Saskatoon Storm Water Utility

Storm Water Management Credit Application Guidance Manual

2019

Saskatoon Water
Utilities & Environment Department

City of Saskatoon

Acknowledgements

The City of Saskatoon thanks officials from the City of Mississauga, the City of Kitchener, and the City of Guelph for sharing their lessons learned, research, and public documents for their respective storm water management credit programs.

Thank you also to our Saskatoon Business Advisory Committee for their support, feedback and advice in the development of Saskatoon's Storm Water Management Credit program, the application process, and the communication plan.

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Glossary of Terms

Applicant – Refers to an individual(s) applying for a Storm Water Management Credit

Best Management Practice (BMP) – Refers to any onsite storm water management measure taken on a property to reduce impacts on the City of Saskatoon's storm water infrastructure by controlling the quantity or improving the quality of runoff leaving the property.

Storm Water Management Credit or Credit – Refer to a percentage reduction in a Storm Water Management Utility Bill and is based on how well a storm water BMP meets the objectives of the City of Saskatoon's storm water management program.

Equivalent Runoff Unit (ERU) – Refers to the amount of runoff that a non-residential or multi-residential property produces in comparison to an average residential property (for example, a property with five ERUs produces five times more runoff than an average residential property). ERUs are calculated based on the size of the property and the type of surface on the property.

1. Introduction

The *Storm Water Management Credit Application Guidance Manual* is intended to provide general information and assistance associated with the Credit Application process and is not intended to be all-inclusive. Other reference material and storm water related experience may be required to fulfil the requirements of the application procedure.

The Saskatoon Water Storm Water Team looks forward to working with local business people, property owners, and engineering and design professionals in reviewing and approving your future Credit Applications.

Sincerely,
The Storm Water Team

Contact Information:

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Phone: (306) 986 - 0914

Address: Storm Water Engineer
Saskatoon Water
Utilities and Environment Department
City of Saskatoon
222 3rd Avenue North
Saskatoon, SK S7K 0J5

2. Storm Water Management Credit Program Information

2.1 Storm Water Utility Background

The City of Saskatoon's Storm Water Utility funds storm water management and flood protection services including ongoing operations and maintenance of its storm water assets. Residential properties are charged a fixed rate of one Equivalent Runoff Unit (ERU). Multi-residential properties and non-residential properties are charged based on their calculated number of ERUs.

The number of ERUs that a non-residential or multi-residential property is assigned is based on the amount of runoff that property produces in comparison to runoff from an average single-unit residential property. The number of ERUs is a function of the size of the property and the type of surface on that property. Properties with a larger area and higher amount of impervious or hard surface will produce more runoff and are assessed a higher number of ERUs.

2.2 Storm Water Management Credit Program Objective

The key objective of the Storm Water Management Credit Program (Credit Program) is to recognize measures taken by property owners who have implemented storm water and/or pollution prevention best management practices (BMPs) to reduce impacts to the City's storm water infrastructure by controlling the quantity and quality of storm water leaving their property. Controlling the quantity of runoff helps to reduce neighbourhood flooding.

2.3 Principles

The Credit Program is designed according to the following guiding principles:

- Available to every non-residential and multi-residential property with more than two units in Saskatoon, unless otherwise exempt from storm water charges.
- A clear linkage exists between the Credit amounts provided and cost savings to the City's storm water program resulting from the implementation of BMPs.
- Property owners have the flexibility to pursue practices that suit the needs of and opportunities on their property.

2.4 Credit Program Basics

Credits are effective for a maximum term of five (5) years from the date of approval, subject to compliance with terms and conditions, and may be renewed for subsequent five (5) year terms.

While the initial Credit Application is focused on demonstrating the design and performance of BMPs, the renewal application is focused on demonstrating that these BMPs are properly maintained and in a state of good repair.

If Credit-approved BMPs are added, expanded, reduced, deleted, or in any way modified such that their level of performance relative to their approved Credit amount has changed, Credit holders must follow the Credit Update Application process.

Credits are only valid for the property owner who has applied for the Credit. In the event that a property changes ownership, a Change-in-Ownership Application must be submitted that demonstrates that the BMP has been properly maintained and is operational.

Full details on application submission requirements can be found in Appendix 1.

3. Storm Water Management Credit Program Framework

3.1 Program Eligibility

All multi-residential with more than two units and non-residential properties (including mixed-use properties) are eligible for the Credit Program. Single residential properties are not eligible for the Credit Program.

Credits will be applied as a percent reduction to the ERUs on a given parcel. Credits will only be applied to the ERUs that BMPs affect.

If you have any questions about your eligibility, please email stormwater@saskatoon.ca. Participation in the Credit Program is by application only.

3.2 Credit Schedule

Credits are available in each of three categories, which align with the overarching objectives of the City's storm water program (Table 1). Detailed descriptions and examples of the interpretation of these evaluation criteria are provided as Appendices 2 and 3.

Table 1. Storm Water Management Credit Categories

Category	Evaluation Criteria	Total Credit (50% Maximum)
Water Quality Improvements	Based on the proportion of storm water directed through a quality control infrastructure that meets the minimum standard of 80% total suspended solids (TSS) removal for particle sizes 50 micron or larger.	Up to 20%
Peak Flow Reduction	Based on the proportion of storm water for a standard 1-in-2 year rain event held onsite and released slowly to the City’s storm water system. The Credit is equal to 0.4 multiplied by the peak flow reduction percentage up to 75%.	Up to 30%
Onsite Retention (Runoff Volume Reduction)	Based on 2% per millimeter of storm water up to 25 mm that is retained onsite and not released to the City’s storm water system.	Up to 50%

A maximum total of 50% Storm Water Management Credit is available. The 50% cap reflects the maximum proportion of the City's storm water program in terms of cost that may

be beneficially impacted by private on-site BMPs. The balance of the City's storm water activities require fixed funding for maintenance and operations.

3.3 Credit-eligible Best Management Practices

This Credit Program is performance-based which means that Credits are awarded based on how well a property's BMPs achieve performance criteria (i.e. those listed in Table 1), rather than Credits awarded based on a prescriptive set of practices (e.g. X% Credit for a green roof of X size). Performance-based programs encourage innovation, provide flexibility and enable property owners to pursue technologies best suited to their property and particular needs, as permitted by existing bylaws, codes and regulations.

The following is a sample list of common practices of BMP technologies that may be eligible for the Credit Program:

- Oil and grit separators
- Parking lot storage along with orifice controls
- Underground storage tanks with orifice controls
- Enhanced vegetated swales
- Roof-top storage
- Green roofs/roof gardens
- Storm water ponds
- Rain gardens/bio-retention systems
- Cisterns
- Permeable pavement
- Infiltration galleries

For more details on each of these BMPs, see Appendix 5 as well as the City of Saskatoon's Low Impact Development Design Guide.

