

Stormwater Design Deliverables Guidance

This document details Ecology’s expectations of deliverables for Ecology funded stormwater projects.

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Stormwater Facility Projects

1.0 Design Report

This section intends to help stormwater grant and/or loan recipients identify the necessary information to include in Design Reports. Ecology does not require that reports follow this outline, but including the information listed expedites the review process. The information required varies by project. Some projects may require additional information, and others may not need as much. Allow for 45 calendar days for Ecology review.

The intent of the Design Report is to demonstrate that the project:

- Has not changed from the project in the original application.
- Uses the applicable design guidance for the proposed BMP(s).
- Provides a quantifiable Flow Control and/or Runoff Treatment benefit.

Design Reports for Ecology review should include the following:

1.1 Introduction

Provide a brief description of the project, including elements such as project location and goals. Include figures as appropriate to show the location and layout of the project.

1.2 Basin Description

Describe the basin that the project lies within under historic, existing, and proposed conditions. Provide figures that show topography and flow direction. Provide information such as current and future land use (i.e. residential, commercial, industrial), soils, area, water bodies, etc.

1.3 Site Description

Provide detailed information about the project site including but not limited to:

- Project Limits.
- Threshold Discharge Areas (TDAs).
- Current use.
- Proposed use.
- Existing stormwater features.

- Proposed stormwater features.
- Total area.
- Vegetation, including trees.
- Wetlands.
- Soils.
- Access.
- Other information relevant to the project design, construction, or maintenance.

1.4 Minimum Requirement/Core Element Analysis

Ecology expects the following analysis for all projects, even if the proposed project is a retrofit. Ecology will use the Minimum Requirement/Core Element Analysis to verify:

- Project eligibility, per the applicable funding guidelines.
- Project compliance with the [NPDES Municipal Stormwater Permit](#)¹, if the project is within a permitted jurisdiction.

These are the main steps in this analysis:

- 1) Identify the stormwater manual currently adopted by the grant and/or loan recipient, and which Ecology manual it is equivalent to.
- 2) Identify and tally the pollution generating and non-pollution generating surfaces pertinent to the MRs/CEs thresholds. Keep each area separate. Examples of areas you may need to identify are:
 - New hard surfaces.
 - Replaced hard surfaces.
 - Existing hard surfaces.
 - Effective impervious surfaces.
 - Effective hard surfaces.
 - Lawn/landscaped areas.
 - Pasture areas.
 - Total land disturbed.
- 3) Include an analysis to determine the MRs/CEs applicable to the project (Figures 2.1 and 2.2 in Ecology's 2019 [Stormwater Management Manual for Western Washington](#)², Section 2.1

¹ <https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Municipal-stormwater-general-permits>

² <https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMWW.htm>

in Ecology's 2019 [Stormwater Management Manual for Eastern Washington](#)³). State which MRs/CEs apply, and to which surfaces within the project limits.

- For projects in Western Washington that require MRs #6 and #7 after the project level analysis, you must also provide a threshold analysis for MRs #6 and #7 for each Threshold Discharge Area (TDA) within the project site.

If the analysis above shows that the project does not exceed new/redevelopment thresholds, the project is a retrofit project.

If the project exceeds the new/redevelopment thresholds and must comply with MRs/CEs for Runoff Treatment and/or Flow Control, provide an analysis of the proposed BMP(s) that provide Runoff Treatment and/or Flow Control for the new and/or replaced surfaces. Identify those BMPs that provide Runoff Treatment and/or Flow Control for existing surfaces above and beyond those required by the MRs/CEs. Ecology considers the BMPs outside of those used to satisfy the MRs/CEs to be retrofit.

Ecology makes an exception for permeable pavement when determining what portions of a project are retrofit, when the funding is only for retrofit elements. If the project is for the replacement of existing conventional impervious pavement with permeable pavement, then Ecology may consider the permeable pavement to be eligible even if it exceeds the new and redevelopment thresholds. Ecology will make this consideration when the permeable pavement is the only trigger for the Minimum Requirements.

1.5 Alternatives Considered

Discuss alternatives considered and why you did or did not select them. Include a brief description of any environmental impacts necessary for the alternatives. This includes large tree removal, sensitive vegetation, wetlands, public recreation areas, etc. large trees are those considered eligible for flow control credit as described by BMP T5.16 in the 2019 Stormwater Management Manual for Western Washington (SWMMWW), and BMP F6.62 in the 2019 Stormwater Management Manual for Eastern Washington (SWMMEW).

1.6 Design Analysis

- 1) Describe the chosen alternative in detail. Name the specific BMP whose design criteria you are using (e.g. BMP T5.15: Permeable Pavements or BMP T7.30: Bioretention Cells, Swales, and Planter Boxes).
- 2) Provide tree species, sizes, and locations of the necessary tree removal, if appropriate.
- 3) Provide drawings of the proposed site improvements.
- 4) Provide a schematic of flow through the facilities if needed to assist in describing the proposed work.
- 5) Provide hydraulic profiles, if appropriate.

³ <https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMEW.htm>

- 6) Describe and/or show the basin contributing to each proposed BMP. Consider and include offsite areas that contribute runoff to the BMP.
- 7) If the project proposes a BMP with an infiltration component, including Bioretention and Permeable Pavement, describe the results from the site specific characterization, soil and infiltration testing. Typically, this will include the long term hydraulic conductivity rate from the geotechnical report and the suitability of soil for treatment.
- 8) Provide detailed design calculations.
 - A. Provide sizing calculations for the selected Runoff Treatment BMP(s). Identify the water quality design flow or volume you use for sizing each Runoff Treatment BMP. This flow or volume may be less than that required for a new/redevelopment BMP if there are site conditions that limit the size of the BMP, and the project does not trip the new/redevelopment thresholds.
 - B. Provide sizing calculations for the selected Flow Control BMP(s). Include an analysis of the flows out of the BMP (use WWHM in western WA and local approved method in eastern WA).
 - C. Summarize the calculation inputs and results for the Runoff Treatment and/or Flow Control improvements.
- 9) Summarize the model results and refer to the computer model printouts, if used. This may involve using “print screens” to include all the relevant information.

1.7 Quantify the Water Quality Benefit

Discuss the amount of water quality benefit expected based on the current level of design.

Provide a discussion that compares the amount of Runoff Treatment and/or Flow Control provided in the proposed project to the amount of Runoff Treatment and/or Flow Control required under full new/redevelopment standards for the area contributing to the BMP. Provide the calculations necessary to verify the discussion. Both treatment and flow control calculations are required unless there is a Flow Control Exemption (Receiving Waters). See Section 4.0 below for Ecology’s guidance on how to quantify the water quality benefit.

1.8 Engineer’s Opinion of Probable Cost

Provide a breakdown showing the total project cost. Additionally, identify what items you consider eligible for Ecology funding. Ecology typically funds the footprint of eligible BMP(s) and immediate connections to existing facilities/discharge points. Ecology will review the proposed cost breakdown to confirm funding eligibility.

1.9 Proposed Schedule

Provide the proposed project schedule. This includes all design and construction milestones. Include Ecology deliverable review times and the grant and/or loan agreement deadline in the

schedule.

