



CITY OF PORTLAND ENVIRONMENTAL SERVICES



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2020 Stormwater Management Manual

Summary of changes: December 14, 2020

The 2020 *Stormwater Management Manual* (SWMM) is in effect starting December 14, 2020. The SWMM enables the City of Portland to comply with regulatory requirements and protect both watershed resources and infrastructure investments with every development or improvement to achieve important citywide goals.

The SWMM applies to development activities that construct or alter impervious area or that impact drainageways. It applies to some paving projects in the right-of-way and any parcel-based development on properties.

The primary goals of this update are to:

- Improve clarity
- Continue to comply with regulations
- Increase technical rigor and facility performance

SWMM Version Applicability:

The 2020 SWMM adoption date for the version applicability is December 14, 2020.

- Land use reviews will be conducted under the manual in place at the time of application submittal, provided the application is complete when first submitted or within 180 days of submittal.
- Building permits will be reviewed based on the permit "in date."
- Public Works Projects will be reviewed based on the date the Concept Development Submittal is accepted for review.
- CIP/IA projects will be reviewed based on 60% plan submittal date.

Acronyms

ADA	Americans with Disabilities Act
CIP	Capital Improvement Program
MS4	Municipal Separate Storm Sewer System
MSTT	Manufactured Stormwater Treatment Technology
PAC	Presumptive Approach Calculator
PBOT	Portland Bureau of Transportation
PWP	Public Works Permitting
ROW	Right-of-Way
SCM	Source Control Manual
SIM	Simplified Design Approach

Overall

The manual is rearranged into a new chapter structure: content from Chapter 2 of the 2016 manual is now distributed to Chapters 2 through 6 in the 2020 manual, and Chapter 3 of the 2016 manual (Operations and Maintenance) is folded into the new Chapters 3 (Private Property Facilities), 4 (Right-of-Way Facilities) and 5 (Drainage Reserves) in the 2020 manual.

Chapter 1: Requirements and Policies

Chapter 1 contains the requirements and policies for the SWMM. The topics covered in Chapter 1 have not changed substantially between the 2016 SWMM and this version. Other changes to this chapter are described below.

1.2 Applicability

1.2.1: Development Activities

Sidewalk, ADA and Safety Projects

What: Removed the exemption for sidewalk, ADA and safety-only projects.

Why: To remove confusion around stormwater applicability and better align with regulatory requirements.

Who will this impact: Some projects in the ROW and on private property will now trigger stormwater requirements when they were previously exempt (primarily sidewalk infill and larger ADA retrofit projects). Many of these projects will now be exempt under the new definition of pavement maintenance. Minor Improvement Permits will not be reviewed for applicability.

Pavement Restoration Exemptions for Public and Private Rights-of-way

What: Consolidated pavement restoration exemptions for public and private rights-of-way. Included additional exemptions for utility service connections that cross the road centerline and for sawcuts associated with curb replacement.

Why: To simplify exemptions and provide consistency across different activities in the right-of-way.

Who will this impact: Which right-of-way projects that require stormwater management will change.

Pavement Maintenance

What: Changed the definition of pavement maintenance to allow the exposure of underlying gravel.

Why: To allow maintenance of concrete and maintain alignment with environmental permit requirements.

Who will this impact: More pavement maintenance activities will be possible without triggering SWMM requirements.

Projects in the Right-of-Way with an Existing Curb

What: The existence of a curb will no longer be used as a factor to determine whether stormwater improvements in the ROW must be constructed.

Why: To improve equity, better align with environmental permit requirements, and ensure all requirements are written in the SWMM.

Who will this impact: Projects in the ROW where there is an existing curb will now be required to provide stormwater management according to the same applicability criteria that apply to all other aspects of a project (e.g. new or replaced pavement).

Vertical Construction

What: SWMM applicability related to vertical building expansion is being narrowed so that vertical additions within an existing building footprint (e.g., adding penthouse units or new stories) with a footprint area of less than 10,000 sf are now exempt.

Why: To improve implementation and clarify when vertical construction projects are exempt from SWMM requirements.

Who will this impact: More projects will be able to add a dormer or a partial new story without triggering SWMM requirements. Large projects that are increasing square footage of building space significantly will still trigger stormwater management requirements.

1.2.2: New Connections or Routes of Conveyance

What: Specified that this trigger applies to catchments that are 500 sf or greater.

Why: To set a specific threshold for applicability.

1.2.3: Landscape Nonconforming Upgrades

What: Specifying that this trigger applies to catchments that are 500 sf or greater. Changed the title of this section to better align with zoning code language.

Why: To set a specific threshold for applicability and improve clarity.

1.2.4: Stormwater Retrofits

What: Clarified applicability of the SWMM to stormwater retrofit projects by defining three types of retrofits: City-required retrofits, state or federal agency required retrofits, or owner-initiated retrofits.