Many of the BMPs listed above could be eligible under more than one type of Credit. For example, a BMP may provide both peak flow reduction and runoff volume reduction. In such cases, only one Credit category is available for individual BMPs. Applicants have flexibility to apply in the category that provides the highest Credit.

Eligibility of a BMP will be contingent on proof of function and on-going maintenance through self-certification reports and City inspections. If the approved BMP is not functioning as intended or removed for any reason, the applicable Credit(s) may be cancelled, and previous years charged back to the owner until the time the BMP was proven to be functioning. An Administration Fee may also be applied.

4. Application Process

4.1 Application Types

There are four types of Credit Applications:

1) **New Credit Application:**
   (a) to apply for a Credit on a property with an existing BMP for the first time;
   (b) to apply for a conditionally pre-approved Credit for a proposed BMP during the development or building permit approval process; or,
   (c) to apply subsequent to the cancellation of a Credit approval.

2) **Credit Update Application** — to update an approved Credit to reflect a change.

3) **Credit Renewal Application** — to renew an approved Credit that is about to expire or has expired for no more than one year prior.

4) **Change-in-Ownership Application** – to renew a previously approved Credit in the case where the property has changed ownership.

For all application types, an application package consisting of a completed Application Form and a report containing all required supporting documentation prepared by a qualified person (see 4.2) must be submitted. The report, including relevant supporting information, shall demonstrate how the BMP meets the City of Saskatoon's Design and Development Standards for Storm Water Drainage, or generally accepted professional practices where City of Saskatoon requirements currently do not exist. Full supporting documentation requirements are outlined in Appendix 1.

The Applicant is solely responsible for costs incurred in the preparation of the required documentation and/or the submission of the Credit Application. There is no application fee.

4.2 Qualified Person Criteria

Certification of a BMP and preparation of all supporting documentation as part of an application must be completed by a Professional Engineer or other qualified person. Examples of a qualified person that may be approved at the discretion of the City for certification of a BMP include:

- Engineering Licensee
- Landscape Architect
- Engineering Technician
- Environmental Technologist
- Architectural Technologist
- Water and Wastewater Technician
- Others, as approved by the City

4.3 Application Form
The application form must be filled out. The City will accept completed application forms submitted via email or by mail with supporting documentation in either hard-copy or digital (PDF) format.

4.4 Review Timelines
The review of an application is a two-step process:

1) Assessment for application completeness; and
2) Technical review of application.

The Storm Water Utility will notify the Applicant of receipt of an application and will conduct an initial screening to ensure application completeness within ten (10) business days. Applicants may be requested to provide additional information. If an Applicant fails to provide the necessary information, the application will be rejected. The City may also conduct a site inspection, as described in the "Inspections during Application Review" section below.

Complete applications will be registered and Applicants will be notified of this registration. An application is deemed complete when the Applicant has filled out all appropriate sections of the Application Form and submitted the relevant reports and documentation which support how the storm water BMPs achieve Credits.

The technical review of an application is expected to be completed within 20 business days of receiving the completed Application Form and all supporting documentation if no additional information or clarification is needed.

4.5 Effective Date of Approved Credit
Applicants are encouraged to apply for the Credit Program by April 30 each year so that the application can be reviewed and any approved Credit applied to the annual Storm Water Management Utility Bill that is sent to non-residential properties between June and August. Multi-residential properties are charged monthly.

Any fully completed application for a BMP that is received on or prior to December 31 and approved will receive a Credit amount that is retroactive to January 1 of the year the complete application package, including the Certification of Operation letter, was received.

For Credit Applications submitted in advance of construction or implementation of the BMPs, such as during the land development approval process or redevelopment/rezoning approval process (in conjunction with the storm water review for the site) or in advance of a proposed site retrofit or re-development, a Credit may be conditionally pre-approved. Conditionally approved Credits will become effective in the year all Terms and Conditions of Credit Approval are met.

4.6 Storm Water Charges billed while Credit Application is Under Review
A pending Credit Application shall not constitute a valid reason for non-payment of the currently-assessed Storm Water Management Charge. Any Storm Water Utility bill that is

received during the Credit Application review process must be paid in full. Any Credit subsequently approved will be applied to the property owner's account.

5. Terms and Conditions of Credit Approval

Credit approvals shall be subject to terms and conditions, including the expectations for the operation and maintenance of the Credit-approved BMPs, completed Inspection and Maintenance Logs, and other matters. Site specific terms and conditions may be imposed, depending on the nature of the property, its use, and its BMPs.

Credit-holders are expected to comply with the terms and conditions of the Credit approval, including the BMP Inspection and Maintenance Plan provided in the Credit Application, and must retain on file and make available upon request specified information throughout the term of the Credit Program. Further details are provided in Appendix 1.

Credit Applications for proposed BMPs submitted during the development application or building permit process will be reviewed and if qualified, may be given conditional approval. Design drawings, a construction completion certificate stamped by a Professional Engineer, and an Inspection and Maintenance Plan must be submitted after conditional pre-approval has been given and prior to the Credits becoming effective. Should a BMP differ in design and construction from the drawings and reports that were used to conditionally pre-approve the Credit, an applicant will be required to submit updated supporting documentation with their engineer's certificate of operation.

6.0 Site Inspections

6.1 Inspections during Application Review

As part of the Credit Application review process, the City may contact the Applicant with a requested date to conduct a site inspection to verify that any constructed BMPs are in conformance with the documentation provided and that these measures are operating in accordance with documented performance criteria. The results of an inspection will be taken into consideration as part of the application review.

If the Applicant fails to respond by telephone, email or in writing to coordinate a site inspection date within thirty (30) calendar days of the initial request, the Credit Application will be considered closed.

6.2 Compliance Inspections

Each Applicant who has received a Credit for a BMP has the responsibility to regularly inspect, maintain and repair the BMP to ensure that it is functioning as designed as agreed to in the Terms and Conditions.

The City reserves the right, according to Bylaw No. 9545, or any successor bylaw, to conduct site inspections in accordance with section 324 of *The Cities Act* to verify all aspects of the BMP, including whether the BMP is being maintained as stipulated in the Inspection and Maintenance plan, and that the BMP is operating in accordance with performance criteria as documented in the application.

In the event that the Applicant is required to attend, the City shall schedule the inspections at a date and time that is mutually acceptable to both parties. Failure to allow for an inspection may result in a denial or cancellation of the Credit.

The inspection shall be limited to storm water BMP and other elements described in the Credit Application. City staff performing inspections may request to see Inspection and Maintenance documents which Credit holders are required to retain for a minimum of five (5) years.

As a result of a site inspection, Credits may be approved, suspended, altered, or cancelled. Sites that are "suspended" will be given a 60 calendar day period to take remedial action to bring their property up to a passing standard. Failure to take required actions within 60 days will result in a failed inspection and cancellation of Credit.

Although the City reserves the right to conduct detailed field measurements and monitoring to verify performance, it is anticipated that inspections will typically involve visual evaluations, informal interviews, and review of Inspection and Maintenance Logs and other documents.

