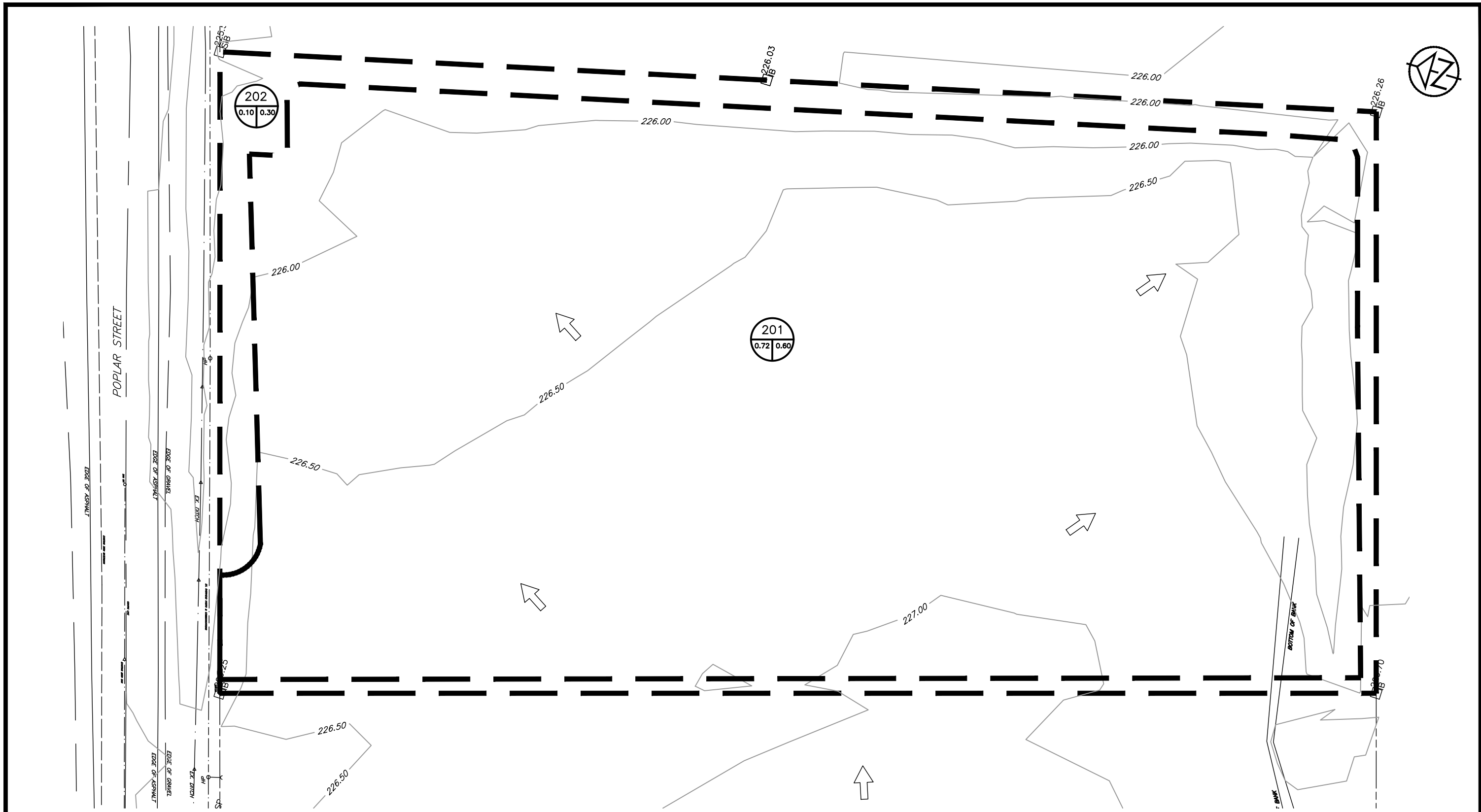
- CATCHMENT ID 
- AREA IN HECTARES 
- RUNOFF COEFFICIENT 
- CATCHMENT AREA 
- EXISTING FLOW DIRECTION 

