CHAPTER 2

Stormwater Planning and Design Integration

Chapter 2 Contents

Chapter 2 Stormwater Planning and Design Integration

2-1 Introduction

This chapter provides guidelines for integrating the planning and design of stormwater-related project elements into the context of the Washington State Department of Transportation (WSDOT) project development process. How the process applies to a specific project depends on the type, size, and complexity of the project and individual WSDOT regional business practices.

2-1.1 Development Team

Assessment and documentation of stormwater impacts and mitigation measures begin during project scoping. The PEO team must involve appropriate participants as part of the scoping process. Project type, size, and complexity factor in determining who to consult during the development of the project's stormwater strategy. Contact the Region Hydraulics Engineer to determine the makeup of the development team. Normally, team members include Region Hydraulics, Region Environmental, Region Materials Engineer, Region Maintenance, and the project office. The PEO may need to expand the list to include region or Headquarters (HQ) geotechnical engineers, the HQ Hydraulics Section, or others, depending on the project.

2-1.2 Site Assessment

Stormwater facility design is a major element for many projects. It requires significant advanced data gathering and assessment to identify alternatives and develop accurate schedules and cost estimates. Data needed to assess the project site aids in:

1. Determining project roadway alignment alternatives.
2. Assessing impacts the project will have on runoff and the local hydrology.
3. Determining minimum stormwater requirements.
4. Developing conceptual stormwater management alternatives.

Characterizing the site and adjacent areas allows the PEO to determine the limiting factors controlling local hydrology. These limiting factors then become the focus of the PEO's stormwater management strategies.

A three-dimensional picture of site hydrology will emerge during the site assessment. This picture will include natural and altered flow paths to the site from upstream areas and from the site to downstream areas. The PEO must preserve natural drainage (see Minimum Requirement 4, Section 3-3.4). The PEO must identify all off-site flows coming to the site, including streams, seeps, and stormwater discharges. The transportation facility must allow for passage of all off-site flows; however, every effort should be made to keep off-site flows separate (via bypass) from the highway runoff. The PEO should accommodate constructed off-site flows with WSDOT utility permits that discharge to WSDOT's stormwater systems.

Ensure runoff from WSDOT right of way does not adversely affect downstream receiving waters and properties. Identify existing drainage impacts on downstream waters and properties during scoping and correct those impacts as a part of the project. Identify drainage impacts using multiple sources of information (see Section 2-1.2.1) and site visits during storms, if possible. Section 4-7 in the *Hydraulics Manual* provides guidelines on performing and documenting a downstream analysis. Use the preliminary downstream analysis for scoping purposes, recognizing that the project design phase may require a more detailed analysis. Include the final downstream analysis in the Hydraulic Report.

During the scoping phase, begin identifying natural areas for conservation within or adjacent to the project boundary. Conserving these areas minimizes project impacts and, given the appropriate site conditions, may serve as part of the project's stormwater management approach for dispersion and infiltration. (See Chapters 4 and 5 for information regarding dispersion and infiltration.)

Conservation areas and their functions require permanent protection under conservation easements or other locally acceptable means. Label conservation areas falling within the right of way on the right of way plan. Obtain a conservation easement or similar real estate protection instrument for conservation areas falling outside the right of way.

2-1.2.1 Information Sources

As a starting point, the PEO will need the following existing information for site assessments:

- Project vicinity and site maps
- Land cover types and areas (aerial photographs)
- Topography (USGS quadrangle maps, LIDAR, and other survey maps)
- Land surveys
- Watershed or drainage basin boundaries
- Drainage patterns and drainage areas
- Receiving waters
- Wetlands
- Stream flow data
- Stormwater conveyances (pipes and ditches and open-channel drainage)
- Floodplain delineations
- Utility types and locations
- Total maximum daily loads (TMDLs)
- Clean Water Act Section 303(d)-listed impaired waters
-
- Soil types, depth, and slope (Natural Resources Conservation Service soil surveys)