Why: To align retrofit types and drivers with applicability of SWMM requirements. City required retrofits must comply with the full SWMM requirements, retrofits required by other agencies only need to meet the SWMM's site evaluation and O&M requirements, and owner-initiated retrofits are not required to meet SWMM requirements.

Who will this impact: Sites that install retrofits to include new or additional stormwater management.

1.2.5: Port of Portland

What: Added more detail about when the SWMM applies to Port Properties and when it does not.

Why: To directly state the applicability of the SWMM to projects on Port property.

1.2.6: Applicability to City Projects

What: Minor changes to this section including specifying that City projects that propose activities described in the applicability section are required to meet the full requirements of the SWMM.

Why: To more thoroughly describe which City projects must meet the specific requirements of the SWMM and which have more flexibility.

Who will this impact: City of Portland led projects that trigger SWMM requirements.

1.3 Stormwater Management Requirements

1.3.1: Onsite stormwater management required

What: Highlighted the requirement to provide onsite stormwater management to users.

Why: To create a specific section for this requirement rather than including it with other information.

1.3.2: Facility Selection: Vegetation and Infiltration

What: Outlined BES' preference for vegetated and infiltration facilities. Moved this to a stand-alone requirement instead of keeping it embedded in the infiltration and discharge hierarchy.

Why: To separate out facility type selection from receiving system identification because they are distinct decisions. BES' commitment to infiltration and vegetated facilities is maintained.

Who will this impact: Minimal impact is anticipated because onsite infiltration and vegetated facilities are still preferred.

1.3.3: Infiltration and Discharge Hierarchy

What: Changed the infiltration and discharge hierarchy to focus on the receiving system.

- Removed the term impervious area reduction technique as a category in the hierarchy.
- Added an ecoroof exception to the hierarchy to allow qualifying ecoroofs to bypass the requirement to provide onsite infiltration.
- Merged category 1 (onsite infiltration with vegetated facilities) with category 2 (onsite infiltration with subsurface infiltration facilities, UICs). These are the new level 1.
- Removed discussion of facility type selection from the hierarchy.
- Changed the term used in the hierarchy from "categories" to "levels" to minimize confusion between manual versions.

Why: This change in the organization of the language better acknowledges that the receiving system drives facility selection and that onsite infiltration is the highest priority for BES.

Who will this impact: The policies have not changed and therefore no new impacts are anticipated.

1.3.4: Level 1: Infiltration Requirements

Hierarchy Levels

What: Combined hierarchy categories 1 (onsite infiltration with a vegetated infiltration facility) and 2 (onsite infiltration to a subsurface infiltration facility, UICs) into the new level 1.

Why: To align projects with onsite infiltration into one level.

Groundwater Separation

What: Added a requirement to provide 5 feet of separation to seasonally high groundwater for surface infiltration facilities.

Why: To protect groundwater quality and to guide better facility design.

UIC Sizing for Installations Without Escape Routes

What: Specified requirement to size UICs with no overland escape route to infiltration the 100-year storm event.

Why: To maintain the conservatism of this requirement even though the general escape route requirement was lifted.

Who will this impact: This will impact drywells constructed below-grade under buildings, and potentially other similar installation types.

1.3.5: Level 2: Separated Storm System Requirements

Water quality design storm

What: Increased the water quality design storm to 1.61 inches.

Why: To continue to meet State environmental permit requirements.

Who will this impact: Projects that are constructing flow-through vegetated facilities for water quality treatment only (including facilities designed using the PAC). The water quality storm for rate-based facilities is not changing.

Flow Control Requirements: General

What: Added explanation of flow control requirements based on system needs: hydromodification, pipe capacity, or no flow control required.

Why: To better communicate what flow control is required and how that varies depending on the part of the separated storm system the site discharges to.

Who will this impact: Projects in the MS4 area that discharge offsite.

Flow Control Requirements: 2-year Event

What: Changed flow control requirements for discharge to surface water bodies to limit one-half of the 2-year post-development peak runoff rate to one-half of the 2-year pre-development peak rate. Applied additional exceptions for flow control for certain situations specified in Chapter 2.

Why: To increase performance of flow control facilities by requiring more orifice control and to update requirements to facilitate that change.

Who will this impact: Projects in the MS4 area that are required to meet flow control requirements.

1.3.5: Level 3: Combined Sewer System Requirements

What: Provided additional clarity on BES' preference to avoid construction of lined facilities in the ROW, in the combined sewer area, when there isn't a local system need.

Why: To match bureau policy, preserve resources, and avoid construction of facilities when there isn't a system need.

Who will this impact: Projects in the ROW in the combined sewer system where infiltration is not feasible may be requested to pay the Special Circumstances fee rather than construct a facility.

1.4: Receiving System Requirements

What: Combined information from the 2016 SWMM hierarchy sections into a new Receiving System Requirements section that covers requirements for the ultimate destination of stormwater from a site. This section also specifies the need to identify and provide an approvable receiving system.

Why: To focus the hierarchy on facility design and performance requirements. This section provides guidance on receiving system requirements (groundwater, storm only, combined, and existing facilities).