7. Credit Update Application

The holder of a Credit is responsible for notifying the City in writing if the BMPs undergo a material change or reduction in the performance of the BMP. This could include any alteration, improvement, deficiency, or failure that impacts how the BMPs operate and was not expressly anticipated and addressed by the parties in the Credit Application process. Material change means actions taken by a property owner and/or those occurring through lack of action by a property owner or unrelated to the actions of the property owner.

The holder of a Storm Water Management Credit must submit a Credit Update Application to the City no later than three (3) months after any material change has been undertaken or occurs that results in a decrease in Credit amount. Late submission of the Application may result in cancellation of the Credit. The City shall have full and absolute discretion to adjust (increase or decrease) the Credit amount. Details on supporting documentation requirements for Credit Update Applications are provided in Appendix 1.

8. Credit Renewal Application

Credit holders are advised to submit a Credit Renewal Application within the calendar year of renewal of their existing Storm Water Management Credits. Applications received after this date may result in loss of Credit for the calendar year which the BMP was to be renewed.

Credit holders will be given until March 31 (Year 6) to submit the Credit Renewal Application and supporting documents including a completed Inspection and Maintenance Log to prove the Credit has been functioning since implementation and still achieve the

Credit for the renewal year. Failure to provide this information by March 31 (Year 6) will result in loss of the Credit for the renewal year and potential loss of the Credit for the period between the initial Credit approval and Credit renewal in which maintenance records are not provided. The approved Credit renewal shall be effective upon the expiration date of the original Credit, or as otherwise determined by the City.

In general, Credit holders wishing to renew their Credit shall provide evidence that acceptable operation and maintenance practices have taken place and that the BMPs are in a state of good repair. Credit holders are not required to re-submit proof of BMP certification. Details on supporting documentation requirements for Credit Renewal Applications are provided in Appendix 1.

9. Change-in-Ownership Application

Credits are only granted to the Property Owner identified in the Application. In the event that a property changes ownership, a Change-in-Ownership Application must be submitted to include a new Inspection and Maintenance Plan and evidence that the BMPs are in a good state of repair, including a copy of the previous owner's completed Inspection and Maintenance Log to date. Details on supporting documentation requirements for Change-in-Ownership-Renewal Applications are provided in Appendix 1.

Upon approval of a Change-in-Ownership Application, the Credits will be effective for a maximum term of five (5) years from the date of approval.

10. Penalties

10.1 Credit Cancellation or Suspension

As described in Bylaw No. 9545, the Credit may be cancelled if the City determines that the BMP measure is not functioning as approved. Examples of grounds for cancellation include the following:

- Failure of the Applicant or Property Owner to meet the terms and conditions of the Credit approval, including maintenance;
- Submission of inaccurate or false information by the Applicant or Property Owner;
- Failure of a BMP measure to operate or meet the performance criteria as documented in the Applicant's New Credit Application or Credit Update, Renewal, or Change-in-Ownership Application and/or its supporting documentation and/or the terms and conditions for the Credit approval, update or renewal.

In the circumstance that a BMP is found to be in a state of disrepair or no longer functions as approved, the Applicant shall reimburse to the City the entire amount of Credit received for the property since the date that the Application was approved, updated or renewed, or since the previous inspection by the City, whichever is later. If the Credit has been cancelled, the Applicant may not reapply for a Credit for a period of 12 months.

At the sole discretion of the City, if a property fails inspection, the Credit may be suspended and the Credit holder will have 60 calendar days to repair, clean, fix, or otherwise correct

deficiencies, and schedule an inspection with the City. If a Credit holder fails to demonstrate action and reasonable progress to correct the deficiencies and schedule a re-inspection within 60 days, the Credit will be cancelled.

Credits will also expire after five (5) years if the Applicant fails to submit a completed Credit Renewal Application.

10.2 Administrative Fee

If the City determines an Applicant has misrepresented information on their Application, or maintenance records, the City reserves the right to issue an Administrative Fee.

10.3 Appeals

A reduction or cancellation of a Credit may be appealed by the Applicant in writing to the Director of Saskatoon Water. The decision of the Director shall be considered final and binding.

Appendix 1: Supporting Documentation for Applications

A1.1 New Credit and Credit Update Applications

To apply for a new Credit or to update an existing approved Credit, the Applicant must provide a completed Application Form and the information listed below, as applicable. The required information outlined below and depends on previous approval by the City and if the BMP is currently in operation:

- **BMP reviewed and approved by City after May 2016 -** Credit Applications for a BMP currently in operation and installed after May 2016 with previous review and approval by the City as part of the building permit application process will not require a submission of **Engineering Drawings and Details** if these were submitted as part of an approved building permit application.

- **BMP operational and not previously reviewed by City -** Credit Applications for a BMP currently in operation, installed before May 2016 and/or without previous review and approval by the City as part of the building permit application process must submit **Engineering Drawing and Details** in accordance with the requirements listed below.

- **BMP Planned and not yet operational** – Credit applications for a planned BMP that is not yet in operation must submit **Engineering Drawings and Details** as either part of a building permit application or independently for conditional Credit approval, with final approval subject to submission of a Certification of Operation letter and meeting all Terms and Conditions.

Unless stated above, Storm Water Management Credit Applications must include all of the following items:

1. **Engineering Drawings and Details** conforming to requirements of the City's Design and Development Standards Manual: Section 6 – Storm Water Drainage System.

   If applying for a Storm Water Management Credit as part of a building permit application, the **Engineering Drawings and Details** will be submitted as required in the development and building permit application.

   If applying for a Storm Water Management Credit outside of a building permit application, the **Engineering Drawings and Details** are expected to be consistent with submissions for building permit applications with the following requirements to be shown:

   a. **Site Grading Plan**:

      - prepared by a professional engineer or other qualified person
      - all units in metric
      - all elevations in metric units and geodetic
      - address of project in title block

- north arrow
- labelled streets and lanes
- dimensioned property lines
- easements
- all existing and proposed buildings and structures
- landscaping, parking areas, driving surfaces including areas, surface materials such as grass, concrete, asphalt, gravel
- design elevations and grades
- existing elevations
- proposed catch basins, catch basin manholes including rim elevations
- location of downspouts and direction of flow
- calculations for the proposed weighted runoff coefficient values
- if required, calculations for the sizing of a flow restriction device
- if required, calculations for onsite storage of storm water
- spill over elevations

b. Site Servicing Plan:

- prepared and sealed by a professional engineer or qualified person
- all units in metric
- address of project in title block
- north arrow
- labelled streets and lanes
- dimensioned property lines
- easements
- existing storm sewer mains within the City right of way, including valves, hydrants, manholes
- all existing and proposed buildings and structures
- landscaping, parking areas, curbs
- existing storm sewer systems servicing the site
- proposed BMP and storm sewer system to the site, including manholes, catch basins, flow restrictor device, oil and grit separator, invert elevations, rim elevations, pipe size, material, slope and length

2. **Credit Calculation** to support Peak Flow Reduction, Water Quality Improvement and/or Onsite Retention (Runoff Volume Reduction) Credit categories. The online Credit Calculator is to be used for the Credit calculation as is provided at www.saskatoon.ca/stormwatercredit.