- Soil infiltration rates (see Section 2-1.2.2)
- Vegetation surveys
- Stormwater discharge points, including outfalls and connections to and from other storm sewer systems
- Stormwater features inventory in GIS to find WSDOT drainage information
- Use the Highway Activity Tracking System (HATS) and Stormwater BMP Specifications (SWABS) web application to find information on existing stormwater BMPs
- Land use types and associated pollutants
- Adjacent development and stormwater facilities – in particular, any nearby infiltration facilities
- Groundwater data (including depth to seasonal high water table)
- Presence of hazardous materials or wastes
- Presence of cultural resources
- Average daily traffic (ADT)
- Roadway geometry (profiles/superelevations)
- Geotechnical evaluation (see Section 2-1.2.2)

Use WSDOT's *GIS Workbench* (an ArcView geographic information system tool) to access detailed site, environmental, and natural resource management data as well as generate maps to help with the project assessment, the selection of stormwater management alternatives, and the determination of maintenance applications.

2-1.2.2 Geotechnical Evaluations

Understanding the soils, geology, geologic hazards, and groundwater conditions at the project site is essential to optimizing the project's stormwater design. Contact the Region Materials Engineer (RME) and staff from the HQ Geotechnical Office as early as possible in the scoping phase for inclusion on the scoping and design team.

Dispersion and Infiltration are the preferred methods for the management of stormwater runoff. Chapters 4 and 5 provide direction on how to apply optimal infiltration for stormwater management on transportation projects. However, the PEO needs to assess the extent to which infiltration can be used during the scoping phase because of its direct impact on stormwater alternatives and costs. The degree to which runoff can infiltrate depends on the project location and context. Limiting factors include soil characteristics, depth to groundwater, and designated aquifer protection areas.

The RME evaluates the geotechnical feasibility of stormwater facilities that may be needed for the project. With assistance from the HQ Geotechnical Engineer, as needed, the RME gathers all available geotechnical data pertinent to the assessment of the geotechnical feasibility of the proposed stormwater facilities. Some subsurface exploration may be required at this stage,

depending on the adequacy of the geotechnical data available to assess feasibility. Refer to the *Design Manual,* Section 610.04, for additional details.

The scoping office develops the stormwater facility conceptual design using input from the RME and the HQ Geotechnical Engineer. Based on this design and investigative effort, fatal flaws in the proposed stormwater plan are identified as well as potential design and construction problems that could affect project costs or the project schedule. Consider the following critical issues:

- Depth to water table (including any seasonal variations)
- Presence of soft or otherwise unstable soils
- Presence in soils of shallow bedrock or boulders that could adversely affect constructability
- Presence of existing adjacent facilities that could be adversely affected by construction of the stormwater facilities
- Presence of existing or planned underground utilities that could provide preferential flow paths for infiltrated water
- Presence of geologic hazards such as earthquake faults, abandoned mines, landslides, steep slopes, or rockfall
- Adequacy of drainage gradient to ensure functionality of the system
- Potential effects of the proposed facilities on future corridor needs
- Maintainability of the proposed facilities
- Potential impacts on adjacent wetlands and other environmentally sensitive areas
- Presence of hazardous materials/contaminated soils and/or groundwater in the area
- Whether or not the proposed stormwater plan will meet the requirements of resource agencies
- Infiltration capacity (infiltration and percolation rates for project sites)
- Presence of and potential impacts to floodplains

To characterize the seasonal variation of the groundwater table, the PEO may need to install piezometers at potential infiltration sites during scoping. One year of monitoring is desirable. At a minimum, one full rainy season is necessary to acquire the data needed to make a determination of site suitability. (See Section 4-5 for additional information.)

2-1.2.3 Right of Way

Once the stormwater requirements for the project are understood, the general hydrologic site characteristics are known (including approximate groundwater table elevations), and the stormwater design alternatives are determined, the PEO can estimate the area necessary for stormwater facilities. Refer to Chapters 4 and 5 to estimate the required area for each facility. Examine the proposed layout of the project, and determine the most suitable sites available to

locate the stormwater facilities. Determine where facilities are proposed outside existing right of way and establish estimates for right of way acquisition areas and costs.