1.10 Attachments

Attachments commonly included in design reports include, but are not limited to:

- Basin Maps.
- Project Limits/TDA Maps.
- Preliminary Plans.
- Cost Estimate Details.
- Storm Simulation outputs and screenshots (e.g. WWHM2012 output).
- Geotechnical Reports, including:
 - Infiltration test results.
 - Soil Suitability Lab test results.
 - Physical soils test results

2.0 90% Design Package

Ecology expects the 90% Design Package to detail the completed final design. Ecology has labeled the package as 90% instead of 100% to allow you to incorporate any comments received from Ecology or any other reviewing parties between the 90% design and the Final Bid Package. Reduce all figures and drawings to 11x17 inches in size. Allow for 45 calendar days for Ecology review.

You need to include the information from the following two Ecology inserts in your plans and specifications:

- [Stormwater Grant/Loan Program Bid Specification Clause](#)⁴.
- [Stormwater Grant/Loan Program Bid Insert](#)⁵.
- It will expedite the review process if you provide a memo that lists each required insert item and where you have inserted the information within the plans and/or specifications (i.e. page numbers and/or sheet numbers).

3.0 Final Bid Package

Ecology expects the Final Bid Package to detail the completed final design, with any comments from the 90% Design Package incorporated. Ecology expects digital copies only of this submittal. Allow for 15 calendar days for Ecology review.

⁴ <https://ecology.wa.gov/DOE/files/fc/fc45c49a-9a58-4eb5-9386-693abb7367ad.pdf>

⁵ <https://ecology.wa.gov/DOE/files/51/5150260c-0962-4202-8053-c4922e5ed05c.pdf>

The Final Bid Package includes all documents used for bidding, including but not limited to:

- Final Plans.
- Final Specifications.
- Addenda.
- Final Engineer's Opinion of Probable Cost.
- Anticipated Project Schedule.

4.0 Quantifying the Water Quality Benefit

Retrofit projects are not required to meet the new and redevelopment criteria established in the three Municipal Stormwater General Permits. As a result, Ecology has not previously established a standardized method to demonstrate how much Runoff Treatment or Flow Control has been accomplished through retrofit projects funded through Ecology. The system discussed below is an attempt to quantify the level of improvement realized through retrofit projects.

Ecology has established Runoff Treatment and Flow Control design criteria for projects that exceed new and redevelopment thresholds as defined in Chapter 2 of Volume I of the Stormwater Management Manual for Western Washington (SWMMWW) and Chapter 2 of the Stormwater Management Manual for Eastern Washington (SWMMEW). The design criteria are well defined and it is clear how to calculate the size of Runoff Treatment and Flow Control BMPs for any given new/redevelopment project. By calculating the size of BMPs that you must install if you needed to meet new/redevelopment standards, a designer can calculate a baseline for comparison purposes.

For retrofit projects that are not required to meet the new/redevelopment standards, the size and environmental constraints within the project site could control the size and capacity of the proposed Runoff Treatment or Flow Control BMP. By comparing the size of the proposed retrofit BMP to the size of a BMP designed to meet new/redevelopment criteria, the designer can demonstrate the level of water quality benefit obtained. Ecology requires that the recipients of Ecology funds calculate two ratios to demonstrate the retrofit water quality benefit:

- 1) Flow Control Ratio.
- 2) Runoff Treatment Ratio.

Once these ratios are calculated, the applicant can develop an Equivalent New/Redevelopment Area for the retrofit project. Projects in Flow Control Exempt basins do not have to calculate the Flow Control Ratio. Projects that provide both Runoff Treatment and Flow Control would provide two separate equivalency values, one for Flow Control, and one for Runoff Treatment.

This information, while not difficult to obtain, does require more detailed information than is typically available at the funding application stage. The designer should include this information

with the Design Report submitted to Ecology as part of the funding requirements. Ecology will require that the designer revise the comparison, as necessary, with submittal of the 90% Design Package and again following construction of the BMP. Ecology will use this information to quantify the water quality benefits realized by retrofit projects funded by Ecology.

The designer may do the comparison using the following methods:

4.1 Western Washington

The procedures below outline methods to estimate the areas improved by proposed Flow Control and Runoff Treatment retrofit projects.

4.1.1 Procedure for Comparison – Flow Control BMPs

Procedure WFC-1: Analysis for Size of Detention/Retention Flow Control BMP

- Run the pre-developed condition for WWHM using the basin area contributing to the BMP.
- Use forested land cover, except where historic information indicates the area was prairie prior to settlement (then use the pasture land cover).
- Size the Flow Control BMP to meet new/redevelopment criteria for the proposed land use of the basin contributing to the BMP immediately after the construction of the project. Using the Auto Pond function is an acceptable method to obtain this information for detention/retention BMPs.
- Calculate the volume of the proposed retrofit Flow Control BMP at the overflow elevation.
- Calculate the ratio of the proposed retrofit Flow Control BMP volume to the volume of the Flow Control BMP required to meet new/redevelopment.

Ratio_{WFC-1}

$$= \frac{\text{Volume at overflow of proposed Flow Control BMP}}{\text{Volume at overflow of Flow Control BMP to meet new/redevelopment criteria}}$$

If Ratio_{WFC-1} > 1, then set Ratio_{WFC-1} = 1

- Multiply the ratio developed above by the area of the basin contributing to the BMP to obtain the Equivalent New/Redevelopment Area.

$$\text{Area}_{\text{WFC-1}} = \text{Ratio}_{\text{WFC-1}} \times \text{Contributing Basin Area}$$

Procedure WFC-2: Analysis for Size of Bioretention/Permeable Pavement Flow Control BMP

- Run the pre-developed condition for WWHM using the basin area contributing to the BMP.
- Use forested land cover, except where historic information indicates the area was prairie

prior to settlement (then use the pasture land cover).

- Size the Flow Control BMP to meet new/redevelopment criteria for the proposed land use of the basin contributing to the BMP.
- Identify the surface area of the proposed retrofit bioretention or permeable pavement BMP.
- Calculate the ratio of the proposed retrofit BMP surface area to the surface area of the BMP required to meet new/redevelopment.
- Note: Bioretention by itself is not an efficient flow control BMP and needs to be quite large to meet the new/redevelopment criteria.

Ratio_{WFC-2}

$$= \frac{\text{Surface Area of proposed Bioretention or Permeable Pavement}}{\text{Surface Area of Bioretention or Permeable Pavement to meet new/redevelopment criteria}}$$

If Ratio_{WFC-2} > 1, then set Ratio_{WFC-2} = 1

- Multiply the ratio developed above by the area of the basin contributing to the BMP to obtain the Equivalent New/Redevelopment Area.

$$\text{Area}_{\text{WFC-2}} = \text{Ratio}_{\text{WFC-2}} \times \text{Contributing Basin Area}$$

4.1.2 Procedure for Comparison – Runoff Treatment BMPs

Procedure WRT-1: Analysis of Size of Traditional Flow Rate or Volume Based Runoff Treatment BMP

- Run the pre-developed condition for WWHM using the basin area contributing to the BMP.
- Use forested land cover, except where historic information indicates the area was prairie prior to settlement (then use the pasture land cover).
- Run the water quality analysis module within WWHM to determine the design flow rate and/or volume for the basin contributing to the Runoff Treatment BMP. Use the on-line or off-line flow rate depending on the configuration of the selected retrofit BMP.
- Using the design flow rate or volume for the Runoff Treatment BMP you are proposing; calculate the ratio between the design flow rate or volume for the retrofit BMP and the design flow rate or volume for the basin contributing to the BMP.