3. **Inspection and Maintenance Plan**

a. Completed Inspection and Maintenance Plan (Applicants must use the online fillable Inspection and Maintenance Plan template provided by the City at www.saskatoon.ca/stormwatercredit or equivalent alternative).
b. Attachment of the BMP supplier's operation and maintenance guide, if applicable.

The completed Inspection and Maintenance Plan should be kept on file by the Applicant or property owner/operator in order for an Inspection and Maintenance Log to be completed, as required. The Inspection and Maintenance Log must be completed, as required, throughout the duration of the approved Credit term and be made available to City staff upon request.

In the event of a change in ownership, the Inspection and Maintenance Log must be transferred to the new owner for inclusion in a "Change-in-Ownership Application" for continuing Credits.

Note: See Appendix 6 for an example of a completed Inspection and Maintenance Plan and Log.

4. Certification of Operation

This certification must be in the form of a letter addressed to the attention of the Storm Water Engineer, signed and stamped by a qualified Professional Engineer or signed by a qualified person. It must include the following:

- Certification that all BMPs have been constructed in accordance with the submitted drawings and that they are operational; and
- Confirmation of the date(s) that all BMPs were implemented into service

Note: In a case of a conditionally approved Credit Application submitted with a building permit application, this Certification of Operation letter will not be submitted with the above listed reports and drawings, but instead submitted after the BMP has been constructed.

A template for the Certification of Operation letter has been provided in section A1.4.

A1.2 Credit Renewal Applications

To renew a previously approved Credit, the Applicant must provide a completed application form and the information listed below, as applicable.

1. A report certified by a Professional Engineer or qualified person providing the following information:

- Confirmation that the performance of all BMPs remains consistent with the previously approved Credit Application;
- Confirmation that all BMPs are in a state of good repair

2. Completed Inspection and Maintenance Log (Credit holders may use the fillable Inspection and Maintenance Log Template that was part of their original Inspection and Maintenance Plan or equivalent alternative), including:

- Dates of inspection and maintenance activities;
- Names, titles, and qualifications of personnel conducting the inspections and/or maintenance;
- Condition of each BMP, including its functional components, if applicable;
- Any other item that could affect the proper function of the BMP; and
- Description of the need for maintenance
- Description of actual maintenance performed

3. Updates to the previous Credit term's Inspection and Maintenance Plan, as required.

Note: A sample completed Inspection and Maintenance Plan and Log is found in Appendix 6.

A1.3 Change-in-Ownership Applications

In that event that a property with a previously approved Credit changes ownership, the new property owner/operator must submit a completed Application Form and the information listed below, as applicable, in order for the Credit to be applied.

1. A report certified by a Professional Engineer or qualified person providing the following information:

- Confirmation that the performance of all BMPs remains consistent with the previously approved Credit Application;
- Confirmation that all BMPs are in a state of good repair;

2. Completed Inspection and Maintenance Log from previous property owner including:

- Dates of inspection and maintenance activities;
- Names, titles/qualifications of personnel conducting the inspections and/or maintenance;
- Condition of each BMP, including its functional components, if applicable;
- Any other items that could affect the proper function of the BMP; and
- Description of the need for maintenance
- Description of actual maintenance performed

3. New Inspection and Maintenance Plan (Applicants must use online fillable Inspection and Maintenance Plan template provided by the City or equivalent alternative)

A1.4 Certification of Operation Template
Date:

To: City of Saskatoon
222 3rd Ave North
Saskatoon, Saskatchewan
S7K 0J5

Attn: Storm Water Engineer, Saskatoon Water

RE: STORM WATER MANAGEMENT OPERATION CERTIFICATION

(Storm Water Utility Account Number)
(Municipal Address)
(Description of BMP)

(Company name/person) has served as the (engineering consultant or other qualified person) for the certification of the (description of BMP) at the above noted address. This letter will confirm that I/We have inspected the (BMP) on the above noted lands and do hereby certify that the all systems have been designed and constructed in accordance with (Drawing No., dated and Functional Servicing Report, dated).

We further certify that all BMP systems are completed and operational in accordance with sound engineering practices and principles and are based on guidance from the City of Saskatoon's Design and Development Standards Manual.

Further, I/We hereby confirm that the (BMP) has been implemented into service and is operational as of (date).

Should you have any questions or concerns regarding the letter please do not hesitate to contact this office at.

Yours truly,

(Name of company)
(P. Eng or other qualified person Signature) P.Eng. Stamp if applicable
(print name)

Appendix 2: Credit Evaluation Criteria

A2.1 Water Quality Improvement Credit (up to 20%)

Evaluation Criteria

Consistent with the City of Saskatoon Design and Development Standards Manual: Section 6 – Storm Water Drainage System, the BMP must remove clay and silt particles from runoff to ensure that the majority of pollutants (hydrocarbons, nutrients, and heavy metals) that adhere to fine particles will be removed on-site and will not be discharged to the City's Storm Water Management system.

The percentage allocated for this Credit is based on the percentage of area that is directed to an approved on-site quality control BMP that provides enhanced treatment. Self-certification shall be provided by way of a report certified by a Professional Engineer and/or a qualified person, and if available, BMP supplier reports.

A BMP that removes a minimum 80% Total Suspended Solids (TSS) will be given a Credit of 20% for the area that is treated. All area that is directed towards the water quality treatment process will be multiplied by the percent Credit to determine the total Credit for the site, as only area that is directed towards this BMP will receive a Credit.

Eligible Infrastructure

Quality control infrastructure include oil and grit separators. Options such as low impact development or storm water inlet filters will be considered if it can be verified that the minimum standard of TSS removal is met.

Certification shall be provided by way of a report certified by a Professional Engineer or qualified person that includes supporting calculations. Calculations supported by supplier data may be acceptable.

Example

If 50% of runoff is directed through an OGS that removes 80% of TSS, the Credit would be 50% X 20% = 10%.

A2.2 Peak Flow Reduction (up to 30%)

Evaluation Criteria

The Peak Flow Reduction Credit will be given for the proportion of storm water for a standard 1-in-2 year rain event held onsite and released slowly to the City's storm water system.

The Credit is equal to 0.4 multiplied by the peak flow reduction percentage up to 75%.

Eligible Infrastructure
Eligible infrastructure may include, but is not limited to, orifice controls along with:

- parking lot storage,
- underground storage,
- roof-top storage, or
- storm water detention ponds.

Self-certification shall be provided by way of a report certified by a Professional Engineer or qualified person that includes supporting calculations. Calculations supported by supplier data may be acceptable.

Example
If 50% of the peak flow from a 1-in-2 year rain event is directed to a detention infrastructure, the Credit would be 0.4 X 50% = 20%.