TATHAM
ENGINEERING






234 POPLAR STREET
PRE-DEVELOPMENT DRAINAGE PLAN


SCALE: 1:400 DRAWN: KB DATE: MAY. 2025

DWG. No. **DP.1**
JOB NO. 125025



LEGEND

- CATCHMENT ID 
- AREA IN HECTARES 
- RUNOFF COEFFICIENT 
- CATCHMENT AREA 
- EXISTING FLOW DIRECTION 

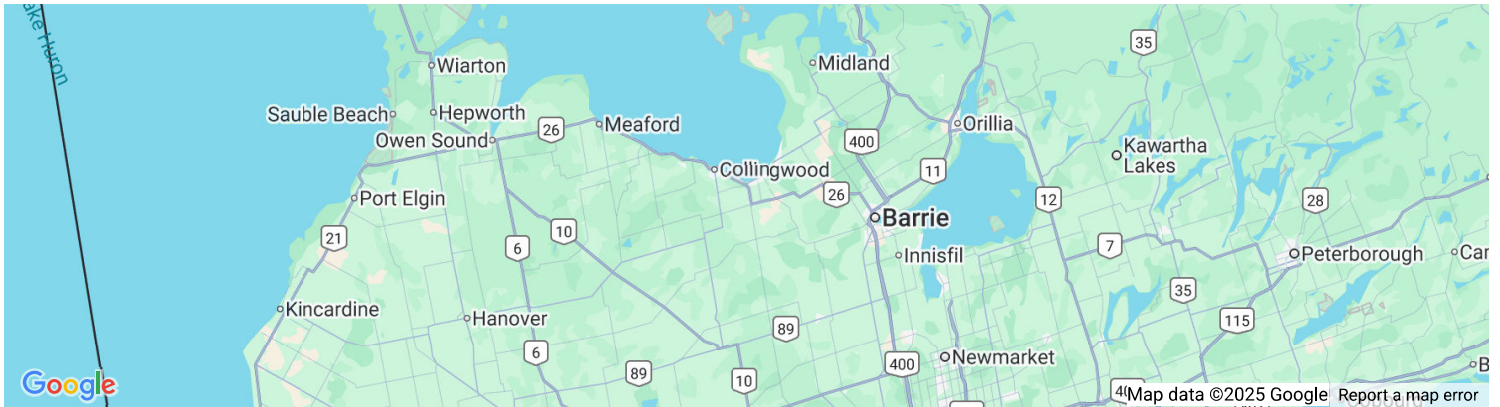
| | | | |
|---|---|-----------|--|
|  | 234 POPLAR STREET POST-DEVELOPMENT DRAINAGE PLAN | | DWG. No. DP.2 |
| | SCALE: 1:400 | DRAWN: KB | DATE: MAY. 2025 |

Appendix A: SWM Calculations

Active coordinate

44° 24' 45" N, 80° 6' 14" W (44.412500,-80.104167)