$$\text{Ratio}_{\text{WRT-1}} = \frac{\text{Design flow rate or volume for proposed retrofit treatment BMP}}{\text{Design flow rate or volume to meet new/redevelopment criteria}}$$

If Ratio_{WRT-1} > 1, then set Ratio_{WRT-1} = 1

- Multiply the ratio developed above by the area of the basin contributing to the BMP to obtain the Equivalent New/Redevelopment Area.

$$\text{Area}_{\text{WRT-1}} = \text{Ratio}_{\text{WRT-1}} \times \text{Contributing Basin Area}$$

Procedure WRT-2: Analysis of Size of Bioretention Runoff Treatment BMP

- Run the pre-developed condition for WWHM using the basin area contributing to the BMP.
 - Use forested land cover, except where historic information indicates the area was prairie prior to settlement (then use the pasture land cover).
- Run iterations of the bioretention module within WWHM to determine the size of the bioretention BMP that results in a minimum of 91-percent flow through the bioretention media. Use the Underdrain Used button and do not include native infiltration. In addition, assume vertical walls on the bioretention BMP.
- Using the surface area of the proposed BMP, calculate the ratio between the surface area for the proposed BMP and the surface area for the full basin.

$$\text{Ratio}_{\text{WRT-2}} = \frac{\text{Design flow rate or volume for proposed retrofit treatment BMP}}{\text{Design flow rate or volume to meet new/redevelopment criteria}}$$

If $\text{Ratio}_{\text{WRT-2}} > 1$, then set $\text{Ratio}_{\text{WRT-2}} = 1$

- Multiply the ratio developed above times the area of the full basin to obtain the Equivalent New/Redevelopment Area.

$$\text{Area}_{\text{WRT-2}} = \text{Ratio}_{\text{WRT-2}} \times \text{Contributing Basin Area}$$

4.1.3 Example Calculations

We use the following sample case in these example calculations:

- Existing Basin Contributing to BMP: 7.0 acres landscaping, flat, 3.0 acres hard surface roads and buildings, Type C soil, 0.3 in/hr native infiltration rate.
- Pre-Developed Scenario: 10.0 acres Type C soil, forested, flat, 0.3 in/hr native infiltration rate.
- Proposed Retrofits:
 - Detention BMP: 1.569 ac-ft at overflow.
 - Traditional treatment BMP: 0.035 cfs design treatment flow rate (on-line).

- Wet Pond/Vault: 0.115 ac-ft (5,000 cu ft) design treatment volume.
- Bioretention BMP 2,500 sq ft surface area, 18-inch media (3 in/hr), 6-inch sand, 18-inch gravel.
- Permeable Pavement 2-acres (out of 3 acres of hard surface), 0.3 in/hr native infiltration rate. The 3 acres of hard surface is the full contributing area to the proposed permeable pavement.

Procedure WFC-1: Detention/Retention BMP

- Existing Conditions WWHM pond volume at top of outlet (using AutoPond function, and vertical side slopes) = 2.302 ac-ft.
- Proposed Retrofit Pond Volume at top of outlet = 1.569 ac-ft.
- Flow Control Ratio of Proposed Pond Volume to Required Pond Volume:

$$\text{Ratio}_{\text{WFC-1}} = \frac{1.569 \text{ ac ft}}{2.302 \text{ ac ft}} = 0.682$$

- Equivalent New/Redevelopment Area:

$$\text{Area}_{\text{WFC-1}} = 0.682 \times 10 \text{ ac} = 6.82 \text{ acres}$$

Procedure WFC-2: Permeable Pavement

- Existing Conditions Surface Area required to meet redevelopment criteria (Flow Control duration curve) = < area provided in retrofit project sq ft.
- Proposed Retrofit design Permeable Pavement surface area = 87,120 sq ft (2 acres).
- Treatment Ratio of Proposed Surface Area to required Surface Area is greater than 1.

$$\text{Since calculated Ratio}_{\text{WFC-2}} > 1, \text{ set Ratio}_{\text{WFC-2}} = 1$$

- Equivalent New/Redevelopment Area (only 3 acres contributing to Permeable Pavement).

$$\text{Area}_{\text{WFC-2}} = 1 \times 3 \text{ ac} = 3 \text{ acres}$$

Procedure WRT-1: Swale/Manufactured Treatment Device (Uses Water Quality Flow rate)

- Existing Conditions WWHM design flow rate for water quality BMP (on-line) = 0.0800 cfs.
- Proposed Retrofit design flow rate for water quality BMP (on-line flow) = 0.035 cfs.
- Treatment Ratio of Proposed design flow rate to required design flow rate:

$$\text{Ratio}_{\text{WRT-1}} = \frac{0.035 \text{ cfs}}{0.080 \text{ cfs}} = 0.437$$

- Equivalent New/Redevelopment Area:

$$\text{Area}_{\text{WRT-1}} = 0.437 \times 10 \text{ ac} = 4.37 \text{ acres}$$

Procedure WRT-1: Wet Pond/Vault

- Existing Conditions Pond Volume required for new/redevelopment criteria (6-month Storm) 0.1614 ac- ft.
- Proposed Retrofit design Wet Pond/Vault Volume = 0.115 ac-ft.
- Treatment Ratio of Proposed design flow rate to required design flow rate

$$\text{Ratio}_{\text{WRT-1}} = \frac{0.115 \text{ ac ft}}{0.1614 \text{ ac ft}} = 0.712$$

- Equivalent New/Redevelopment Area

$$\text{Area}_{\text{WRT-1}} = 0.712 \times 10 \text{ ac} = 7.12 \text{ acres}$$

Procedure WRT-2: Bioretention BMP (underdrain)

- Existing Conditions Surface Area required to meet redevelopment criteria (91-percent treated) = 3,500 sq ft.
- Proposed Retrofit design Bioretention surface area = 2,500 sq ft.
- Treatment Ratio of Proposed design flow rate to required design flow rate:

$$\text{Ratio}_{\text{WRT-2}} = \frac{2,500 \text{ sq ft}}{3,500 \text{ sq ft}} = 0.714$$

- Equivalent New/Redevelopment Area:

$$\text{Area}_{\text{WRT-2}} = 0.714 \times 10 \text{ ac} = 7.14 \text{ acres}$$

4.2 Eastern Washington

The designer calculates the volume of the Flow Control BMP and the water quality design flow rate or volume needed to meet new/redevelopment criteria. The designer compares these two values to the actual volume of the Flow Control BMP and actual water quality design flow rate for the selected retrofit project. Using these ratios, the designer will calculate the percentage of water quality benefit that the retrofit BMP provides compared to the full new/redevelopment BMP for both Flow Control and Runoff Treatment. You then multiply the resulting ratio by the basin area to obtain the Equivalent New/ Redevelopment Area.