A2.3 Onsite Retention (up to 50%)

Evaluation Criteria
The credit for Onsite Retention is based on the percent capture (on-site retention and/or reuse) of the first 25 mm of rainfall during a single rainfall event. A single rainfall event means a period of rainfall activity defined by preceding and following periods of at least 24 hours without measurable rainfall.

The percentage allocated for this Credit is based on the runoff volume reduction achieved over the affected area using a sliding scale of 2% per mm achieved. Only the area that is directed to the BMP will be given Credit. Certification shall be provided by way of a report certified by a Professional Engineer or qualified person.

Eligible Infrastructure
Eligible Low Impact Development (LID) infrastructure that retains storm water may include, but is not restricted to the following:

- rain gardens,
- permeable pavement,
- infiltration galleries,
- green roofs/green roof gardens, and
- rainwater harvesting systems.

Certification shall be provided by way of a report certified by a Professional Engineer or qualified person that includes supporting calculations. Calculations supported by supplier data may be acceptable.

Example
If an infiltration gallery retains 10 mm of runoff onsite, the Credit would be 10 mm X 2% = 20% Credit.

Appendix 3: Sample ERU Calculation

Storm Water ERU Calculation

Address
833 51st St E

	Asphalt/ Concrete	Building	Grass	Gravel	Soil	Exempt Area	Total Site
Area (m^2)	7092	1734	884.7	6064.2	0	0	15775
Percent	45.0%	11.0%	5.6%	38.4%	0.0%	0.0%	100%
ERU	24.1	5.9	0.5	5.7	0.0	0.0	36.1

Runoff Coefficients

Asphalt/ Concrete	Buildings	Grass	Gravel	Soil	Exempt Area
0.9	0.9	0.15	0.25	0.1	0

$$ERU = \frac{Area\ of\ Site \times Runoff\ Factor}{265.4m^2}^{*}$$

Area of Site = 15775 m^2

Runoff Factor = area x runoff coefficient / total area =

$$\frac{7092 \times 0.9 + 1734 \times 0.9 + 884.7 \times 0.15 + 6064 \times 0.25 + 0 \times 0.1 + 0 \times 0}{15774.8\ m^2}$$

Runoff Factor = 0.61

$$ERU = \frac{15774.8\ m^2 \times 0.608}{265.4\ m^2}$$

ERU = 36

The maximum ERU that a site can be charged is capped at 100 ERU in 2018.

*The runoff factor is a relationship between the amount of runoff from a site to the amount of precipitation received. It is calculated by multiplying the area of each surface type on a site by the corresponding runoff coefficient. The runoff coefficient value is larger for areas of low infiltration and high runoff (asphalt, concrete), and lower for more permeable areas (soil, grass).

All ERU calculations are to be completed in a similar way to the example ERU calculation above. The credit calculator can be found on the Credit Program website at www.saskatoon.ca/stormwatercredit.

Appendix 4: Credit Calculation Examples

Example 1: Storm Water Quality Improvement Credit

Note: Must use areas and partial ERUs from Saskatoon Storm Water ERU assessment for developments that have been completed. This will be provided upon request to Saskatoon Storm Water.

Land Use	Bldgs	Asphalt/Concrete	Grass	Gravel	Soil	Ponds	Total
Area (m^2)	1733.5	7092.4	884.7	6064.2	0	0	15774.8
ERU	5.9	24.1	0.5	5.7	0	0	36.1

1) **Storm Water Management Credit Request:**
   Water Quality Improvement Credit for Oil and Grit Separator (OGS) that removes at least 80% of total suspended solids

2) **Assumptions/Notes:**
   - Runoff from all buildings and asphalt/pavement drains to the OGS
   - No other surfaces drain to the OGS

3) **Credit Calculations:**

   ERU that the Credit is applied to = sum of ERUs that drain to BMP

   ERU that the Credit is applied to = 24.1 (Asphalt Area) + 5.9 (Buildings) = 30.0 ERU

   Site Credit Percentage = (% Credit * ERU that the Credit is applied to) / total site ERU

   Site Credit Percentage = (20% * 30.0) / 36.1 = **16.6 % Credit**

4) **Submittals:**
   - Credit Application Form
   - Engineering Drawings and Details (See Appendix 1)
   - Credit Calculation
   - Inspection & Maintenance Plan
   - Certification of Operation letter, signed by a Professional Engineer or qualified person confirming that the OGS has been installed as designed.

Example 2: Peak Flow Reduction Credit

Note: Must use areas and partial ERUs from Saskatoon Storm Water ERU assessment for developments that have been completed. This will be provided upon request to Storm Water.

Land Use	Bldgs	Asphalt/Concrete	Grass	Gravel	Soil	Ponds	Total
Area (m^2)	1733.5	7092.4	884.7	6064.2	0	0	15774.8
ERU	5.9	24.1	0.5	5.7	0	0	36.1

1) **Storm Water Management Credit Request:** Peak Flow Reduction Credit for parking lot detention with orifice control

2) **Assumptions/Notes:**
   - Runoff from building and all asphalt/pavement drains to the orifice control
   - Volume stored on parking lot with orifice for peak flow reduction
   - No other surfaces drain to the orifice control

3) **Credit Calculations:**

[1] $C_{Proposed} = C_p = \sum(C_{\text{Land Use Type}} * \text{Area}_{\text{of Land Use Type}}) / \sum (\text{Area}_{\text{total that drains to BMP}})$
$C_{Proposed} = C_p = [(0.95 * 1733.5) + (0.95 * 7092.4)] / (1733.5 + 7092.4) = 0.95$

[2] New Flow Rate (from orifice control) = Flow rate / Area that drains to BMP
New Flow Rate (from orifice control) = 50 L/s / 8826m^2
New Flow Rate (from orifice control) = 50 L/s / 0.88 ha
New Flow Rate (from orifice control) = 56.8 L/s/ha

[3] C_{New} = New Flow Rate (L/s/ha) /114 (L/s/ha)
C_{New} = 56.88 L/s/ha / 114 L/s/ha = 0.498

% Credit Subtotal = $(C_p - C_{New})/ C_p$ *100%
% Credit Subtotal = (0.95 – 0.498) / 0.95 * 100%
% Credit Subtotal = 47.6%

Notes:
[1] C Values for C_P calculation:

Building, Concrete and Asphalt	Gravel	Grass and Soil
0.95	0.5	0.1

C values are taken from Table B-2 of City of Saskatoon Design and Development Standards Manual: Section 6 – Storm Water Drainage System
(Not the same Runoff Coefficient C values used in ERU calculation).

[2] Flow Rate comes from the flow rate that the implemented orifice control will have.