Who will this impact: All projects whether they infiltrate onsite or discharge offsite.

1.5: Stormwater Master Planning

What: Changes to this section were limited to improving clarity and readability.

1.6: Operations and Maintenance Requirements

What: Separated requirements for public ROW facilities from requirements for facilities on properties. Changed the terminology for public ROW facilities from "O&M" to the "maintenance warranty period."

Why: Improve clarity and align with actual operations and maintenance processes.

1.7 Decommissioning Stormwater Facilities

What: Added a new section to discuss procedures for decommissioning existing stormwater facilities.

Why: Provided standards and guidance for removing existing stormwater facilities.

Who will this impact: Projects requesting to decommission existing stormwater facilities.

1.8 Special Circumstances

What: Added a staff review special circumstances process that allows sidewalk, ADA and safety only projects to pay the offsite management fee without providing specific feasibility analysis. Permit review staff will have the authority to approve the fee.

Why: To acknowledge that for these project types it is assumed that building a separate stormwater facility for this area is infeasible. This facilitates implementation of removing exemptions for sidewalk only and ADA projects.

Who will this impact: The Staff-Review Special Circumstances is available to projects or portions of projects that require stormwater management and propose one or more of the following:

- A project that creates, expands or replaces sidewalk and other pavement in the sidewalk corridor behind an existing curb in the ROW;
- A project that creates, expands, or replaces pedestrian paths or walkways that cannot be otherwise managed; or
- A project that adds or replaces impervious area to meet ADA requirements.

1.9 Administrative Reviews and Appeals

Language in this section was updated in the 2016 SWMM as part of a larger code and rule update. These changes are also included in the 2020 SWMM and more clearly state what decisions can be reviewed through an administrative review process. These changes align with recent updates to Portland City Code Title 17 and associated BES administrative rules regarding administrative reviews and appeals.

1.10 Enforcement

What: Added a section about enforcement authority for the SWMM. BES is not adding any additional enforcement authority to this section. This section specifies the code authority and rules that are applicable to SWMM compliance.

Why: To improve clarity.

Who this will impact: Anyone in violation of the requirements of the SWMM.

1.11 Relationship to Other Requirements and Standards

What: Updated this language to minimize duplicative information in the SWMM and to incorporate any relevant changes to other requirements.

1.12 Revision and Amendment Process

What: Updated the BES mailing address.

Chapter 2: Stormwater Facility Selection and Sizing

Chapter 2 describes processes to select and size stormwater facilities. It describes the site evaluation and subsurface investigations, including infiltration testing procedures. It discusses the stormwater facility options given the site characteristics and describes the design approaches available for different types of projects and the sizing methods for each approach.

2.1.1 Site Design Strategies

What: Provided site design strategies for reducing stormwater runoff and retaining flow pathways.

Why: To encourage thoughtful site design strategies to facilitate stormwater management.

2.1.2. Design Approach

What: Provided more specificity regarding when the Simplified Approach is not authorized and when the Presumptive or Performance Approaches might be used. For example, the Simplified Approach is allowed for a private street if all of the stormwater runoff from the street drains to a drywell.

Why: To improve clarity for which approach is allowed/required based on the project and proposed stormwater facilities.

2.2 Site Evaluation

What: Developed a new site evaluation section that focuses on needed site investigations and ties those to stormwater facility design and submittal requirements.

Why: To better align site evaluation requirements with the planning and design process.

2.2.1 Location

What: Provided additional information regarding site location, including:

- Plan Districts, and how they might impact stormwater selection for ecoroofs.
- Environmental Overlay zones.
- City stormwater systems, including a map of the systems and a description of how the systems impact design.

Why: To provide additional guidance for project planning and improve clarity.

2.2.4 Setbacks

What: Updated the following:

- Removed setbacks for surface infiltration facilities adjacent to the right-of-way.
- Identified what does not require setbacks.
- Updated section about drywells under buildings (such drywells must be sized to the 100-yr event).
- Included setbacks for mini drywells, rain gardens, filter strips, downspout extensions and ponds.
- Added discussion for projects that propose to encroach into setbacks.
- Removed setbacks for 10% slopes.

Why: To update requirements and provide clarity.

2.2.5 Subsurface Conditions that could Restrict Infiltration

What: Updated the following:

- Added a statement that “Infiltration facilities must be at least 5 ft above seasonal high groundwater, unless otherwise approved by BES”
- Added a significantly expanded discussion on infiltration at contaminated sites and how to determine if a site is contaminated.
- Added discussion of infiltration in fill soils.

Why: To provide specificity.

Who this Will Impact: Projects proposing infiltrating in fill, in contaminated sites or possibly contaminated sites, or in sites with shallow groundwater.