4.2.1 Procedure for Comparison – Flow Control BMPs

Procedure EFC-1: Analysis for Size of Detention/Retention Flow Control BMP

- Develop the Flow Control BMP sized to meet new development criteria for the full contributing area and the proposed land use. You can use the method that you tell developers to use to determine detention/retention sizing. This will give you the volume of the Flow Control BMP required to meet new/redevelopment.
- Calculate the volume of the proposed retrofit Flow Control BMP at the overflow elevation.
- Calculate the ratio of the proposed retrofit BMP volume to the volume of the BMP required to meet the new development criteria.

$$\text{Ratio}_{\text{EFC-1}} = \frac{\text{Volume at overflow of proposed Flow Control BMP}}{\text{Volume at overflow of Flow Control BMP to meet new/redevelopment criteria}}$$

If $\text{Ratio}_{\text{EFC-1}} > 1$, then set $\text{Ratio}_{\text{EFC-1}} = 1$

- Multiply the ratio developed above times the area of the full basin to obtain the Equivalent New/Redevelopment Area.

$$\text{Area}_{\text{EFC-1}} = \text{Ratio}_{\text{EFC-1}} \times \text{Contributing Basin Area}$$

4.2.2 Procedure for Comparison – Runoff Treatment BMPs

Procedure ERT-1: Analysis of Size of traditional Flow Rate or volume based Runoff Treatment BMP

- Determine water quality design flowrate and/or volume for full basin (6-month, 24-hr volume or Standard flow rate). Use the method that you tell developers to use to determine water quality treatment flowrate and/or volume. Alternatively, you can use one of the five methods to calculate water quality volume or the three methods to calculate water quality treatment flow in Chapter 2.7.6 of the SWMM EW. Either use the in-line or off-line flow rate depending on the configuration of the selected retrofit BMP. This treatment BMP should treat 90% of the annual runoff.
- Using the design flow rate or volume for the water quality BMP you are proposing; calculate the ratio between the design flow rate or volume for the retrofit BMP and the design flow rate or volume for the full basin.

$$\text{Ratio}_{\text{ERT-1}} = \frac{\text{Design flow rate or volume for proposed retrofit treatment BMP}}{\text{Design flow rate or volume to meet new/redevelopment criteria}}$$

If $\text{Ratio}_{\text{ERT-1}} > 1$, then set $\text{Ratio}_{\text{ERT-1}} = 1$

- Multiply the ratio developed times the area of the full basin to obtain the Equivalent

New/Redevelopment Area.

$$\text{Area}_{\text{ERT-1}} = \text{Ratio}_{\text{ERT-1}} \times \text{Contributing Basin Area}$$

4.2.3 Example Calculations

We use the following sample case in these example calculations:

- Existing Basin: 7.0 acres Type C soil, landscaping, flat, 3.0 acres hard surface roads and buildings, 0.3 in/hr native infiltration rate.
- Pre-Developed: 10.0 acres Type C soil, forested, flat, 0.3 in/hr native infiltration rate.
- Proposed Retrofits:
 - Detention BMP: 1.569 ac-ft at overflow.
 - Traditional treatment BMP: 0.035 cfs design treatment flow rate (on-line).
 - Wet Pond/Vault: 0.115 ac-ft (5,000 cu ft) design treatment volume.

Procedure EFC-1: Detention/Retention BMP

- Existing Conditions calculated pond volume at top of outlet = 2.302 ac-ft.
- Proposed Retrofit Pond Volume at top of outlet = 1.569 ac-ft.
- Flow Control Ratio of Proposed Pond Volume to Required Pond Volume:

$$\text{Ratio}_{\text{EFC-1}} = \frac{1.569 \text{ ac ft}}{2.302 \text{ ac ft}} = 0.682$$

- Equivalent New/Redevelopment Area:

$$\text{Area}_{\text{EFC-1}} = 0.682 \times 10 \text{ ac} = 6.82 \text{ acres}$$

Procedure ERT-1: Swale/Manufactured Treatment Device (Uses Water Quality Flow Rate)

- Existing Conditions water quality design flow rate for water quality BMP (on-line) = 0.0800 cfs.
- Proposed Retrofit design flow rate for water quality BMP (on-line flow) = 0.035 cfs.
- Treatment Ratio of Proposed design flow rate to required design flow rate:

$$\text{Ratio}_{\text{ERT-1}} = \frac{0.035 \text{ cfs}}{0.080 \text{ cfs}} = 0.437$$

- Equivalent New/Redevelopment Area:

$$\text{Area}_{\text{ERT-1}} = 0.437 \times 10 \text{ ac} = 4.37 \text{ acres}$$

Procedure ERT-1: Wet Pond/Vault (Uses Water Quality Volume)

- Existing Conditions Pond Volume required for redevelopment criteria (6-month Storm) 0.1614 ac- ft.
- Proposed Retrofit design Wet Pond/Vault Volume = 0.115 ac-ft.
- Treatment Ratio of Proposed design flow rate to required design flow rate:

$$\text{Ratio}_{\text{ERT-1}} = \frac{0.115 \text{ ac ft}}{0.1614 \text{ ac ft}} = 0.712$$

- Equivalent New /Redevelopment Area:

$$\text{Area}_{\text{ERT-1}} = 0.712 \times 10 \text{ ac} = 7.12 \text{ acres}$$

5.0 Construction Quality Assurance Plan (CQAP)

A Construction Quality Assurance Plan (CQAP) is the documentation of the recipient and contractor's process for delivering the level of construction quality required by the contract. Ecology intends this document to provide guidance to recipient as to what is expected from CQAPs, and to identify the criteria for these plans. As per the agreement, the recipient will submit a CQAP to Ecology for review and acceptance prior to beginning construction on any stormwater project. This plan must describe how the recipient will provide adequate and competent construction oversight. Washington Administrative Code regulation, [WAC Chapter 173-240-075](#)⁶, lists the requirements for preparing a CQAP.

The CQAP submittal should include a cover page containing the grant and/or loan recipient name, project name, agreement number, project engineer's name, job title, jurisdiction/company, and date CQAP was prepared/revised. The recipient must upload the submittal to EAGL and notify the Ecology Project Manager of the submittal. Allow for 15 calendar days for Ecology review.

If the recipient is using the Washington State Department of Transportation (WSDOT) standard specs, [Division 1 of the WSDOT standard specs](#)⁷ covers the general requirements of a CQAP. The CQAP must also contain project and recipient specific information.

5.1 Introduction and Site Description

Provide an overview of project to include a site description and project construction. Include a

⁶ <http://apps.leg.wa.gov/WAC/default.aspx?cite=173-240-075>

⁷ <https://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS.pdf>

description of any construction activities that are not grant and/or loan eligible, but installed under the construction contract in place.

5.2 Features of Work

Provide a brief description of the tasks performed under the grant and/or loan agreement in sequential order. This description should include a discussion of the overall project, summary of the schedule timeline, any special activities, and the number of subcontractors, etc. to get the reader up-to-date on the project.

Include a statement that states that the Cultural Resources Inadvertent Discovery Plan (IDP) will be maintained on site at all times during the project construction. If an IDP was not completed, the recipient must produce the plan prior to construction.

5.3 Project Organization

Submit an organizational chart with names, email addresses, and phone numbers of key personnel; include sub-consultants and major sub-contractors (if known at the time of submittal, if not known provide an update once you select the contractor). Include a brief summary of the construction management organization, management procedures, lines of communication, and responsibility. Include recipient and Ecology Project Managers in the organization chart.

5.4 General Administrative Work

Identify how the recipient will interface between the contractor and the engineer and where the contractor may find guidance for administrative work. This includes information on submittals for review, pay requests, change orders, inspections, etc. Identify the occurrence of meetings between the contractor, engineer, and recipient.

If you use Division 1 of the *Standard Specifications for Road, Bridge, and Municipal Construction* (WSDOT Specs), you can reference this and the requirements of this section are satisfied.