Retrieved: Mon, 14 Jul 2025 15:23:15 GMT



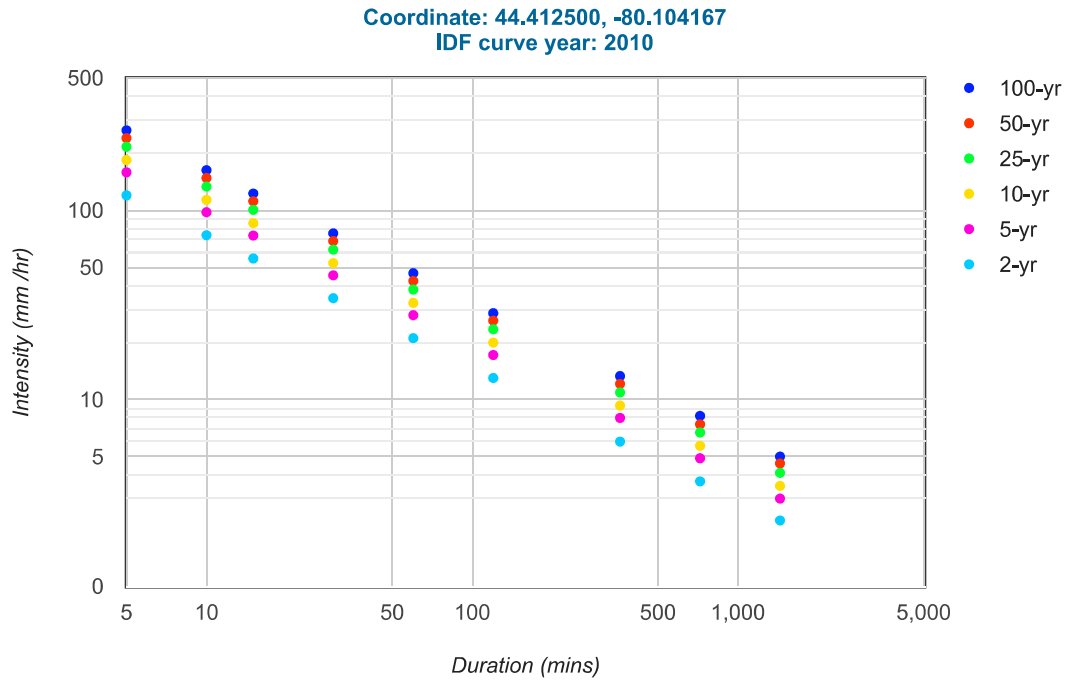
Location summary

These are the locations in the selection.

IDF Curve: 44° 24' 45" N, 80° 6' 14" W (44.412500,-80.104167)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 44° 24' 45" N, 80° 6' 14" W (44.412500,-80.104167)

Retrieved: Mon, 14 Jul 2025 15:23:15 GMT

Data year: 2010

IDF curve year: 2010

| Return period | 2-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr |
|---------------|--------|--------|--------|--------|--------|--------|
| A | 21.1 | 27.9 | 32.4 | 38.1 | 42.3 | 46.5 |
| B | -0.699 | -0.699 | -0.699 | -0.699 | -0.699 | -0.699 |

Statistics

Rainfall intensity (mm hr⁻¹)

| Duration | 5-min | 10-min | 15-min | 30-min | 1-hr | 2-hr | 6-hr | 12-hr | 24-hr |
|----------|-------|--------|--------|--------|------|------|------|-------|-------|
| 2-yr | 119.8 | 73.8 | 55.6 | 34.3 | 21.1 | 13.0 | 6.0 | 3.7 | 2.3 |
| 5-yr | 158.5 | 97.6 | 73.5 | 45.3 | 27.9 | 17.2 | 8.0 | 4.9 | 3.0 |
| 10-yr | 184.0 | 113.4 | 85.4 | 52.6 | 32.4 | 20.0 | 9.3 | 5.7 | 3.5 |
| 25-yr | 216.4 | 133.3 | 100.4 | 61.9 | 38.1 | 23.5 | 10.9 | 6.7 | 4.1 |
| 50-yr | 240.3 | 148.0 | 111.5 | 68.7 | 42.3 | 26.1 | 12.1 | 7.4 | 4.6 |
| 100-yr | 264.1 | 162.7 | 122.5 | 75.5 | 46.5 | 28.6 | 13.3 | 8.2 | 5.0 |

Rainfall depth (mm)

| Duration | 5-min | 10-min | 15-min | 30-min | 1-hr | 2-hr | 6-hr | 12-hr | 24-hr |
|----------|-------|--------|--------|--------|------|------|------|-------|-------|
| 2-yr | 10.0 | 12.3 | 13.9 | 17.1 | 21.1 | 26.0 | 36.2 | 44.6 | 54.9 |
| 5-yr | 13.2 | 16.3 | 18.4 | 22.6 | 27.9 | 34.4 | 47.8 | 58.9 | 72.6 |
| 10-yr | 15.3 | 18.9 | 21.3 | 26.3 | 32.4 | 39.9 | 55.6 | 68.5 | 84.3 |
| 25-yr | 18.0 | 22.2 | 25.1 | 30.9 | 38.1 | 46.9 | 65.3 | 80.5 | 99.2 |
| 50-yr | 20.0 | 24.7 | 27.9 | 34.3 | 42.3 | 52.1 | 72.5 | 89.4 | 110.1 |
| 100-yr | 22.0 | 27.1 | 30.6 | 37.7 | 46.5 | 57.3 | 79.7 | 98.2 | 121.0 |