2.3 Infiltration Testing and Related Subsurface Investigations

What: Provided information and updates on the following:

- Boring depth requirements and soil classification requirements
- Depth to groundwater measurements
- Infiltration tests in fast and slow draining soils
- Minimum number of infiltration tests required
- Maximum required depth for infiltration testing (30 feet below ground surface)
- Criteria for waiving the infiltration test requirement based on site conditions
- Contact information for assistance regarding infiltration testing requirements
- Safety guidance for simple pit tests
- Depth of simple pit test: 2 ft for facilities up to 2 ft deep; 3 ft for facilities deeper than 2 ft deep
- Determination of whether an excavation can maintain a water head
- Pre-soak time for excavations that can maintain a water head (1 hour)
- Minimum volume of water for the direct infiltration test (250 gallons)
- Minimum interior diameter for encased infiltration tests: 4.25 inches for excavations 20 ft or deeper and 6 inches for excavations less than 20 ft deep
- Maximum water depth for encased infiltration test: the borehole encasement should not be filled more than one inch less than the depth of the first section of the pipe to prevent water from escaping the pipe joints.
- Submittal requirements

Why: To improve the quality of submittals and accommodate the range of conditions in Portland. The changes better align infiltration testing methods with other site geotechnical investigations.

Who this Will Impact: All projects requiring infiltration testing to determine infiltration feasibility and inform stormwater facility design. For many sites, infiltration testing will take less time than under current requirements.

2.4 Conceptual Design Development

What: Updated to include:

- A table of stormwater facility options based on site conditions
- Summary of dispersal facilities
- Escape routes are now recommended, not required
- Summary of facilities requiring overflow pipes and/or underdrains
- Discussion about area trading and other design considerations

Why: To improve guidance and submittals.

2.5 Stormwater Facility Selection, Sizing, and Design

What: Provided new tables to summarize the requirements and describe what facilities can be used to meet different requirements.

Why: To clarify the requirements.

2.5.1 Simplified Approach

What: Summarized the simplified approach design requirements and added a summary of impervious area limitations.

Why: To clarify the requirements.

2.5.2 Presumptive Approach

What: Updated as follows:

- The water quality storm is 1.61 inches
- Provided predevelopment curve numbers to use based on the site's soil type.
- Added orifice control and set limits on the minimum orifice diameter.
- Referred to the flow control requirements under the Performance Approach (section 2.5.3); these requirements are built into the PAC.
 - For facilities required to meet Level 2 requirements, other than those that discharge to the Willamette River, Columbia Slough, or Columbia River, removed the requirement to reduce the 2-year, 24-hour post-development peak outflow to no more than $\frac{1}{2}$ the 2-year, 24-hour pre-development peak outflow and replaced this with a requirement for the $\frac{1}{2}$ the 2-year, 24-hour post-development peak outflow to be reduced to no more than $\frac{1}{2}$ the 2-year, 24-hour pre-development peak outflow.
 - Added design criteria for peak flow reduction requirements: Sites that cannot meet the flow control requirements within the standard facility design parameters should be sized to filter the 25-year, 24-hour storm event without overflow and with no orifice.
 - Added design criteria for peak flow reduction requirements: Lined right-of-way facilities in the MS4 area will not be required to control the 25-year, 24-hour storm event.
 - Updated the 25-year, 24-hour design storm to 3.8 inches in 24-hours.

Why: To continue to meet regulatory requirements. To align flow control requirements for improved reliability in combination with increasing use of orifice control. The 25-year, 24-hour storm event update was to correct a typo in the previous SWMM.

Who this Will Impact: The revised water quality storm depth impacts stormwater facilities designed using the presumptive approach that do not fully infiltrate the 10-yr, 24-hr design storm and do not discharge to the combined sewer system. Stormwater facilities designed using the presumptive approach that require flow control will change in size, some will get smaller some will get bigger. Generally, facilities in the combined system will get smaller and facilities in the MS4 and water-quality-only facilities will get bigger.

2.5.3 Performance Approach

What: Updated as follows:

- The water quality storm depth is 1.61 inches.
- For facilities required to meet Level 2 requirements, other than those that discharge to the Willamette River, Columbia Slough, or Columbia River, removed the requirement to reduce the 2-year, 24-hour post-development peak outflow to no more than $\frac{1}{2}$ the 2-year, 24-hour pre-development peak outflow and replaced this with a requirement for the $\frac{1}{2}$ the 2-year, 24-hour post-development peak outflow to be reduced to no more than $\frac{1}{2}$ the 2-year, 24-hour pre-development peak outflow.
- Added design criteria for peak flow reduction requirements: Sites that cannot meet the flow control requirements within the standard facility design parameters should be sized to filter the 25-year, 24-hour storm event without overflow and with no orifice.
 - Added design criteria for peak flow reduction requirements: Lined right-of-way facilities in the MS4 area will not be required to control the 25-year, 24-hour storm event.
 - Updated the 25-year, 24-hour design storm to 3.8 inches in 24-hours.
- Projects choosing to meet standard pollution reduction requirements with MSTTs must use products on the City's approved list of devices.
- Pond must treat $\frac{1}{2}$ the water quality storm as well as the water quality storm.
 - Referred to the Presumptive Approach Section (2.5.2) for predevelopment curve numbers to use based on the site's soil type when using the Santa Barbara Urban Hydrograph method.
 - Added orifice control and set limits on the minimum orifice diameter.
 - Added a 30-hour drawdown time for some facilities and the reference points for measuring drawdown for different facilities.