5.5 Construction Stormwater Pollution Prevention Plan (SWPPP)

Identify if the Ecology Construction Permit applies to the project and who is responsible for compliance with the permit. Confirm that the SWPPP is on-site and updated as necessary.

5.6 Quality Control Methods

Submit a description/summary table of the quality control testing such as soil and material tests, leakage/pressure tests, equipment performance tests, etc. Include type of tests, frequency, parameters, specifications and who will perform the tests. Add brief explanations as appropriate.

5.7 Inspections

Summarize your construction inspection program. Include:

- Inspector's responsibility.
- Inspection frequency.
- Deficiency resolution process.
- Inspector qualifications (brief summary may be included or attached).
- Municipality or authorized agent performing the inspection.
- Daily Inspection Report Template.

5.8 Technical Records Handling

Briefly discuss who is responsible for keeping technical records, and where the records are stored. Technical Records include project correspondence, plans and specifications, inspection reports and daily logs, meeting minutes, shop drawings, field orders and change orders.

5.9 Field Testing Procedures

Describe field-testing procedures to verify that control measures are adequate to provide a product that conforms to contract. This may include referencing applicable testing parameters (ASTM, etc.), listing approved and validated facilities and equipment, and verification and review that all tests are documented and submitted as part of quality control system reporting.

5.10 Permits, Licenses, Easements, and Agreements

List and track all required permits, easements, agreements and licenses. Include any associated notices. The recipient will complete all design, environmental review and permitting tasks and respond to Ecology comments in a timely manner.

5.11 Documentation

Describe the maintenance of project document records and submittals, to include, Inadvertent Discovery Plan (IDP), project correspondence, reimbursements, plans and specifications, addenda, progress reports, inspection reports and daily logs.

5.12 Change Order Documents

Describe how modifications or revisions to the specifications will be tracked and relayed to grant and/or loan recipient key personnel and Ecology. Submissions can include drawings, plans, diagrams, or any other supplementary data or calculations.

When applicable, the submittal should include a description of tasks and items that may have costs that changed.

Submit a description of the change order process. Include who will initiate, review, negotiate, approve, and send change orders to Ecology. Ecology must review and accept change orders before implementation. Promptly convey Issues during construction that may result in a change order to Ecology either at construction meetings, via phone and/or email as they arise. Include a change order template in submittal.

Prior to execution, the recipient will submit in writing any eligible change orders that are a significant deviation from Ecology-accepted plans and specifications for Ecology review and acceptance for payment. Allow for 10 calendar days for Ecology review. Ecology must review and accept all change orders that impact grant and/or loan eligible activities prior to implementation. Ecology must review all other change orders for technical merit and should be submitted within 30 days after execution. Change orders are to be signed by the contractor, the engineer (if appropriate), and the recipient prior to submittal to Ecology for acceptance.

5.13 Project Completion Documentation

3) GIS data deliverables.

- Site visits.
- Record drawings.
- Water benefit calculation.

Upon project completion, the recipient will submit the Declaration of Construction Completion form to Ecology in accordance with [WAC 173-240-090](#)⁸. The form, when signed by a professional engineer, indicates that the contractor completed the project in accordance with the plans and specifications and major change orders approved by Ecology, and accurately shown on the record drawings.

You may be required to submit a CQAP revision if there are significant changes in your project.

6.0 Operations and Maintenance Plan (O&M) for Facilities

- For TAPE GULD devices, the manufacturer's Operation and Maintenance plan is required. For non-TAPE GULD devices, provide specific BMP O&M plan. See more details below.
- For Low Impact Development (LID) BMPs maintenance guidance, you may refer to Appendix G of the [Eastern Washington Low impact Development Guidance Manual](#)⁹ or Appendix 4 of the [Low Impact Development Technical Guidance Manual for Puget Sound](#)¹⁰.
- Identify the person or party who's responsible for the operation and maintenance, such as

⁸ <https://apps.leg.wa.gov/WAC/default.aspx?cite=173-240-090>

⁹ <https://fortress.wa.gov/ecy/publications/documents/1310036.pdf>

¹⁰ https://www.psp.wa.gov/downloads/LID/20121221_LIDmanual_FINAL_secure.pdf

Public Works Department or the third-party contractor.

- Describe how the maintenance operations fit into the recipient’s overall operations and maintenance plan.
- Post-construction plant maintenance for BMPs that rely on vegetation to maintain functionality.

7.0 GIS

This section intends to help stormwater grant and/or loan recipients identify the necessary information to include in GIS deliverables. Ecology does not require that GIS deliverables follow this outline, but following this guidance will expedite the review process.

Stormwater facility agreements include deliverables for preliminary and final GIS data. The preliminary project file is completed at the design phase, and the final project file is based on the completed construction of the stormwater facility. Ecology review of GIS data may include the following:

- Comparison between GIS data and design plans.
- Comparison between GIS data and field observations using GIS/GPS mapping application tools during site visits.
- Georeferenced photos.
- Comparison between GIS data and water quality benefit equivalent area calculations, as reported in Two-paged Outcome Summary Report during closeout.

7.1 EAGL Mapping

Although the recipient has authorization to upload the project contributing area into the Mapping Information form of EAGL, Ecology prefers to have the Ecology regional project manager upload after Ecology has reviewed the data, as it is easy to accidentally repopulate EAGL with a default placeholder GIS file.

7.2 Data and Schema

All GIS data must be polygon(s), and not lines or points. The standard Ecology Projection is Washington State Plane, South Zone, NAD 83 HARN, US Feet. Ecology may accept other projections so long as the files are readily accommodated by ArcMap.

Stormwater facility GIS files should provide the following information:

- 1) Contributing area. One polygon feature class with a single feature. The feature can be multipart, and must be a single record in the attribute table. Fields should include:
 - A. Project ID (i.e. agreement number).
 - B. Contributing area in acres.

- C. Pollution Generating Impervious Surface (PGIS) in acres.
 - D. Runoff Treatment benefit in acres from equivalent new/redevelopment area determination.
 - E. Flow Control benefit in acres from equivalent new/redevelopment area determination.
 - F. Text comments for additional clarification if necessary.
- 2) BMP footprint. One polygon feature class with a separate polygon feature for each BMP. If more than one BMP is constructed, then multiple records should appear in the attribute table. Fields should include:
- A. Project ID (i.e. agreement number).
 - B. BMP name consistent with an Ecology approved manual, or Ecology approved TAPE device name.
 - C. Text comments for additional clarification if necessary.

Stormwater Decant Facilities should provide the following GIS files:

- 1) Decant facility footprint. Fields should include:
- A. Project ID (i.e. agreement number).
 - B. Text comment of a brief description of decant facility constructed.
- 2) If a water quality treatment or flow control facility is constructed as part of the project, provide the BMP footprints for these facilities. Fields should include:
- A. Project ID (i.e. agreement number).
 - B. BMP name consistent with an Ecology approved manual, or Ecology approved TAPE device name.
 - C. Text comments for additional clarification if necessary.

All files must be zipped (.zip) to upload to the EAGL Uploads form of the agreement. An empty file geodatabase template with acceptable schema is available on the [General Resources for Water Quality Grants & Loans webpage under Forms - Stormwater Agreement Materials](#)¹¹.