[3] Formula (including 114 L/s/ha) from Design & Develop Standards Manual, Section 6 - 4.4 Maximum Allowable Discharge Rate and

Site Credit Percentage = (% Credit Subtotal * ERU that the Credit is applied to * 0.4) / total site ERU

Site Credit Percentage = (0.476 * (5.9 + 24.1) * 0.4) / 36.1 = **15.8 % site Credit**

4) **Submittals:**
   - Credit Application Form
   - Engineering Drawings and Details (See Appendix 1)
   - Credit Calculation
   - Inspection & Maintenance Plan
   - Certification of Operation letter, signed by a Professional Engineer or qualified person confirming that the measures have been installed as designed.

Example 3: Onsite Retention Credit

Note: Must use areas and partial ERUs from Saskatoon Storm Water ERU assessment. This will be provided by Storm Water upon request.

Land Use	Bldgs	Asphalt/Concrete	Grass	Gravel	Soil	Ponds	Total
Area (m^2)	1733.5	7092.4	884.7	6064.2	0	0	15774.8
ERU	5.9	24.1	0.5	5.7	0	0	36.1

1) **Storm Water Management Credit Request:** Onsite Retention Credit for two above ground storage tanks for building runoff

2) **Assumptions/Notes:**
   - All building surface drains to above ground storage tanks
   - No other surfaces drain to storage tanks
   - Each of 2 buildings drains to a 22 m^3 storage tank
   - Water is reused for irrigation of grass, trees, or other vegetation

3) **Credit Calculations:**

   Retention Credit percentage = Volume stored / (0.001m * Area of surface stored) *2%
   Retention Credit percentage = (2 * 22m^3) / (0.001 m * 1733.5 m^2) * 2% = 50.8%

   Site Credit Percentage = (% Credit * ERU that the Credit is applied to) / total site ERU

   Site Credit Percentage = (50.8% * 5.9) / 36.1 = **8.3 % site Credit**

4) **Submittals:**
   - Credit Application Form
   - Engineering Drawings and Details (See Appendix 1)
   - Credit Calculation
   - Inspection & Maintenance Plan
   - Certification of Operation letter, signed by a Professional Engineer or qualified person, confirming that the measures have been installed as designed.

Appendix 5: Description of Common BMPs

For more in-depth information on common BMPs please see the City of Saskatoon's Low Impact Development Design Guide.

Oil and Grit Separators

An Oil and Grit Separator (OGS) is designed to remove sediment, oils, and other pollutants from rainwater runoff before it enters the storm sewer system and waterways. Rainfall runoff travels through the OGS where suspended sediment and other hazardous materials are separated from the water before it enters the storm sewer system. OGSs are often used in parking lot applications where these sediment and other hazardous materials are more prevalent.

The City of Saskatoon's Storm Water Design and Development Standards requires OGS on sites with a paved area greater than 1,500 m^2 or sites which are gas stations, lube and oil change facilities, vehicle maintenance and mechanical shops, and sites with onsite-fuel storage.

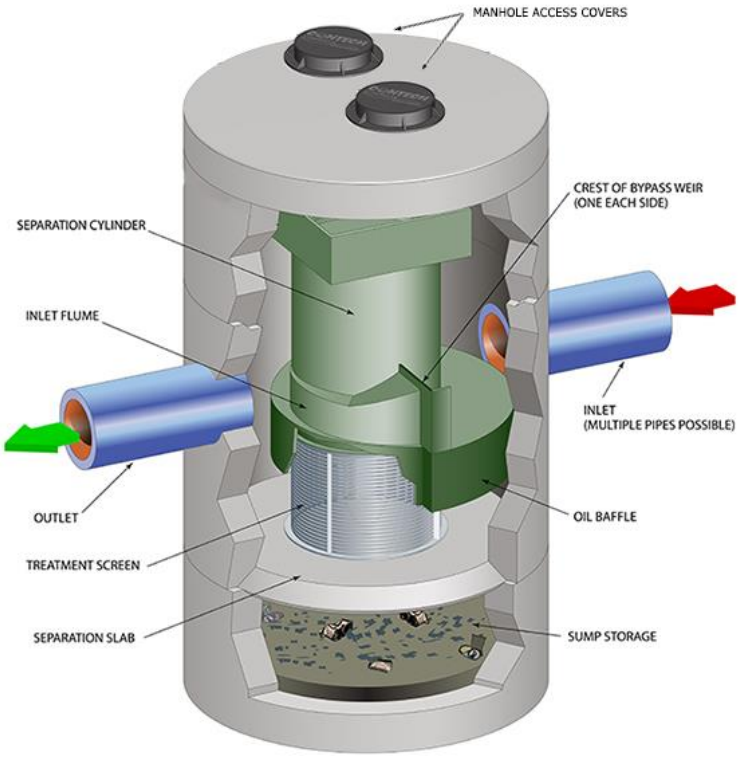

Figure 1: Oil and Grit Separator (Rainwater Management - http://www.rainwatermanagement.ca/products/cds-technologies-oilgrit-separation/)

Parking lot storage and underground storage along with orifice controls

Figure 2: Example of above ground parking lot storage (Susdrain - Providing surface storage, https://www.susdrain.org/delivering-suds/drainage-exceedance/managing-exceedance/storage.html)

Orifices control the amount of rainfall runoff that can enter the storm sewer system at one time. They are commonly in the form of a plate installed in a storm drain or pipe that restricts the amount of water that can pass. These devices slowly release runoff to the storm sewer system which aids in reducing the load on the system's capacity. The delayed release of runoff creates temporary onsite storage requirements for the runoff before it is released to the storm

sewer system. In these cases, water is commonly stored in underground storage systems or above ground in parking lot surfaces around drains.

The City of Saskatoon's Storm Water Design and Development Standards requires some form of reduction of discharge rate and onsite storage to be installed on sites in which the runoff coefficient exceeds the runoff coefficient of the City's original stormwater system design. Please review the Design and Development Standards for details.

Enhanced Vegetated Swales

Enhanced vegetated swales (also referred to as bio-swales) are channeled drainage courses with gently sloped sides filled with plants, compost, and/or riprap. They are designed to allow runoff time to infiltrate into the underlying soil. A bio-swale will improve water quality, attenuate peak flows, and contribute positively to infiltration. In some situations, a bio-swale may be used in place of an underground storm sewer pipe. A bio-swale differs from a simple grassed swale because the constructed soil layers enhance infiltration and storage beyond what the compacted native soil of a grassed swale can absorb.