2-1.2.4 Utilities

The project design office must contact the Region Utilities Office to obtain information about whether existing utilities have franchises or easements within the project limits.[1] Whenever proposed stormwater facilities conflict with an existing utility's right of way and facilities, a utility agreement is required. WSDOT may be responsible for the relocation costs, the utility owner may be responsible for the costs, or the costs may be shared. Refer to the *Utilities Manual* for further information about utility elements.

2-1.3 Documentation

For a general list of documents required to be preserved in the Design Documentation Package and the Project File, see the Design Documentation Checklist at:
www.wsdot.wa.gov/design/projectdev/

2-1.3.1 Stormwater Scoping Package for Stand-Alone Stormwater Retrofit Projects

The *stormwater scoping package* refers to the stormwater documentation developed during the scoping phase of project development. This package contains the information used to preliminarily determine project stormwater impacts and the initial selection of stormwater BMPs. It provides the stormwater information needed to complete the Project Summary documents.

The stormwater scoping package plays a critical role in project development and must be retained and easily retrievable. Upon project programming and assignment to a project office, the file and report become the starting point for the design phase. Refer to the stormwater scoping instructions on the HRM webpage at:
www.wsdot.wa.gov/Design/Hydraulics/HighwayRunoffManual.htm

2-1.3.2 Project Summary

As described in Section 2-3, the product of scoping is the *Project Summary*. The Project Summary is developed and approved before funding the project for design and construction. It documents the results of the scoping process and defines the overall scope of the proposed solution in terms of the work and material involved. This documentation also links the project to the *Washington State Highway System Plan* and the *Capital Improvement and Preservation Program* (CIPP).

[1] Underground utilities are often embedded in sand or gravel to protect them from native soils and rocks. These treatments can also act as French drains and provide preferential flow paths for water infiltrated on site. The project may need to install check dams or impermeable liners around these utility trenches to prevent this.

2-1.3.3 Environmental Documentation

Environmental documentation begins after the approval of the Project Summary. The State Environmental Policy Act (SEPA) and National Environmental Policy Act (NEPA) require thorough documentation of stormwater-related environmental impacts and tracking of stormwater design commitments. To aid in the accurate exchange of stormwater-related information from the design team to workgroups preparing environmental documentation and permit applications, the PEO must prepare a *Stormwater Design NEPA/SEPA Documentation Checklist* and accompanying *Stormwater Design Documentation Spreadsheet*. Access the Checklist and Spreadsheet separately at:
www.wsdot.wa.gov/Design/Hydraulics/HighwayRunoffManual.htm

Projects with a federal nexus (those with federal funding, permit, or approval) must go through consultation according to Section 7 of the federal Endangered Species Act (ESA). The *ESA Stormwater Design Checklist,* which differs for eastern and western Washington, assists in providing pertinent information about a project's stormwater treatment facilities to biologists responsible for preparing biological assessments required for consultation under Section 7 of the Endangered Species Act. Access both versions of the Checklist at:
www.wsdot.wa.gov/environment/technical/fish-wildlife/policies-and-procedures/esa-ba/preparation-manual#BA template

PEOs are responsible for any stormwater related environmental commitments made during the SEPA/NEPA process including those made in responses to comments in the Environmental Impact Statement (EIS) and Environmental Assessment (EA). These stormwater commitments are in addition to the HRM minimum requirements. When commitments for stormwater treatment are made during the environmental process, those commitments must be tracked in the WSDOT Commitment Tracking Database and complied with. If a stormwater related environmental commitment from the SEPA/NEPA process conflicts with the HRM minimum requirements, the PEO needs to work with the Region Hydraulics Engineer to ensure the necessary HRM Minimum Requirements are met. A stormwater deviation must be submitted to the DAT and needs approval before any stormwater related environmental commitment is implemented that may result in less protection than the HRM's Minimum Requirements.