Why: To continue to meet regulatory requirements and provide consistency. Flow control requirement changes are to align flow control requirements for improved reliability in combination with increasing use of orifice control. The 25-year, 24-hour storm event update was to correct a typo in the previous SWMM.

MSTTs on the City's approved list have verified performance that meets the City's standard. Setting predevelopment curve numbers will reduce guess work when designing stormwater facilities. Orifice control will improve performance reliability for flow control facilities.

Who this Will Impact: Facilities designed using the performance approach. The revised water quality storm depth impacts non-rate-based stormwater facilities designed using the performance approach that do not fully infiltrate the 10-yr, 24-hr design storm and do not discharge to the combined sewer system. Stormwater facilities designed using the performance approach that require flow control will change in size, some will get smaller some will get bigger.

Chapter 3: Private Stormwater Facilities

This chapter contains requirements and guidance for designing facilities on private property. In the 2016 SWMM the information for private facilities and right-of-way facilities was in a single chapter; creating separate chapters should make the information easier to access.

Tree Credit for Use on Private Property (Removed)

What: Removed the stormwater management credit for trees on private property. (It's still an option for projects in the right-of-way.)

Why/Impact: Few sites used the credit and most that did also constructed stormwater facilities. For those sites, stormwater facilities will need to be sized for a slightly larger area.

3.2.1: Ecoroofs

What: Removed the term "impervious area reduction techniques" and created this section.

Why: The infiltration and discharge hierarchy has been simplified for ease of use.

3.2.1.1: Ecoroofs

What: Provided details about criteria under which BES will waive the requirement for evaluation of onsite infiltration when an ecoroof is constructed.

Why: To clarify when ecoroof projects can be exempted from infiltration testing.

What: Updated the requirements to allow for roofs with deeper growing media and more diverse plant pallets.

Why: To provide more flexibility in response to the ecoroof requirement in the Central City 2035 Plan.

What: Added guidance for sizing ecoroofs for flow control.

Why: To provide sizing guidance for ecoroofs that cover only part of a roof to determine how those roofs meet flow control requirements in the CSO and MS4 areas.

Who this will impact: Projects with partial ecoroof coverage on sites that require flow control.

3.2.2: Bioretention Facilities

What: Combined general design and construction requirements for raingardens, basins, and planters into one section.

Why: To improve clarity and reduce repetition.

What: Removed swales as a separate bioretention facility type.

Why: To reduce confusion about facility types: in the 2016 SWMM, swales were a separate facility type although they shared the same x-section as basins. (Grassy swales, which are predominantly used for conveyance and treatment, remain as a separate facility type in Section 3.2.5.)

What: Lined basins are no longer allowed under the Simplified Approach.

Why: There were too many problems with construction issues such as liner attachments.

What: Added guidance for use of orifices under the Presumptive and Performance approaches. The minimum orifice size is now 3/8" for filtered flow (e.g. flow coming out of an underdrain). The minimum size is 1" for orifices taking some unfiltered flow (e.g., overflow).

Why: To improve flow-control performance.

What: Added the following design details for bioretention facilities

- Underdrain setup - slotted pipe and single aggregate (PRE and PER Approaches)
- Orifice configurations (PRE and PER Approaches)
- Check dams
- Surface flow dissipator

3.2.3: Dispersion Facilities

What: Grouped filter strips, driveway center strips, and downspout disconnections together

Why: To group similar facility types.

3.2.3.1: Filter Strips (SIM and PER Approaches)

What: Expanded the applicability of filter strips – they can be designed for paths up to 12 feet wide and with more than 500 sf of IA. Added design guidance for sizing filter strips for water quality, flow control, and disposal.

Why: Promote the use of filter strips where other facilities aren't feasible

Who this will impact: For sites that meet the conditions, vegetated slopes adjacent to paths and sidewalks can serve as a filter strips.

3.2.3.2: Driveway Center Strips (SIM Approach)

What: Created a separate facility type for driveway center strips - they were previously included as a type of filter strip.

Why: To allow for ease of use and to provide more detailed design information.

3.2.3.3: Downspout Extensions (SIM Approach)

What: Limited the use of downspout extensions to existing development (retrofits).

Why: BES has concluded this facility type is unsuited to new construction because of problems with planning and implementation.

3.2.4 Subsurface Infiltration Systems (UICs)

3.2.4.2: Drywells

What: Updated the SIM Approach sizing table to reduce maximum catchment areas.

Why: To ensure drywells are sized adequately to provide onsite disposal.

Who this will impact: Some SIM Approach sites will need to install drywells that are larger than under the 2016 SWMM. Most sites will be able to use the same size.