Figure 3: River Landing Bio-swale (City of Saskatoon – Low Impact Development Guide)

Green Roofs/Roof Gardens

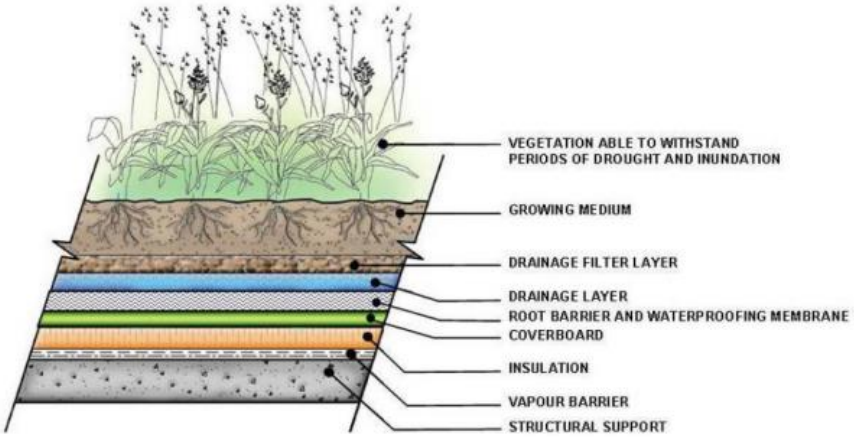

Figure 4: Cross Section of Rain Garden (Drainage Services, City of Edmonton – Low Impact Development: Best Management Practices Design Guide, https://www.edmonton.ca/city_government/documents/PDF/LIDGuide.pdf)

Figure 5: College of Law Addition Green Roof (City of Saskatoon – Low Impact Development Guide)

A Green Roof is an installation of live plants on top of a building. It may be extensive (a thin layer of growing medium covered with a hardy ground cover plant) or intensive (a thicker layer of growing medium and with more park-like landscaping that may include shrubs or trees). Both types of green roof include several layers to ensure that the roof remains structurally safe while providing adequate support to the vegetation for growth. Green roofs reduce runoff from otherwise impervious roof surfaces and improve the water quality of the excess rainfall or snowmelt that leaves the area. They also provide an insulating layer for the building, and help combat heat island effects in the summer.

Storm Water Ponds

Figure 6: Storm Water Pond in Saskatoon (City of Saskatoon – Low Impact Development Guide))

Storm Water Ponds collect rainfall runoff from a site and store it in a designated storage area onsite. The ponds can either be permanently full of water with collected runoff filling the pond with additional water during rain events or can be completely dry with water filling the pond only during rain events. Storm Water Ponds are typically connected to the storm sewer system, but the runoff is stored in the pond while released back into the storm sewer system at a slower rate. Storm Water Ponds can also improve the quality of storm water by allowing sediment and other suspended particles to settle before the water is released to the storm sewer system.

Rain Gardens/Bio-Retention Systems

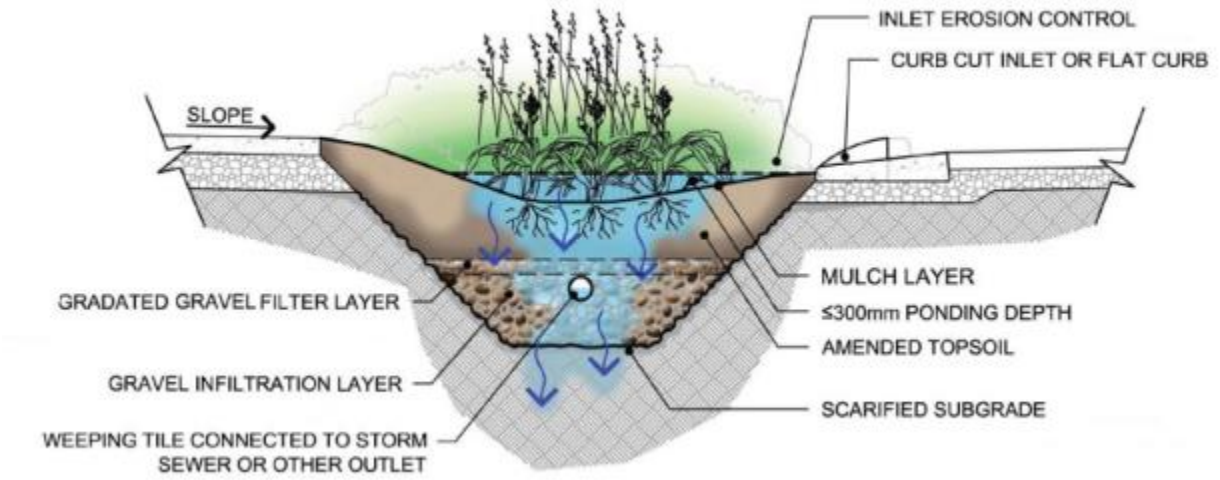

Figure 7 Cross-Section of a Basic Bio-retention Area (Drainage Services, City of Edmonton - Low Impact Development: Best Management Practices Design Guide, https://www.edmonton.ca/city_government/documents/PDF/LIDGuide.pdf))

Rain Gardens and Bio-Retention Systems direct surface runoff into a shallow landscaped depression that mimics a forested ecosystem to filter and evapotranspirate excess runoff. Bio-retention is best suited to serve impervious drainage areas less than 0.8 hectares (two acres) in size. A bio-retention cell uses a filter of layered sand, soil, and organic material to allow runoff into an underdrain system that may connect to the main storm sewer. In some situations, the underdrain and sewer connection can be omitted, but this requires permeable soils capable of infiltrating the runoff in a reasonable amount of time. Rain gardens are a small scale bio-retention facilities usually installed on smaller properties.

Cisterns

Cisterns are containers that store collected rainwater runoff for re-use in other applications such as irrigation or toilet flushing. It may be as simple as a rain barrel used to water a flower bed, or more complex large scale cisterns connected to bus wash facilities. This is most effective in reducing runoff flow volumes in small rainfall events, as once the container is full there is no longer any effect. It also relies on the user to reuse the water between rain events.

Figure 8: Cistern Tanks at CoS Access Transit Garage (City of Saskatoon – Low Impact Development Guide)

Permeable Pavement

There are many variations of permeable pavement such as porous asphalt, porous concrete, permeable unit pavers, and open grid pavers. Permeable pavements reduce the impermeable area of the development without compromising functionality. These are best suited to low traffic areas such as parking lots or driveways. Proper construction of a permeable pavement surface will consist of four layers: permeable pavement layer, bedding layer of washed stone, reservoir layer of washed uniformly graded aggregate or a matrix of open weave boxes, and a perforated underdrain if required. Proper drainage will ensure that winter does not damage the permeable pavement.