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Last Modified: September 2016

Project Details

| | |
|-------------------|--------|
| 234 Poplar Street | 124206 |
|-------------------|--------|

Municipality

| |
|-----------------------|
| Township of Clearview |
|-----------------------|

Pre-Development Analysis

| | |
|-----------------------------|------|
| Catchment ID | 101 |
| Catchment Area (ha) | 0.82 |
| 1:5-Year Runoff Coefficient | 0.15 |
| Time of Concentration (min) | 15 |

Prepared By

| | |
|----|---------------|
| KB | July 11, 2025 |
|----|---------------|

Post-Development Analysis

| | Controlled Catchment | Uncontrolled Catchment |
|--|----------------------|------------------------|
| | 201 | 202 |
| | 0.72 | 0.10 |
| | 0.60 | 0.30 |
| | 15 | 15 |

Rational Method Calculations

| Design Storm | 2 | 5 | 10 | 25 | 50 | 100 | Design Storm | 2 | 5 | 10 | 25 | 50 | 100 | | |
|--------------|-----------------------|-------|-------|-------|-------|-------|--------------|-----|-----------------------|-------|-------|-------|-------|-------|-------|
| IDF Curve | A | 21 | 28 | 32 | 38 | 42 | 46 | 201 | C | 0.60 | 0.60 | 0.60 | 0.66 | 0.72 | 0.75 |
| | B | -0.70 | -0.70 | -0.70 | -0.70 | -0.70 | -0.70 | | Q (m ³ /s) | 0.066 | 0.087 | 0.102 | 0.131 | 0.159 | 0.182 |
| | C | - | - | - | - | - | - | | | | | | | | |
| 101 | i (mm/hr) | 55 | 73 | 85 | 99 | 110 | 121 | 202 | C | 0.30 | 0.30 | 0.30 | 0.33 | 0.36 | 0.38 |
| | C | 0.15 | 0.15 | 0.15 | 0.17 | 0.18 | 0.19 | | Q (m ³ /s) | 0.005 | 0.006 | 0.007 | 0.009 | 0.011 | 0.013 |
| | Q (m ³ /s) | 0.019 | 0.025 | 0.029 | 0.037 | 0.045 | 0.051 | | | | | | | | |

Peak Flow Summary (m³/s)

| Storm | Q _{existing} | Q _{uncontrolled} | Q _{controlled} | Q _{total} | Q _{existing} - Q _{proposed} |
|-------|-----------------------|---------------------------|-------------------------|--------------------|---|
| 2 | 0.019 | 0.005 | 0.007 | 0.012 | 0.007 |
| 5 | 0.025 | 0.006 | 0.009 | 0.015 | 0.009 |
| 10 | 0.029 | 0.007 | 0.011 | 0.018 | 0.011 |
| 25 | 0.037 | 0.009 | 0.014 | 0.023 | 0.014 |
| 50 | 0.045 | 0.011 | 0.016 | 0.027 | 0.018 |
| 100 | 0.051 | 0.013 | 0.017 | 0.030 | 0.022 |