What: Added more guidance for small plastic drywells.

Why: To ensure designs including small drywalls are suitable for the circumstances.

What: Provided more guidance for sizing Performance Approach drywells.

Why: To clarify sizing requirements.

Who this will impact: Sites that have impervious areas greater than those covered in the SIM table and those that are designing drywells for events other than the 10-year event.

What: Provided guidance for post-construction testing of drywells.

Why: Designers requested this guidance.

Who this will impact: Designers of drywells that don't meet setback requirements (e.g. drywells under buildings) and designers who want to confirm the capacity of a drywell or are intending to adjust the total number of drywells required at a site based on results from the first drywell.

3.2.5 Other Stormwater Facilities

3.2.5.1: Manufactured Treatment Technologies (MSTT)

What: Clarified when the use of the City's list of approved MSTTs is required.

Why: To ensure that MSTTs used to comply with SWMM water quality requirements have been approved for use in Portland based on an independent certification process.

3.2.5.4: Surface Sand Filters (SIM and PER Approach)

What: Added surface sand filters as a new facility type.

Why: To add this as an option for heavily-shaded sites where planters aren't feasible.

3.3 O&M Requirements & Submittals

What: Moved O&M requirements to the private facility chapter from its own chapter.

Why: For easy access by designers.

3.4 Submittal Requirements

What: Updated submittal requirement section to clarify what is expected for permit review.

Why: To help streamline the process.

Chapter 4: Right-of-way facilities

This chapter contains technical information and design requirements for stormwater facilities in the right-of-way. In the 2016 SWMM this information was combined with requirements for facilities on private property. Creating separate chapters for public and private design requirements should make the information easier to access.

4.2 Vegetated Stormwater Facilities (Green Streets)

4.2.2 Guidelines for Site Design

What: Added guidance for pedestrian circulation, maintenance access, drop height between the sidewalk and facility bottom, and barriers.

Why: To standardize current best practices and to improve public safety.

Who this Will Impact: The changes will improve safety for pedestrians (in particular the visually impaired), vehicles, and maintenance staff.

What: Removed references to swales. The sloped facility worksheet or the basin option can be used to design facilities with sloped sides.

Why: To reduce confusion about facility types by consolidating the language.

4.2.2.1 Additional Site Design Guidelines for Curb Extensions

What: Information specific to designing curb extensions for emergency access, ADA requirements, pedestrian and vehicle safety, parking, and maximum/minimum length and widths.

4.2.2.2 Additional Site Design Guidelines for Furnishing Zone/Planting Strip Facilities

What: Information for designing behind the curb-face for parking, and maximum/minimum length and widths. Dimensions have been changed and clarified for facilities in the planting strip, or between the sidewalk and the curb. The minimum width when both sides are sloped is approximately 11 feet – 6 inches, as measured from the back of curb to the sidewalk, including a 2-foot flat bottom. Side slopes are not allowed in PBOT Pedestrian Districts adjacent to sidewalks.

Why: To increase the space-efficiency of stormwater facilities, reduce the maintenance burden associated with side slopes, and reduce soil loss adjacent to sidewalks that can leave them without adequate structural support.

Who this Will Impact: In some cases, designers will be required to use more planter walls. This is not intended to require more ROW dedication, but to discourage the use of side slopes. Other options that fit into an 8' planting strip include SW-301, SW-302, SW-303.

4.2.3 Guidelines for Stormwater Design

What: Inlet requirements. Added requirements for inlet sizing, placement and quantity, including tables to use with planting strip facilities for different design storms.

Why: To improve facility performance by designing inlet capacity to increase the likelihood of stormwater entering facilities.

What: Added forebay requirements for some street classifications

Why: To protect facility capacity and performance; for maintenance efficiency.

Who this Will Impact: Designers of facilities serving higher-traffic streets.

4.2.4 2-Year Maintenance Warranty

What: The party responsible for performing the work will be required to sign the form.

Why: So that establishment requirements are communicated to the party doing the work.

4.2.5 Details and Drawings

What: Moved approximately 15 details to the [City of Portland Standard Details](#).

Why: Provide consistent details for construction and maintenance.

What: Made a variety of changes to details in the SWMM both the SW drawing series (typical design details in the SWMM) and the details now included as City of Portland Standard drawings.

Why: To standardize construction, improve conditions for plant health and overall maintenance, standardize current best practices, and improve public safety.

- Swales, SW-300, SW-303, SW-305: Required 2 ft flat bottom, increasing min. width.
- Check Dams, SW-312 – SW-315: Required concrete check dams; remove wood detail. Additional details give guidance for different configurations, including weep hole spacing
- Inlets, [P-301](#), [P-303](#), [P-304](#), [P-305](#), [P-306](#), SW-310: Added modifications to inlets, including typical dimensions.
- Metal Inlet with G-1 or G-2 Grate, [P-305](#): Provided new detail for use on steep slopes, or where there are concerns about water entering the facility.