2-1.3.4 Hydraulic Report

The Hydraulic Report serves as a complete record containing the engineering justification for all drainage modifications that occur as a result of project construction, including documentation of the analysis and design for the post-construction stormwater management system. Refer to the *Hydraulics Manual* for additional details.

2-1.3.5 Construction Planning

During the design phase, the PEO must produce key stormwater documents to meet stormwater site planning requirements associated with Minimum Requirement 1 (see Section 3-3-1).

- All projects require spill prevention, control, and countermeasures (SPCC) plans prepared by the contractor after award of the project contract. The WSDOT Hazardous Materials Program (www.wsdot.wa.gov/environment/technical/disciplines/hazardous-materials) and Section 1 07.15(1) in the *Standard Specifications for Road, Bridge, and Municipal Construction (Standard Specifications)* provide more information regarding SPCC plan expectations. To ensure plan implementation, develop provisions of the SPCC plan during the PS&E phase (see Section 2-1.3.7).
- For soil-disturbing projects, the PEO must also prepare temporary erosion and sediment control (TESC) plans (see the *Temporary Erosion and Sediment Control Manual*).

2-1.3.6 Contract Plan Sheets

Identify all stormwater best management practices (BMPs) using names and numbers found in Chapter 5, as well as conservation areas and other drainage and environmental elements on the contract plan sheet. Division 4 of the *Plans Preparation Manual* defines the development of the contract plan sheets.

2-1.3.7 Plans, Specifications, and Estimates (PS&E)

Prepare the Plans, Specifications, and Estimates during the PS&E phase of a project. These documents translate the stormwater management elements of the design into a contract document format for project advertisement, bidding, award, and construction.

2-1.3.8 Underground Injection Control Wells

Drywells and infiltration trenches containing perforated pipe are considered injection wells and require registration per the Washington State Department of Ecology's (Ecology's) Underground Injection Control (UIC) Program. Registration information is available at: https://fortress.wa.gov/ecy/publications/summarypages/ecy04047a.html. Fill out the registration form and submit to WSDOT's Stormwater Features Inventory Coordinator for registration with Ecology and entry into WSDOT's UIC Registration and Assessment database.

For further guidelines, see Section 4-5.4 and consult region environmental staff or HQ Environmental Services Office staff.

2-2 Developer Projects

WSDOT must provide for the passage of existing off-site flows through its right of way to maintain natural drainage paths. Private developer projects that discharge to a WSDOT right of way or storm sewer system must comply with the provisions of the *Highway Runoff Manual* (HRM), Ecology stormwater management manuals, or an Ecology-approved local equivalent manual. The developer must also demonstrate that WSDOT conveyance systems have adequate capacity to convey the developer's flows in accordance with *Hydraulics Manual* conveyance design standards. WSDOT will not concur with designs or allow discharges that do not comply with these requirements.

For details regarding WSDOT requirements and the process for review and concurrence of private project drainage design, refer to the *Development Services Manual* and the *Utilities Manual*.

2-3 Stormwater Facility Design Approach

Originally, the only function of highway stormwater management was to maintain safe driving conditions using engineering techniques designed to prevent stormwater from ponding on road surfaces. While maintaining safe driving conditions remains an essential function of the highway drainage system, it is in the state's vital interest to protect and preserve natural resources and other environmental assets, as well as its citizens' health and safety. These interests have become integrated with other vital interests entrusted to the department, including the cost-effective delivery and operation of transportation systems and services that meet public needs. Thus, stormwater management objectives for WSDOT involve: (1) protecting the functions of the transportation facility, and (2) protecting ecosystem functions and the beneficial uses of receiving waters.

2-3.1 Context Sensitive Solutions

The PEO must recognize the importance of the watershed context where the project resides to understand how transportation facilities, in combination with other development, can affect the natural hydrology of watersheds and the water quality of receiving waters. This understanding can guide the planner and designer in choosing stormwater management solutions that more successfully achieve the objective of protecting Washington's ecosystems.