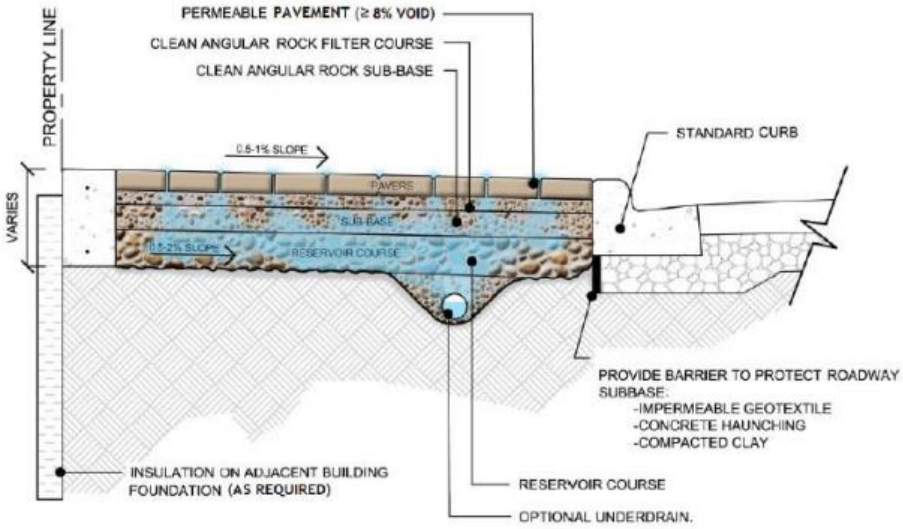

Figure 9: Cross Section of Permeable Pavement (Drainage Services, City of Edmonton - Low Impact Development: Best Management Practices Design Guide, https://www.edmonton.ca/city_government/documents/PDF/LIDGuide.pdf))

Infiltration Galleries

Many variations of infiltration galleries are available. Typically infiltration galleries involve a dug out area overlain with soil and grass. The dug out area is filled with a permeable material such as gravel or sand that allows a higher amount of water to soak into the ground. The infiltration gallery is commonly connected to building downspouts with perforated pipe inside the infiltration gallery.

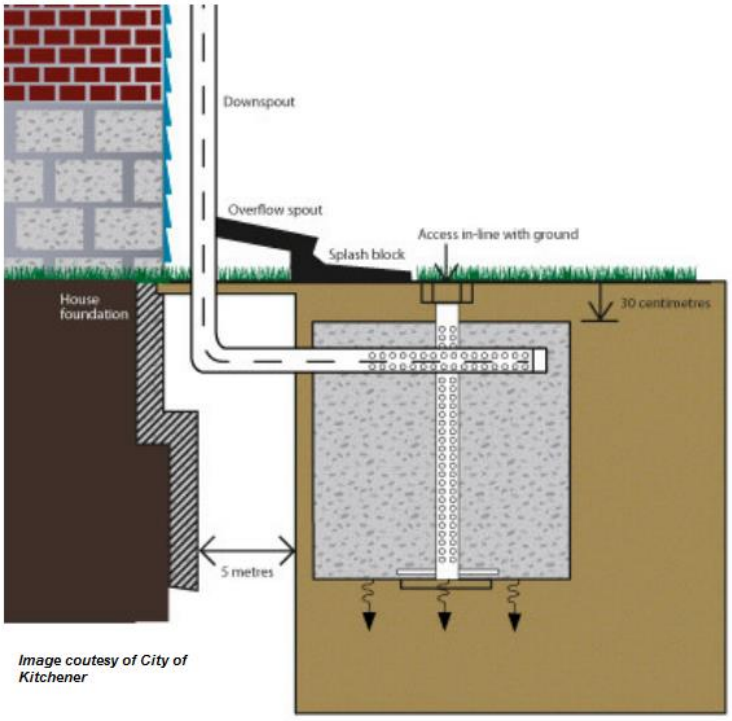

Figure 10: Cross section of Infiltration Gallery (City of Kitchener – Stormwater Credit Application, https://www.kitchener.ca/en/resourcesGeneral/Documents/DSD_ENG_stormwater_credit_Application.pdf)

Appendix 6: Inspection and Maintenance Plan and Log Example

City of Saskatoon
Saskatoon Water

222 3rd Avenue North Saskatoon, Saskatchewan S7K 0J5
Phone (306) 975-2454 Fax (306) 975-2971

Storm Water Management BMP Inspection & Maintenance Plan & Log (Example)

Account Number:	123456789
Property Address:	222 3rd Ave N
Name (First & Last):	John Smith
Company/Organization:	City of Sasaktoon
Description of BMP:	Oil and Grit Separator (OGS)

I hereby certify that the information in this document is true and correct to the best of my knowledge.

Owner/Designate Signature: _____

Date: _____

Note: An Inspection & Maintenance Plan is to be completed for each BMP applied for

Inspection & Maintenance Plan

To be submitted with New, Update, or Change-in-Ownership Applications

BMP Maintenance Requirement	Removal of accumulated sediment and debris
Inspection Frequency	Semi-Annually
Specify if Other	
Maintenance Criteria/Timing	When depth reaches 15% of the unit's storage capacity (should be as recommended by product supplier)
Maintenance Action	Remove Sediment and Debris

Inspection & Maintenance Log

To be completed and submitted with Credit Renewal Application

Maintenance or Inspection	Date	Performed By	Title/ Qualifications	Condition, Results, Follow-Up
Inspection	May 13/19	John Smith	Property Operations Mngr.	Sediment Level at 5% storage capacity
Inspection	Aug 6/19	John Smith	Property Operations Mngr.	Sediment Level at 10% storage capacity
Inspection	May 11/20	John Smith	Property Operations Mngr.	Sediment Level at 15% storage capacity
Maintenance	May 22/20	Contractor ABC	Storm Sewer Vac Services	Sediment and debris removed
Inspection	Jul 31/20	John Smith	Property Operations Mngr.	Sediment Level at 5% storage capacity
Inspection	May 6//21	John Smith	Storm Sewer Vac Services	Sediment Level at 10% storage capacity
Inspection	Aug 20/21	John Smith	Property Operations Mngr.	Sediment Level at 14% storage capacity
Maintenance	Aug 30/21	Contrator A	Storm Sewer Vac Services	Sediment and debris removed
Inspection	May 10/22	John Smith	Property Operations Mngr.	Sediment Level at 5% storage capacity
Inspection	Aug 15/22	John Smith	Property Operations Mngr.	Sediment Level at 10% storage capacity
Inspection	May 1/23	John Smith	Property Operations Mngr.	Sediment Level at 15% storage capacity
Maintenance	May 15/23	Contrator ABC	Storm Sewer Vac Services	Sediment and debris removed
Inspection	Sept 15/23	John Smith	Property Operations Mngr.	Sediment Level at 5% storage capacity

BMP Maintenance Requirement	Removal of oil, fuel, chemicals, etc.
Inspection Frequency	Other
Specify if Other	After Oil, Fuel, or Chemical Spill
Maintenance Criteria/Timing	Immediately After Spill
Maintenance Action	Clean OGS oil port

Maintenance or Inspection	Date	Performed By	Title/ Qualifications	Condition, Results, Follow-Up
Maintenance	July 5/21	John Smith	Property Operations Mngr.	OGS oil port cleaned, oil removed

BMP Maintenance Requirement	
Inspection Frequency	
Specify if Other	
Maintenance Criteria/Timing	
Maintenance Action	

Maintenance or Inspection	Date	Performed By	Title/ Qualifications	Condition, Results, Follow-Up

BMP Maintenance Requirement	
Inspection Frequency	
Specify if Other	
Maintenance Criteria/Timing	
Maintenance Action	

Maintenance or Inspection	Date	Performed By	Title/ Qualifications	Condition, Results, Follow-Up