Soils and Underdrain

- Underdrain Pipe, SW-316 – SW-318: Changed from perforated pipe to slotted pipe, truncated the underdrain pipe, and will require orifice (3/8 in. minimum) to meet flow control when an underdrain is used.
- Soil depth, SW-316: Reduced depth of blended soil to 12" when there is not a rock gallery and increased depth of blended soil to 24" when there is a rock gallery.
- 01040 Blended Soil specification: The specification was updated in 2019.
- Rock gallery specification: Changed from 3" of $\frac{3}{4}$ " – no.4 aggregate with $\frac{3}{4}$ " – $1\frac{1}{2}$ " drain rock to a single aggregate (angular $\frac{1}{4}$ " – no.10) to simplify installation.

Utility Coordination

- Utility Coordination, Sewer Service Requirement Under Green Streets, [P-331](#): Added detail with information for a lateral cleanout under a stormwater facility.
- Utility Coordination, Water Assets, [P-332](#), [P-333](#): Reorganized and clarified vertical and horizontal setbacks from Water Bureau assets.
- Street Trees in Facility with Rock Gallery, SW-321: Removed requirement to over-excavate for the tree planting; added requirement for a pedestal of native soil to be left during construction at the location where the tree will be planted.

4.4 Manufactured Stormwater Treatment Technologies

What: Added requirement to size the facility to manage the full catchment area and install a sedimentation maintenance hole as pretreatment.

Why: Standardize maintenance and design practices across the Bureau.

4.6 Tree Credit

What: Removed the required 10' distance from new impervious pavement, modified the credit given per tree, removed the maximum percent of impervious area that can be managed, and removed the nuisance tree exemption for credit. Simplified the calculation method. The tree credit will only apply in the ROW.

Why: Make it easier to use the tree credit in the ROW because the canopy is more likely to be over impervious area. Modified credit given per tree to balance out removing the maximum percentage of impervious area that can be managed. These changes are more practical for linear ROW projects.

Who this Will Impact: All street trees will receive credit in the ROW making the credit more applicable to linear projects.

4.9 Submittal Requirements

What: Updated submittal requirements for permit review.

Why: To help streamline the process.

[Chapter 5 – Drainage Reserves](#)

Drainage reserve requirements were located throughout the various chapters of the 2016 SWMM. The primary change to drainage reserve requirements in the 2020 SWMM was to consolidate all drainage reserve requirements into chapter 5, which will make it easier to find and understand information about drainage reserve applicability, exemptions and requirements. Other changes to drainage reserve requirements are listed below.

5.1.1 Importance of Protecting Drainageways

What: A new narrative was added to provide additional background on the importance of drainageway protections.

Why: Language was added to support the importance of protecting drainageways for water quality and flow conveyance. Language was also added to support the importance of removing invasive vegetation and the use of native plants in drainage reserves.

5.2 Applicability

What: A new applicability section was added.

Why: Clarity and transparency is improved regarding when drainage reserve requirements apply and when drainage reserve requirements are exempt.

Who will this impact: Applicability and exemptions will apply to any site with an identified drainageway.

5.5 Drainage Reserve Encroachments

5.5.1 Allowable Encroachment Activities.

What: A new section was added: 5.5.1 Allowable Encroachment Activities. Allowable encroachment activities include the following (additional restrictions apply):

- Soft surface trails.
- Maintenance and repair of culverts and water crossing structures.

- Operations, maintenance and repair of drainage facilities managed by Drainage Districts as defined in Chapter 33.430.
- Removal of nuisance plants.
- Replanting with native vegetation.
- Split rail fencing.
- Installation of temporary fencing.
- Single outfalls 4 inches or smaller.
- Underground utility infrastructure.
- Temporary emergency procedures.

Why: The new section improves clarity regarding the difference between exemptions for drainage reserve requirements and when encroachments are allowed but are still subject to BES review.

Who will this impact: It is now clear that projects proposing any of the above listed activities within the drainage reserve do not need to go through full review for the proposed encroachment. The list of allowable encroachments includes activities that have a relatively low impact to drainage reserves, as determined by BES.

5.5.2 Encroachment Requirements.

What: Mitigation requirements were clarified in Section 5.5.2 Encroachment Requirements.

Why: More clarity is provided on different mitigation requirements for permanent and temporary disturbance areas.

Who will this impact: Mitigation requirements apply to projects that propose drainage reserve encroachments that trigger mitigation requirements.

5.6 Planting Requirements

What: Planting densities for drainage reserve buffer encroachments and drainage reserve channel encroachments were reduced.

Why: Planting densities are reduced to better match best practices for restoration planting.

Who will this impact: Planting requirements apply to projects that propose an encroachment that is not listed as an allowable encroachment in Section 5.5.1.

5.7 Drainageway Design and Determining Drainageway Capacity

What: Design requirements for encroachments were clarified.

Why: Site analysis requirements are now limited to only require additional investigations and analysis for projects that propose an encroachment. Additional design guidance differentiates design guidance for natural channels, artificial channels and piped systems.