The context sensitive solutions (CSS) approach to transportation planning, also known as *context sensitive design, context sensitive sustainable solutions*, and *thinking beyond the pavement*, broadens the focus of the project development process to look beyond the basic transportation issues and develop projects integrated with the unique context(s) of the project setting. This approach considers the elements of mobility, safety, environment, community, and aesthetics from the beginning to the end of the project development process. CSS also involves a collaborative project development process that obligates participants to understand the impacts and trade-offs associated with project decisions. Find further discussion of and guidance on the context sensitive solutions approach at:
www.wsdot.wa.gov/design/policy/csdesign.htm

2-3.2 Stormwater Facility Design Strategy

Stormwater management facilities (runoff treatment and flow control) can mitigate both the hydrologic impacts and the water quality impacts of a development project by applying the following fundamental strategy:

Maintain the preproject[2] hydrologic and water quality functions of the project site as it undergoes development.

Implement this strategy through the following hierarchy of steps:

1. Avoid impacts on hydrology and water quality.
2. Minimize impacts on hydrology and water quality.
3. Compensate for altered hydrology and water quality by mimicking natural processes to the extent feasible.
4. Compensate for any remaining hydrology and water quality alterations using end-of-pipe solutions.

Achieve *Steps 1*, *2*, *3*, and *4* by minimizing impervious cover; conserving or restoring natural areas; mimicking natural drainage patterns (for example, using sheet flow, dispersion, infiltration, or open channels); disconnecting drainage structures to avoid concentrating runoff; and using many small redundant facilities to treat, detain, and infiltrate stormwater. This approach to site design reduces reliance on the use of structural management techniques. *Step 4* refers to the use of traditional engineering structural approaches (for example, detention ponds) to the extent that *Steps 1* through *4* cannot fully accomplish the strategy.

The methods listed for achieving *Steps 1* through *4* are commonly referred to as low-impact development (LID) approaches. By using the project site's terrain, vegetation, and soil features to promote infiltration, the landscape can retain more of its natural hydrologic function. Low-impact development methods will not be feasible in all project settings, depending on the site's physical characteristics, the adjacent development, and the availability and cost of acquiring right of way (if needed). However, the PEO must always use LID methods to the extent feasible. This requires that the PEO understand the site's soil characteristics, infiltration rates, water tables, native vegetation, natural drainage patterns, and other site features. (See Section 4-5 for LID feasibility criteria.)

2-3.3 BMP Design and Project Timing

Stormwater mitigation to meet the project's HRM Minimum Requirements must be constructed and operational by the project's construction close-out. Corridor projects that have multiple stages or phases must provide stormwater mitigation to meet each stage or phase's HRM Minimum Requirements before each stage or phase's construction close-out. An HRM deviation and approval by the Demonstrative Approach Team (DAT - which includes an Ecology representative) is required when the project, stage, or phase cannot provide stormwater mitigation by construction close-out to meet the HRM Minimum Requirements. For design-bid-build projects, DAT approvals must be approved before the hydraulic report is approved. This is generally before the start of the PS&E phase. For design-build projects, HRM deviations are typically identified and approved by the DAT during the Request for Proposal (RFP) development.

[2] The term *preproject* refers to the actual conditions of the project site before the project is built.

Projects may provide stormwater mitigation for future projects only when those future projects are to be advertised for construction within the same NPDES Municipal Stormwater permit cycle (5-year permit cycle). This will minimize any stormwater and hydraulic design rework since stormwater regulations could change during subsequent NPDES Municipal Stormwater permit cycles. The Project Engineering Office (PEO) should consult the Region Hydraulics Engineer if the stormwater mitigation for a future project may have an AD date outside of the current NPDES Municipal Stormwater permit cycle.

2-4 Special Design Considerations

2-4.1 Critical and Sensitive Areas

State law requires local jurisdictions to adopt ordinances to protect critical areas. Critical areas include wetlands, floodplains, aquifer recharge areas, geologically hazardous areas, and those areas necessary for fish and wildlife conservation.