Required Storage Volume Summary (m³)

| Duration (min) | 2 | 5 | 10 | 25 | 50 | 100 |
|----------------|-----------|------------|------------|------------|------------|------------|
| 15 | 53 | 70 | 81 | 105 | 129 | 148 |
| 30 | 63 | 84 | 98 | 127 | 155 | 179 |
| 45 | 69 | 92 | 107 | 139 | 171 | 197 |
| 60 | 74 | 98 | 114 | 148 | 182 | 210 |
| 75 | 76 | 102 | 119 | 154 | 190 | 220 |
| 90 | 79 | 105 | 122 | 158 | 197 | 227 |
| 105 | 80 | 107 | 125 | 162 | 201 | 233 |
| 120 | 81 | 109 | 126 | 164 | 205 | 237 |
| 135 | 82 | 110 | 128 | 166 | 208 | 241 |
| 150 | 82 | 111 | 128 | 167 | 209 | 243 |
| 165 | 82 | 111 | 129 | 167 | 211 | 245 |
| 180 | 82 | 111 | 129 | 167 | 212 | 246 |
| 195 | 82 | 111 | 128 | 167 | 212 | 247 |
| 210 | 81 | 110 | 128 | 167 | 212 | 247 |
| 225 | 81 | 110 | 127 | 166 | 212 | 247 |
| 240 | 80 | 109 | 126 | 165 | 211 | 247 |
| 255 | 79 | 108 | 125 | 164 | 210 | 246 |



| | |
|---------------------|--------------------|
| Project: | 234 Poplar Street |
| File No: | 125025 |
| Date: | July 2025 |
| Designed By: | KB |
| Checked By: | |
| Subject: | SWMF Stage-Storage |

STAGE-STORAGE-DISCHARGE TABLE

Primary Low Flow Outlet

| | | |
|---------------|-----------|-----------|
| Type | Orifice 1 | Orifice 2 |
| Diameter (mm) | 75 | 75 |
| Invert (m) | 225.45 | 225.82 |
| Area (sq.m) | 0.004 | 0.004 |
| Coefficient | 0.63 | 0.63 |

| Pond Water Level | Discharge | | Total | Active Storage |
|------------------|--------------------------|-----------|-----------|----------------|
| | Primary Low Flow Outlets | | Pond | |
| | Orifice 1 | Orifice 2 | Discharge | |
| (m) | (cms) | (cms) | (cms) | (cu.m) |
| 225.50 | 0.0000 | 0.0000 | - | 0 |
| 225.60 | 0.0041 | 0.0000 | 0.0041 | 12 |
| 225.70 | 0.0057 | 0.0000 | 0.0057 | 32 |
| 225.80 | 0.0069 | 0.0000 | 0.0069 | 61 |
| 225.90 | 0.0079 | 0.0000 | 0.0079 | 99 |
| 226.00 | 0.0088 | 0.0047 | 0.0135 | 145 |
| 226.10 | 0.0096 | 0.0061 | 0.0157 | 200 |
| 226.20 | 0.0104 | 0.0072 | 0.0176 | 264 |
| 226.30 | 0.0111 | 0.0082 | 0.0193 | 336 |
| 226.40 | 0.0118 | 0.0091 | 0.0209 | 418 |
| 226.50 | 0.0124 | 0.0099 | 0.0223 | 508 |

Project Details

| | |
|-------------------|--------|
| 234 Poplar Street | 125025 |
|-------------------|--------|

Prepared By:

| | |
|----|-----------|
| KB | 7/14/2025 |
|----|-----------|

Source: Hydraulic Structures, C.D.Smith, University of Saskatchewan
 Trapezoidal Broad Crested Weir

The trapezoidal weir is a combination of the rectangular weir and the triangular weir

Parameters:

| | | |
|----------------------------|-----|------|
| Weir Bottom Width (m) | W = | 1 |
| Head (m) | H = | 0.17 |
| Weir Downstream Length (m) | L = | 1 |
| Side Slope (H:V) | S = | 5.0 |

Rectangular Weir

$$Q = CWH^{3/2}$$

| | |
|-------|-------|
| H/L = | 0.170 |
| C = | 1.605 |

| | | |
|---|-----|--------------|
| Rectangular Weir Flow (m ³ /s) | Q = | 0.113 |
|---|-----|--------------|