¹¹ <https://ecology.wa.gov/About-us/How-we-operate/Grants-loans/Find-a-grant-or-loan/Water-Quality-grants-and-loans/General-resources>

8.0 Example Scope of Work

Task Number: 1

Task Cost:

Task Title: Grant and Loan Administration

Task Description:

- A. The RECIPIENT shall carry out all work necessary to meet ECOLOGY grant or loan administration requirements. Responsibilities include, but are not limited to: maintenance of project records; submittal of requests for reimbursement and corresponding backup documentation; progress reports; an EAGL (Ecology Administration of Grants and Loans) recipient closeout report; and a two-page Final Report (including photos, if applicable). In the event that the RECIPIENT elects to use a contractor to complete project elements, the RECIPIENT shall retain responsibility for the oversight and management of this funding agreement.
- B. The RECIPIENT shall keep documentation that demonstrates the project is in compliance with applicable procurement, contracting, and interlocal agreement requirements; permitting requirements, including application for, receipt of, and compliance with all required permits, licenses, easements, or property rights necessary for the project; and submittal of required performance items. This documentation shall be made available to ECOLOGY upon request.
- C. The RECIPIENT shall maintain effective communication with ECOLOGY and maintain up-to-date staff contact information in the EAGL system. The RECIPIENT shall carry out this project in accordance with any completion dates outlined in this agreement.

Task Goal Statement:

Properly managed and fully documented project that meets ECOLOGY's grant and loan administrative requirements.

Task Expected Outcome:

* Timely and complete submittal of requests for reimbursement, quarterly progress reports, Recipient Closeout Report, and two-page Outcome Summary Report.

* Properly maintained project documentation.

Grant and Loan Administration Deliverables

Number	Description	Due Date
1.1	Progress Reports that include descriptions of work accomplished, project challenges, and changes in the project schedule. Submitted at least quarterly.	
1.2	Recipient Closeout Report (EAGL Form).	

1.3	Two-page Outcome Summary Report.	
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Task Number: 2

Task Cost:

Task Title: Cultural and Environmental Reviews, and Permitting

Task Description:

The RECIPIENT shall ensure the following items are completed and provide the associated deliverables to ECOLOGY. The RECIPIENT must approve all materials prior to submitting them to ECOLOGY for acceptance.

- A. The RECIPIENT will provide both the ECOLOGY project manager and separegister@ecy.wa.gov an initial consultation on the draft State Environmental Policy Act (SEPA) documents.
- B. The RECIPIENT will notify the ECOLOGY project manager, in addition to the required distribution and public notice, when SEPA documents have been issued for the official comment period, which is a minimum of 21 days.
- C. The RECIPIENT is responsible for application of, receipt of, and compliance with all required local, state, tribal and federal permits, licenses, easements, or property rights necessary for the project.
- D. Above and below ground activities must be reviewed for cultural resource impacts. The RECIPIENT will submit the forms listed below to ECOLOGY to initiate consultation for cultural resources review.

To initiate cultural resources review:

- 1. The RECIPIENT will submit the 05-05/106 Form to ECOLOGY, using the ECOLOGY template. Any supporting materials must conform to the Department of Archeology and Historic Preservation’s Washington State Standards for Cultural Resource Reporting.
- 2. The RECIPIENT will submit an Inadvertent Discovery Plan (IDP) to ECOLOGY, using the ECOLOGY template. The RECIPIENT will ensure that all contractors and subcontractors have a copy of the completed IDP prior to and while working on-site. The IDP template may be found on the ECOLOGY website.

The RECIPIENT must receive written notice from ECOLOGY prior to proceeding with work. Work done prior to written notice to proceed shall not be eligible for reimbursement. This includes geotechnical work.

Task Goal Statement:

The RECIPIENT will complete all cultural and environmental reviews and permitting tasks in a timely manner.

Task Expected Outcome:

The project will meet the requirements set forth by the cultural resource protection requirements, State Environmental Policy Act, and all other applicable federal, state, and local laws, and regulations.

Cultural, Environmental Review, and Permitting Deliverables

Number	Description	Due Date
2.1	SEPA checklist, or other documentation for projects considered exempt from SEPA review. Upload to EAGL and notify ECOLOGY when upload is complete.	
2.2	List of permits acquired and environmental review documents. Upload to EAGL and notify ECOLOGY when upload is complete.	
2.3	ECOLOGY 05-05/106 Form. Email the form and any supplemental cultural resources documentation directly to the ECOLOGY Project Manager. ECOLOGY will upload documentation to EAGL when cultural resources is complete.	
2.4	Inadvertent Discovery Plan. Upload to EAGL and notify ECOLOGY when upload is complete.	

Task Number: 3

Task Cost:

Task Title: Design Plans and Specifications

Task Description:

The RECIPIENT shall ensure the following items are completed and provide the associated deliverables to ECOLOGY. The RECIPIENT must approve all materials prior to submitting them to ECOLOGY for acceptance.

- A. The RECIPIENT will develop a stormwater project design. The design submittals must conform to the Design Deliverables for Stormwater Projects with Ecology Funding (Design Deliverables Document). Projects must be designed in accordance with the Stormwater Management Manual for Eastern Washington, Stormwater Management Manual for Western Washington, or equivalent manual. Refer to the ECOLOGY website for specific guidance. Project must be reviewed and accepted in writing by ECOLOGY to be eligible for reimbursement.

The RECIPIENT will upload the design submittals listed below to EAGL for ECOLOGY review. Reduce design figures to 11x17 inches in size and ensure they are legible.

- 1. The RECIPIENT will submit a Design Report to ECOLOGY for review and acceptance. Allow 45 calendar days for ECOLOGY review.

The RECIPIENT agrees to respond to ECOLOGY comments. The RECIPIENT must receive an Ecology Design Report Acceptance Letter prior to proceeding to 90 Percent Design.

2. The RECIPIENT will submit a 90 Percent Design Package to ECOLOGY for review and acceptance. At a minimum, this package must include 90 percent plans, specifications, engineer’s opinion of cost, which includes a schedule of eligible costs, and project construction schedule. The current required bid inserts and specifications may be found on the Ecology website. Allow 45 calendar days for ECOLOGY review.

The RECIPIENT agrees to respond to ECOLOGY comments. The RECIPIENT must receive an Ecology 90 Percent Design Acceptance Letter prior to proceeding Final Design.

3. The RECIPIENT will submit a Final Bid Package to ECOLOGY for review and acceptance prior to advertising the project. The Final Bid Package includes: project plans, specifications, engineer’s opinion of cost including a schedule of eligible costs, and project construction schedule. Allow 15 calendar days for ECOLOGY review.
- B. The RECIPIENT will calculate and submit a preliminary equivalent new/re-development area for the completed retrofit project(s) using the methods outlined in the Design Deliverables Document.
 - C. The RECIPIENT will submit a preliminary GIS compatible project area in shapefile, geodatabase file, or ECOLOGY-approved equivalent. The project area should include polygon features for stormwater facilities and contributing areas.

Task Goal Statement:

The RECIPIENT will complete all design tasks and respond to ECOLOGY comments in a timely manner.

Task Expected Outcome:

The project will meet the requirements set forth by ECOLOGY water quality facility design standards and all other applicable federal, state, and local laws, and regulations.