2-4.1.1 Wetlands

Minimum Requirement 7 (see Section 3-3.7) addresses wetland protection. While natural wetlands generally cannot substitute for runoff treatment, Ecology's *Stormwater Management Manual for Eastern Washington* (SWMMEW) allows the use of lower-quality wetlands for runoff treatment if hydrologic modification requirements are met. For detailed guidance on this for eastern Washington projects, refer to *Use of Existing Wetlands to Provide Runoff Treatment* (Section 2.2.5, page 2-26) and *Application to Wetlands and Lakes* (Section 2.2.6, page 2-33) in Ecology's SWMMEW and the *Eastern Washington Wetland Rating Form* at:
www.wsdot.wa.gov/environment/technical/disciplines/wetlands/policies-procedures/recon-assess#RatingForm

For western Washington projects that may potentially alter the wetland hydroperiod, refer to Guide Sheet 3B in Appendix I-D of Ecology's *Stormwater Management Manual for Western Washington* (SWMMWW) to review the recommended allowable limits for altering the hydroperiod of wetlands. Section 4-6 provides additional information on wetland hydroperiods.

Region or Headquarters hydraulics and environmental staff can provide further assistance on hydroperiod modeling. For guidelines on wetland creation or restoration as mitigation for direct wetland impacts, contact the region's wetland biologist or consult the following website:
www.wsdot.wa.gov/environment/technical/disciplines/wetlands

2-4.1.2 Floodplains

Loss of hydrologic storage may require projects to mitigate the loss by creating new hydrologic storage elsewhere in the watershed. A decision to locate structural detention facilities in floodplains depends on the flow control benefits realized. If a detention facility placement allows it to function through the 10-year flood elevation, it will accomplish most of its function by controlling peaks during smaller, more frequent events that cumulatively cause more damage. Stormwater facilities located outside the 2-year, 10-year, and 25-year flood elevations do not compromise any flood storage during those floods. Some stormwater treatment

facilities, such as filter strips, dispersion areas, or biofiltration swales, may be located within some parts of the floodplain. Contact the Region Hydraulics Office or HQ Hydraulics Section for guidance. Consult the Region Hydraulics Office to identify alternative mitigation opportunities if locating stormwater facilities outside the 100-year floodplain presents a challenge.

2-4.1.3 Aquifers and Wellhead Protection Areas

To ensure highway improvement projects protect drinking water wells, WSDOT has entered into an agreement (www.wsdot.wa.gov/publications/manuals/fulltext/m31-11/agreements/ia_drinkingwell.pdf) with the State Department of Health (DOH). This agreement includes the following screening criteria under which DOH **does not** consider a highway project a potential source of contamination to drinking water wells:

1. Road location and construction setbacks are maintained such that the drinking water source intake structure is not in danger of physical damage.
2. All concentrated flows of untreated roadway runoff are directed via impervious channel or pipe and discharged outside the *Sanitary Control Area* (SCA).
3. If roadside vegetation management practices are identified as a potential source of contamination, the water purveyor will provide the location of the SCA to the appropriate WSDOT Maintenance Office for inclusion in the *Integrated Vegetated Management Plan* for that section of highway as necessary to protect the wellhead.
4. WSDOT complies with all National Pollutant Discharge Elimination System permits, as required per Section 402 of the federal *Water Pollution Control Act*.
5. WSDOT provides the well purveyor with contact information to be used in the event of any problems or questions that may arise.

The PEO must gather and document information on all drinking water wells along the project corridor. Refer to the local critical areas ordinances for details on aquifer and wellhead protection areas applicable to the project site. To locate wells in the project site, check Ecology's website for listed well logs: apps.ecy.wa.gov/welllog/. This website contains a database of wells constructed and registered since the 1930s and wells managed by Ecology since 1971. The WSDOT *GIS Workbench* can also provide a preliminary assessment of wellhead and aquifer protection areas in the vicinity of a given project. After conducting these queries, follow up with field investigations to identify whether any unregistered wells exist.[3] Contact region environmental staff early in the project design phase when wells exist within the radius of concern.