Triangular Weir

$$Q = CH^{5/2} \tan(\theta / 2)$$

| | | |
|------------------------|-------------|---------|
| Notch Angle (one side) | 78.690 | degrees |
| Notch Angle (one side) | 1.373400767 | radians |

| | |
|--------------------|----------|
| $\tan(\theta / 2)$ | 5.000000 |
|--------------------|----------|

| | |
|----------------|-------|
| Triangular H/L | 0.170 |
| C | 1.201 |

| | | |
|--|-----|--------------|
| Triangular Weir Flow (m ³ /s) | Q = | 0.072 |
|--|-----|--------------|

Total Rectangular + Triangular Weir

| | | |
|---|-----|--------------|
| Trapezoidal Weir Flow (m ³ /s) | Q = | 0.184 |
|---|-----|--------------|

| | | | |
|---------|---|------|-----------|
| PROJECT | 234 Poplar Street | FILE | 125025 |
| | | DATE | July 2025 |
| SUBJECT | Water Quality - Treatment Train Calculation | NAME | KB |
| | | PAGE | 1 OF 1 |

Water Quality Treatment Train Calculation

Site Area

Drainage Area to SWM #1: 0.82 ha Imperviousness of Drainage Area to Controls= 80%

| Device | | Target Total Suspended Solids (TSS) Removal |
|---------------------|-----------------------------|---|
| Primary Treatment | Enhanced Swale ¹ | 76% |
| Secondary Treatment | Dry Pond ² | 30% |

Note:

1. Sustainable Technologies Evaluation Program (STEP)
2. Stormwater Management Planning and Design Manual. Ministry of the Environment (MOE) (March 2023)

$$TSS\ Removal = (1 - ((1 - R_{PT}) * (1 - R_S) * (1 - R_S)) * (1 - R_S))$$

where:

R_P = % TSS Removal provided by Pretreatment Strategy

R_P = % TSS Removal provided by Primary Treatment Strategy

R_S = % TSS Removal provided by Secondary Treatment Strategy

TSS Removal Provided By Controls = 83% %

Phosphorus Budget Assessment

Project Details

| | |
|-------------------|--------|
| 238 Poplar Street | 125025 |
|-------------------|--------|

Prepared By

| | |
|----|-----------|
| KB | July 2025 |
|----|-----------|

Watershed

| |
|-------------------|
| Nottawasaga River |
|-------------------|

| LAND USE CATEGORY | Phosphorus Loading Rate (kg/ha/yr) | Pre-Development | | Post-Development | | | | Untreated Area | |
|----------------------------------|------------------------------------|-----------------|-----------------|------------------|-------------------|--------------|-------------------|----------------|-------------------|
| | | Total Area | | Treated Area | | Treated Area | | Untreated Area | |
| | | | | Enhanced Swale | | Filter Strip | | | |
| | | Area (ha) | Loading (kg/yr) | Area (ha) | Loading (kg/year) | Area (ha) | Loading (kg/year) | Area (ha) | Loading (kg/year) |
| Cropland | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hay-Pasture | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Turf -Sod | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.02 | 0.04 | 0.00 |
| High Intensity Development - C/I | 1.48 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| High Intensity Development - R | 1.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Low Intensity Development | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Quarry | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Unpaved Road | 0.83 | 0.00 | 0.00 | 0.65 | 0.54 | 0.00 | 0.00 | 0.00 | 0.00 |
| Forest | 0.06 | 0.82 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Transition | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Wetland | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Open Water | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | | 0.82 | 0.05 | 0.65 | 0.54 | 0.17 | 0.02 | 0.04 | 0.00 |

CONTROLS

| Proposed Treatment Method | Removal Efficiency (%) | Area (ha) | Loading (kg/year) |
|-------------------------------------|------------------------|-------------|-------------------|
| Enhanced Swale | 20.00 | 0.65 | 0.43 |
| Effective Removal Efficiency | | 0.65 | 0.43 |

SUMMARY

| | |
|---|--------------|
| Existing Phosphorous Load | 0.05 kg/year |
| Post Development Phosphorous Load (no controls) | 0.56 kg/year |
| Post Development Phosphorous Load (with controls) | 0.43 kg/year |
| Overall Increase in Phosphorus Load | 0.38 kg/year |