Design Plans and Specifications Deliverables

Number	Description	Due Date
3.1	Contract documents (if contracting out for design). Upload to EAGL and notify ECOLOGY when upload is complete.	
3.2	Design Report. Upload to EAGL and notify ECOLOGY when upload is complete.	
3.3	Responses to ECOLOGY Design Report comments. Upload to EAGL and notify ECOLOGY when upload is complete.	
3.4	ECOLOGY Design Report Acceptance Letter. Upload to EAGL and notify ECOLOGY when upload is complete.	

3.5	90 Percent Design Package. Upload to EAGL and notify ECOLOGY when complete.	
3.6	Responses to ECOLOGY 90 Percent Design Package comments. Upload to EAGL and notify ECOLOGY when upload is complete.	
3.7	ECOLOGY 90 Percent Design Acceptance Letter. Upload to EAGL and notify ECOLOGY when upload is complete.	
3.8	Preliminary equivalent new/redevelopment area determination. Upload to EAGL and notify ECOLOGY when upload is complete.	
3.9	Preliminary project area shapefile, geodatabase file, or ECOLOGY-approved equivalent. Upload to EAGL and notify ECOLOGY when upload is complete. Upload ECOLOGY acceptance documentation.	
3.10	Final Bid Package. Upload to EAGL and notify ECOLOGY when upload is complete.	
3.11	Responses to ECOLOGY Final Bid Package comments. Upload to EAGL and notify ECOLOGY when upload is complete.	
3.12	Ecology Final Bid Package Acceptance Letter. Upload to EAGL and notify ECOLOGY when upload is complete.	
3.13	Bid documents (e.g. bid announcement, bid tabulations, and bid award). Upload to EAGL and notify ECOLOGY when upload is complete.	

Task Number: 4

Task Cost:

Task Title: Construction Management

Task Description:

The RECIPIENT shall ensure the following items are completed and provide the associated deliverables to ECOLOGY. The RECIPIENT must approve all materials prior to submitting them to ECOLOGY for acceptance.

- A. The RECIPIENT will provide construction oversight and management of the project.
- B. The RECIPIENT will submit a detailed Construction Quality Assurance Plan (CQAP) to ECOLOGY for review and acceptance before the start of construction. This plan must describe how the RECIPIENT will perform adequate and competent construction oversight. Guidance for CQAP development is located in the Design Deliverables Document available on the ECOLOGY website. Allow 15 calendar days for ECOLOGY review.
- C. The RECIPIENT will conduct a pre-construction conference meeting and invite ECOLOGY to attend.
- D. The RECIPIENT will submit an updated project schedule and cost estimate prior to the start of construction and whenever major changes occur.
- E. Prior to execution, the RECIPIENT will submit to ECOLOGY any eligible change orders

that deviate from ECOLOGY-accepted plans and specifications. ECOLOGY must review and accept all change orders that affect grant eligible activities prior to implementation. Allow 10 calendar days for ECOLOGY review.

Task Goal Statement:

The RECIPIENT will oversee and manage construction, communicate with ECOLOGY in a timely fashion, and provide ECOLOGY with all requested project documentation.

Task Expected Outcome:

The project will be constructed on schedule and in accordance with accepted plans.

Construction Management Deliverables

Number	Description	Due Date
4.1	Construction Quality Assurance Plan. Upload to EAGL and notify ECOLOGY when upload is complete. Upload ECOLOGY acceptance documentation.	
4.2	Pre-construction conference meeting minutes. Upload to EAGL and notify ECOLOGY when upload is complete.	
4.3	Project Schedule. Upload to EAGL and notify ECOLOGY when upload is complete.	
4.4	Revised construction cost estimates when changes in construction schedule occur. Upload to EAGL and notify ECOLOGY when upload is complete.	
4.5	Change Order(s). Upload to EAGL and notify ECOLOGY when upload is complete. Upload ECOLOGY acceptance documentation.	

Task Number: 5

Task Cost:

Task Title: Construction

Task Description:

The RECIPIENT shall ensure the following items are completed and provide the associated deliverables to ECOLOGY. The RECIPIENT must approve all materials prior to submitting them to ECOLOGY for acceptance.

- A. The RECIPIENT will complete construction of the project in accordance with ECOLOGY-accepted plans and specifications. The construction project will include installation of **(NAME OF BMPs FROM PROJECT SHORT DESCRIPTION)** to mitigate runoff from **(ACRES)** of pollution-generating impervious surfaces.
- B. Stormwater Construction Completion Form signed by a professional engineer indicating that the project was completed in accordance with the plans and specifications, and major change orders approved by ECOLOGY’s Project Engineer and shown on the

Record Drawings. The Stormwater Construction Completion Form can be found on the ECOLOGY website.

Task Goal Statement:

Construction of the project in accordance with ECOLOGY-accepted plans and specifications.

Task Expected Outcome:

Constructed project will provide water quality benefits including reductions in (LIST PARAMETERS FROM SHORT PROJECT DESCRIPTION).

Construction Deliverables

Number	Description	Due Date
5.1	Signed and dated construction contract. Upload to EAGL and notify ECOLOGY when upload is complete.	
5.2	Stormwater Construction Completion Form. Upload to EAGL and notify ECOLOGY when upload is complete.	

Task Number: 6

Task Cost:

Task Title: Project Close Out

Task Description:

The RECIPIENT shall ensure the following items are completed and provide the associated deliverables to ECOLOGY. The RECIPIENT must approve all materials prior to submitting them to ECOLOGY for acceptance.

- A. The RECIPIENT will operate and maintain the constructed facility for the design life of the facility. The RECIPIENT will develop and submit an Operations and Maintenance (O&M) plan for all facilities constructed with ECOLOGY funding to ECOLOGY for review. The O&M plan must address long-term activities to assure ongoing pollutant removal and flow-control capability of the project in accordance with the design manual. O&M plan development guidance is located in the Design Deliverables Document available on the ECOLOGY website. Allow 15 calendar days for ECOLOGY review.
- B. The RECIPIENT will calculate and submit a final equivalent new/re-development area for the completed retrofit project(s) using the methods outlined in the Design Deliverables Document.
- C. The RECIPIENT will submit the final GIS compatible project area in shapefile, geodatabase file, or ECOLOGY-approved equivalent. The project area should include polygon features for stormwater facilities and contributing areas.
- D. The RECIPIENT will submit the Recipient Closeout Report (RCOR) in EAGL in accordance

with Task 1.

- E. The RECIPIENT will submit the Two-page Outcome Summary Report using the ECOLOGY template in accordance to Task 1. Upload the Two-page Outcome Summary Report in the RCOR in EAGL.

Task Goal Statement:

The RECIPIENT will complete all close out submittals in a timely manner.

Task Expected Outcome:

* Timely and complete submittal of O&M plan, equivalent area calculation, GIS, Recipient Closeout Report, and Two-page Outcome Summary Report.

* Proper maintenance of the constructed facility to maintain water quality benefits.

Project Closeout Deliverables

Number	Description	Due Date
6.1	Facility Operation and Maintenance Plan. Upload to EAGL and notify ECOLOGY when upload is complete. Upload ECOLOGY acceptance documentation.	
6.2	Final, as constructed, equivalent new/redevelopment area determination. Upload to EAGL and notify ECOLOGY when upload is complete.	
6.3	Final, as constructed, project area shapefile, geodatabase file, or ECOLOGY-approved equivalent. Upload to EAGL and notify ECOLOGY when upload is complete. Upload ECOLOGY acceptance documentation.	