County health departments set well protection buffers or sanitary control areas (SCAs), presuming that the well protection buffer width will adequately protect wells from contamination. When highway projects encroach into well SCAs, document how the project will avoid impacting the well and water supply.

[3] Area maintenance personnel are good sources of local knowledge. Check with them first before beginning field investigations.

If a road project expects to intersect a public water supply well's SCA, contact the water purveyor to confirm the location of the well and its SCA. If the project intersects the SCA, a licensed professional engineer, using the screening criteria listed above, needs to establish the conditions under which a highway project **will not** create potential sources of contamination to drinking water wells. Then, the engineer needs to attest to the well purveyor in writing, on WSDOT letterhead, that the project satisfies the screening criteria's conditions. Having met the conditions, WSDOT expects that the purveyor will identify and sign SCA-restrictive covenants and/or WSDOT will check for such covenants filed with the County Auditor's Office.

If an irresolvable dispute arises with the water purveyor regarding the project's potential impacts to a well, elevate the issue to HQ Environmental Services Office (ESO) Stormwater and Watersheds Program staff. Likewise, contact HQ ESO Stormwater and Watersheds Program staff to evaluate mitigation options if the project cannot meet the screening criteria.

Projects that include large cuts or compaction of soil over shallow aquifers could potentially intercept groundwater flows and restrict the quantity of water reaching a well. The State Department of Health agreement does not cover groundwater quantity issues. Thus, analyses of potential groundwater quantity impacts must be conducted in consultation with the HQ Materials Laboratory and the HQ Hydraulics Section.

2-4.1.4 Streams and Riparian Areas

Avoid encroachment into riparian areas. Place stormwater facilities away from the stream to the extent practicable, and take measures to preserve or enhance riparian buffers.

2-4.2 303(d)- Listed Water Bodies and Approved TMDL Boundaries

If a water body reach does not meet water quality standards for a specific pollutant, it gets added to the 303(d) list. The Department of Ecology is required to develop a Total Maximum Daily Load (TMDL) for water bodies on the 303(d) list to remedy the water quality impairment.

If the project's stormwater will discharge to any 303(d)- listed water body or to a water body within an approved TMDL-boundary, where feasible, select BMPs that: (1) reduce the pollutant(s) of concern, and (2) avoid generating the pollutant(s) of concern to the listed water body. The first page of each BMP section in Chapter 5 includes TMDL/303(d) considerations to aid in BMP selection when discharging to an impaired water body. As a general rule, infiltration and dispersion BMPs are the most desirable approach for 303(d) or TMDL situations.

To determine whether a 303(d)-listed water body or approved TMDL exists within or near the proposed project site, access WSDOT's GIS Environmental Workbench>Water Quality> "303(d) Impaired Waters and TMDLs" dataset. View each layer in the dataset independently to identify listings and boundaries that may overlap. Since 303(d) listings and approved TMDLs change frequently, review these GIS layers at the start of each project to document all applicable impairments. The Department of Ecology's Water Quality Atlas has the most up to date impairment information but it does not include helpful details such as milepost information.

For more information on TMDLs or 303(d) listings, contact the Stormwater and Watersheds Program in the HQ Environmental Services Office (ESO), or access the WSDOT TMDL webpage

(www.wsdot.wa.gov/environment/technical/disciplines/water-erosion/reports-research), or visit Ecology's website (www.ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Total-Maximum-Daily-Load-process). (Ecology's Water Quality Atlas (open in MS Edge) https://fortress.wa.gov/ecy/waterqualityatlas/StartPage.aspx)

2-4.3 Airports

The design of stormwater facilities for projects located near airports requires special considerations. Roadside stormwater features, including BMPs with standing water (such as wet ponds) and certain types of vegetation, can attract birds both directly and indirectly. The presence of large numbers of birds near airports can create hazards for aircraft and airport operations.