Who will this impact: These requirements apply to projects that propose to alter or move a drainageway.

5.8 Crossings, Bridges and Culverts

What: Guidance was added for crossings, bridges and culverts.

Why: Additional design guidance clarifies design requirements for crossings over natural stream bed systems versus artificial channels.

Who will this impact: These requirements apply to projects that include a crossing or a culvert in a drainage reserve.

5.9 Drainage Reserve Submittal Requirements

What: Additional guidance was provided for submittal requirements. Key changes include:

- Survey information is only required for projects with drainageways within 50 feet of the disturbance area.
- Detailed survey information of the drainageway is only required for sites that are proposing encroachments.
- Engineering calculations are only required for projects that may impact the conveyance capacity of the drainageway.

Why: Additional guidance is provided to tailor requirements to the level of impact to the drainage reserve.

Who will this impact: This will apply to projects that have a drainageway located on the site. Sites proposing fewer impacts will be required to do fewer site investigations and provide less design information.

5.10 Notice of Drainage Reserve and Operations and Maintenance (O & M)

What: Drainage reserve operations and maintenance requirements were updated. A Notice of Drainage Reserve Form was added, which will be used when a drainageway and reserve have not been impacted or when an encroachment into the reserve does not require mitigation. In addition, an O & M form specific to drainage reserves was added, which must be used when encroachments or mitigation require ongoing maintenance.

Why: The previous SWMM used a general O & M for drainageways even when no future maintenance was necessary. The proposed changes improve clarity and no longer require ongoing maintenance for situations when no encroachment or mitigation occurred.

Who will this impact: All sites with drainageways that require a drainage reserve.

5.11 Enforcement

What: A separate enforcement section was added.

Why: A new section was added to indicate which existing regulations apply to drainage reserve enforcement.

Who will this impact: Enforcement requirements apply to unauthorized encroachments and adverse impacts within the drainage reserve, and failures to comply with O & M Plans.

[Chapter 6: Vendor List Submittal Requirements](#)

This is a new chapter that describes submittal requirements for vendors applying to have their products added to BES' list of approved Manufactured Stormwater Treatment Technologies (MSTTs) or List of Vendors of the Blended Soil Specification for Vegetated Stormwater Systems.

What: The review process for MSTT applications has been simplified – a third party review is no longer required.

Why: Performance standards for the WA TAPE testing protocol, which are the basis for the application, either meet or exceed Portland's performance requirements.

What: Updated the list of considerations and conditions BES may apply when approving or denying approval for the use of an MSTT in the City of Portland.

Why: For transparency in decision-making.

What: Required a delay of at least two years between the certification of an MSTT by the Washington TAPE program and submittal of an application for approval in Portland.

Why: To ensure applicants will successfully meet Portland's application requirement for documentation about operations and maintenance needs to ensure continued performance.

[Engineering Assumptions and Presumptive Approach Calculator \(PAC\) changes](#)

PAC Update

What: The PAC has been updated to accommodate the proposed changes in the SWMM, including the truncated underdrain and orifice control.

Increasing the assumed infiltration rate of the blended soil from 2 in/hr. to 6 in/hr.

Why: To better match observed performance and to minimize the impact to facility sizes of increasing the water quality storm event.

Who this will impact: Some facility sizes will change. In some instances, design elements other than the blended soil will be the limiting factor. Water-quality-only facilities will increase in size by a small amount, some infiltration facilities can get smaller, and flow control facilities will be sized with orifice control rather than the soil.

Using more orifice control in lined facilities with a minimum orifice size of 3/8".

Why: To better meet flow control performance objectives.

Who Will this Impact: For some facilities designed to meet Levels 2b, 2c, and 3 the addition of another element to stormwater facilities will require additional attention from designers and will increase maintenance needs.

Set standard pre-development curve numbers based on hydrologic soil group

Proposed Numbers: A: 65; B: 72; C: 79; D: 81

Why: To remove guesswork and improve feasibility of meeting flow control requirements.

Appendix A: Stormwater Design Methodologies:

- Section A.1: Added a section describing the different types of stormwater facilities for sizing.
- Section A.2: Described the change to the water quality storm rainfall depth (from 0.83 inches to 1.61 inches). Used some of the same graphics, but otherwise rewrote this appendix.
- Section A.3: Provided new curve numbers for the Santa Barbara Urban Hydrograph Method and specified the intensities for the Rational Method.
- Section 4: Revised the calculations for the Simplified Approach appendix to be based upon Simplified Approach sizing.
- Section 5: Rewrote the PAC Appendix for the new PAC. The new PAC appendix describes the process of using the PAC and describes each user-entered parameter in detail to help designers understand the PAC. The new PAC appendix also provides an overview of the equations used in the PAC.

Appendix B: Recommended Guidance for Culverts and Outfalls

Changes to this section were limited to improving clarity and readability.

Appendix C: Resources and References

Minor updates were made to update various web links to resources.