Stormwater Activity Projects

9.0 Enhanced Maintenance Plan

The Enhanced Maintenance Plan should include the following sections, as well as a cover page containing the title, jurisdiction, and date the plan was prepared/revised.

9.1 Introduction

Provide an overview of the plan and the context within your larger stormwater management program. Describe the increase in benefits you expect to achieve and goals you hope to meet.

9.2 Pre-Project (Baseline) Program

9.2.1 Area Prioritization and Program Implementation

Describe the method your jurisdiction is currently using to prioritize the maintenance activity you plan to improve (e.g. sweeping, vactoring, line jetting or other source control activities). In your description, please discuss:

- Geographic areas, urban catchments and outfalls.
- Frequency for each activity.
- Special events (community and/or weather) or spill response capability.
- Methods and tools used for tracking maintenance activities, curb miles, roads/routes, loading complaints, emergency response, etc.
- Where street waste, including decanted solids and liquids, are disposed of and managed
- Information on load testing for hazardous substances, including frequency, sampling methods, and testing protocols.
- The facilities and equipment that are used to implement the current program.
- Who currently implements each program element including any existing agreements or partnerships.

9.2.2 Evaluation and Adaptive Management

State the current program performance standards and goals. Describe how and how often you currently measure program performance.

9.2.3 Estimate of the Water Quality Benefits

Describe the methodology used to calculate the water quality benefits in the current program. Include total units of pollutants, sediment, other materials or benefits provided by the current program. If you do not have an existing methodology, develop an estimate using the best

available data.

Ecology does not currently have an approved state-wide method for calculating water quality benefits for source control activities. An online database of source contribution tools and methodologies for BMPs including source control BMPs has been compiled by the [California Stormwater Quality Association](#)¹². This database is not exhaustive and should not be construed as a specific recommendation for specific cases. For additional assistance in developing a method appropriate for your program contact your Ecology regional project manager.

9.2.4 Program Costs

Calculate the short and long-term costs of operating the current program. Include costs such labor, disposal, equipment storage, maintenance, and replacement, etc. Include a brief description of how the program is currently funded.

9.3 Proposed or Post Project Program

9.3.1 Area Prioritization and Program Implementation

Describe the specific changes that will be made to the baseline program. If any additional equipment or facilities will be required to implement the program, describe how you determined the size/type and number needed.

9.3.2 Evaluation and Adaptive Management

Describe any revised goals or performance measures. If the baseline program did not include standards and goals that relate to improvements in water quality, they must be included in the proposed program.

Discuss any alternatives considered and why they were not selected.

9.3.3 Estimate of the Water Quality Benefits

Calculate the water quality benefits of the proposed projects using the method described for the baseline condition and compare the pre-and post-project conditions.

Describe any proposed revisions to the methodology.

9.3.4 Program Costs

Calculate the short and long-term costs of operating the proposed program. Include costs such labor, disposal, equipment storage, maintenance, and replacement, etc.

¹² <https://www.casqa.org/resources/effectiveness-assessment/source-contribution-tools-methodologies/online-database>

Provide details on how the program will fund additional costs associated with the Enhanced Maintenance Plan including long-term costs such as equipment replacement.

10.0 Additional Information for Activities Infrastructure and Equipment

10.1 Decant Facilities

10.1.1 Minimum Requirements for a Decant Facility

If an Enhanced Maintenance Plan shows the recipient needs to construct a decant facility, and the Plan has been accepted by Ecology, Ecology will pay for the design and construction of such a facility. Decant facility design and/or construction must follow the scope of work template and deliverables guidance for stormwater facility design and construction, in addition to the following requirements:

- Include at least two bays. Covered bay recommended, but not required for Eastern Washington.
- Meet new/redevelopment criteria according to the Ecology Stormwater Management Manuals for Eastern or Western Washington, or accepted equivalent manual.
- Be authorized to discharge to either a sanitary sewer or other accepted treatment facility.
- Treatment methods other than sanitary sewer discharge can be discussed on a case-by-case basis.
- Include an oil/water separator downstream of the decant water collection area.
- Include safety lighting.
- Include shutoff valve to control hot load in the event of emergency spill.
- Provide adequate room for turning vehicles.
- Provide facilities for washing out the interior of vector tanks and sweeper storage bay.
- Include facilities for testing water and soils for hazardous materials.

10.1.2 Decant Facility Operations and Maintenance Plan (O&M) Requirements

- Before the decant facility becomes operational, Ecology must review and accept an Operations and Maintenance Plan. The plan must:
 - Describe how the flow line is clear and properly maintained.
 - Describe how all on-site stormwater BMPs are maintained and repaired.
 - Ensure to have discharge authorization or other permission to discharge to the sanitary sewer issued by the municipality's sewage treatment agency.

- Not limited to sanitary, but open to other options, such as on-site treatment and infiltration into ground. It is required to treat street waste liquids, refer to Appendix IV-B of SWMMWW.
- For an O&M manual template example, you can refer to [Appendix E of Regional Siting Study for the counties of Snohomish, King, Pierce, and Thurston](#)¹³.

10.2 Sweepers and Vector Equipment

10.2.1 Sweeper Trucks

- Regenerative Air Sweeper or vacuum sweeper as manufactured by Elgin, Tennant, Peterbilt, International, or Schwarze, or approved equivalent.
- Contains standard equipment for operation, operator comfort, and monitoring of sweeping activities.

10.2.2 Vector Trucks

- Vacuum trucks for cleaning catch basins and piping as manufactured by Peterbilt, International, Freightliner, Kenworth, or approved equivalent.
- Contains standard equipment for operation, operator comfort, and catch basin and pipe cleaning operations.

10.2.3 Sweeper/Vector Truck Operations and Maintenance Plan (O&M)

The Operations & Maintenance Plan should include the following elements:

- Training:
 - How staff will be trained to operate equipment.
- Operating procedures:
 - Start-up.
 - Load dumping.
 - Wash out.
- Equipment inspection:
 - Inspection schedule.
 - Inspection tasks.
 - Parties responsible for inspection.
- Equipment maintenance:
 - Maintenance schedule.

¹³ <http://www.wastormwatercenter.org/decant/>

- Maintenance tasks.
- Parties responsible for maintenance.
- Budget:
 - Estimated costs for regular maintenance tasks, materials, and supplies.
 - Funding source for operations and maintenance.

10.2.4 Equipment Purchase, Rental, or Use Rate Reimbursement

If the Ecology-accepted Enhanced Maintenance Plan shows the recipient needs additional equipment, Ecology will pay for the purchase, rental, or contracted use of a high efficiency street sweeper, vactor truck, or both, when the recipient meets the following criteria:

- Recipient has an Ecology-accepted Enhanced Maintenance Plan.
- Recipient has an Ecology-accepted equipment Operations and Maintenance Plan.
- Recipient has documented a current contract for proper disposal of sweeping/cleaning waste.
- Recipient may purchase equipment according to the agreement and funding program guidelines. When cost effective and feasible, the recipient should consider renting versus purchasing.
- Recipient must submit documentation to verify they possess the equipment before requesting reimbursement.
- If the recipient will rent or contract for services, or seek reimbursement for sweeping costs, they must include a breakdown of the use rate. The use rate can include all components related to the total cost of operating the equipment. Costs associated with labor, testing and disposal of solids and effluent are eligible.
- Recipient must report miles swept and tons of debris collected quarterly and cumulatively for the remainder of the agreement.