To decrease wildlife-aircraft interactions caused by stormwater facilities, the Federal Aviation Administration (FAA) and WSDOT partnered to create the *Aviation Stormwater Design Manual* (ASDM) to assist in the design, construction, and maintenance of stormwater facilities on and near airports. The ASDM focuses on design modifications to decrease the attractiveness of stormwater facilities to wildlife rather than active wildlife removal measures. Thus, the ASDM supplements the HRM by providing design details for the types of stormwater facilities recommended for an airport environment.

2-4.4 Bridges

The over-water portion of the bridge surface does not trigger Minimum Requirement 6 (flow control requirement), since that area intercepts rainfall that would otherwise fall directly into the receiving water body. However, the design must prevent runoff from generating localized erosion between the bridge surface and the outfall to the water body. While this simplifies the need for flow control, the over-water bridge surface is still considered a pollution-generating impervious surface and is therefore subject to runoff treatment for pollutant removal. (See the HRM Frequently Asked Questions for more information.)

Finding sufficient area to site stormwater treatment solutions for over-water crossings often presents challenges. Traditionally, bridges were designed to discharge runoff directly into the receiving waters by way of downspouts or scuppers. Today's prohibition of this practice requires that the designer incorporate runoff collection, conveyance, and treatment facilities into the project design for these surfaces.

Avoid using suspended pipe systems to convey bridge runoff whenever possible, since these systems tend to plug with debris, making maintenance difficult. The preferred method of conveyance involves directing the runoff to larger inlets at the ends of the bridge. This method requires adequate shoulder width to accommodate flows so they do not spread farther into the traveled way than allowed (see Chapter 5 of the *Hydraulics Manual* for allowable spread widths). For situations requiring closed systems, use larger bridge drain openings and pipe diameters as well as avoid 90° bends to ensure the system's operational integrity. The consideration of closed systems requires early coordination with the HQ Bridge and Structures Office as well as the HQ Hydraulics Section.

2-4.5 Ferry Terminals

A ferry dock consists of the bridge (trestle and span), piers, and some of the holding area (parking facility). The terminal consists of the dock and all associated upland facilities. Requirements and consideration for the terminal's upland facilities resemble those for park and ride lots, rest areas, and maintenance yards as described in Section 2-4.6. Requirements and considerations that apply to bridges also apply to the trestle, span, and other over-water portions (see Section 2-4.4).

2-4.6 Maintenance Yards, Park and Ride Lots, and Rest Areas

Consult the Ecology stormwater management manuals for western (SWMMWW) and eastern (SWMMEW) Washington for BMP design approaches pertaining to maintenance yards, park and ride lots, and rest areas. These manuals provide more specific stormwater BMP information related to parking lot and industrial settings. The PEO must use LID BMPs where feasible for these facilities. (See Section 5-3.5 for more information.)

2-4.7 Watershed and Basin Plans

Contact entities with basin planning responsibilities as early as possible in the project planning process. Such groups include *lead entities* under the Salmon Recovery Act and *watershed planning units* under the Watershed Planning Act, as well as city and county public works departments responsible for basin planning. Shared funding opportunities may exist for local priority mitigation projects, which could significantly reduce project mitigation costs. Also, such entities may have data and analyses useful in the project planning process.

- For information on activities under the Watershed Planning Act, including a map of Washington's water resource inventory areas, see:
  www.ecy.wa.gov/watershed/index.html
- For information on activities under the Salmon Recovery Act, see:
  http://wdfw.wa.gov/fishing/salmon/chum/pugetsound/recovery.html
- For watershed data, reports, and other related information, see:
  www.ecology.wa.gov/Water-Shorelines/Water-supply/Water-availability/Watershed-look-up

Contact the Region Environmental Office or the HQ ESO Stormwater and Watersheds Program to arrange meetings and help coordinate watershed-related efforts.